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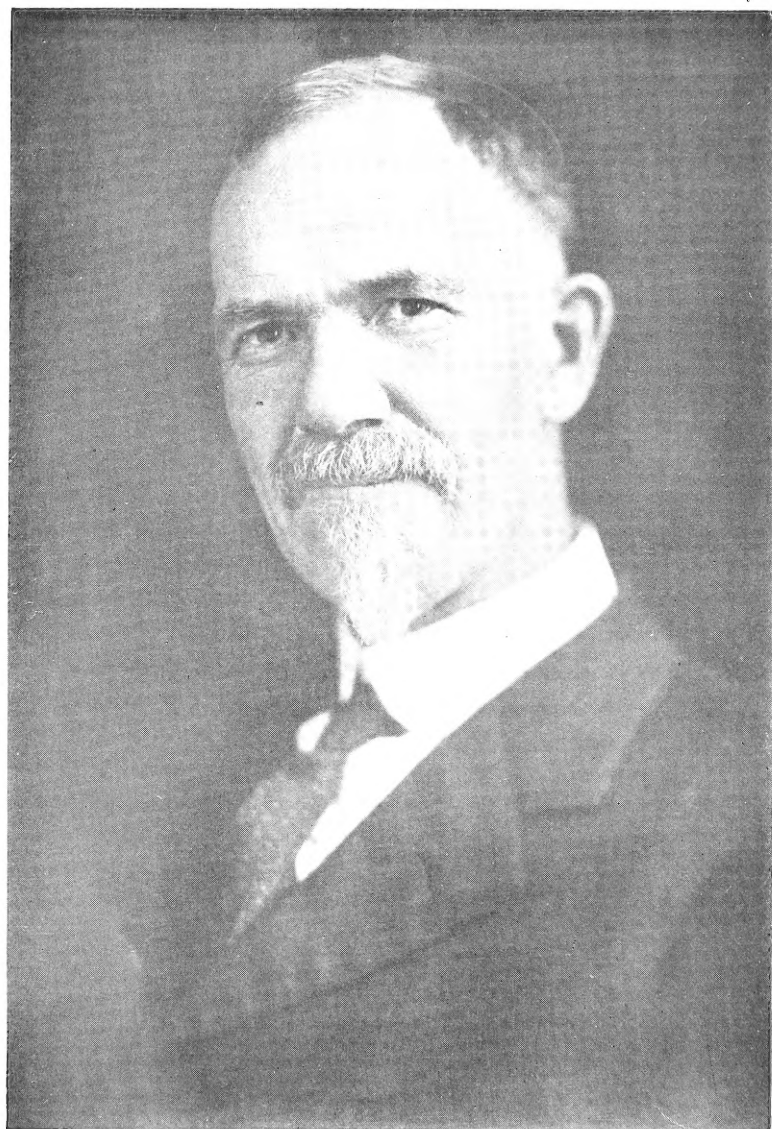
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DR. CHARLES BENEDICT DAVENPORT

President of the Third International Congress of Eugenics, New York, 1932

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A DECADE *of* PROGRESS IN EUGENICS

Scientific Papers *of the*
Third International Congress of Eugenics
held at

American Museum of Natural History
New York, August 21-23, 1932



These papers, and their accompanying exhibits, mark the advance made in the field of eugenics, both as a pure and as an applied science, between the meeting of the Second International Congress of Eugenics in 1921 and of the Third Congress in 1932.

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TO THE MEMORY OF
MRS. E. H. HARRIMAN
FOUNDER OF
THE EUGENICS RECORD OFFICE



"Eugenics is the study of the agencies under social control that may improve or impair the racial qualities of future generations either physically or mentally."

SIR FRANCIS GALTON.

CONTENTS

Introduction: Historical Background of the Third International Congress of Eugenics. Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.....	1
--	---

PART I. SCIENTIFIC PAPERS

SECTION I. ADDRESSES AND MESSAGES

1. Presidential Address: The Development of Eugenics. Dr. Charles B. Davenport, President, Third International Congress of Eugenics, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.....	17
2. Message to the International Congress of Eugenics. Major Leonard Darwin, Sussex, England.....	23
3. Response to President's Address. Professor Corrado Gini, Rome, Italy.....	25
4. Birth Selection versus Birth Control. Professor Henry Fairfield Osborn, Honorary Vice President, Third International Congress, Museum of Natural History, New York.....	29

SECTION II. ANTHROPOMETRIC METHODS; TESTS

1. On the Need of Checking in Anthropometry. Dr. Charles B. Davenport, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.....	45
2. Plan for Obtaining an International Technique in Physical Anthropology. Professor R. Ruggles Gates, University of London, England.....	47
3. Standardizing Measurements of the Living. Dr. Richard H. Post, Smith College.....	48
4. The Unification of the Anthropological Type of Italians and its Eugenic Effects. (English Abstract.) Dr. Marcello Boldrini, Professor of Statistics, Catholic University, Milan, Italy.....	50
5. Bloodgroups in Relation to Race in the Dutch East Indies. Dr. H. J. T. Bijlmer, Ambon, Dutch East Indies.....	51
6. Stability of the Seashore Measures of Musical Talent as shown by Retests. Dr. Hazel Stanton, Eastman School of Music, Rochester, N. Y.....	54
7. The Handwriting of Introverts and Extraverts. Dr. June E. Downey, University of Wyoming.....	67

SECTION III. RACE AMALGAMATION

8. Control of Immigration. Dr. D. F. Ramos, Havana, Cuba.....	79
9. The Eurasian Community as a Eugenic Problem. Henry E. Roseboom and Cedric Dover, Bangalore, India.....	87
10. Volkstumsverbreitung und ihre Ursachen. (Racial Distribution and its Causes.) Dr. Wilhelm Pessler, Hannover, Germany.....	95
11. Harmonic Types among Western European Crania. Ruth S. Wallis, Hamline University, St. Paul, Minnesota.....	99

12. Virginia's Effort to Preserve Racial Integrity. Dr. W. A. Plecker, Bureau of Vital Statistics, Richmond, Virginia..... 105
13. The American People of Polish Origin in Texas. Dr. Boleslaw Rosinski, Institute of Anthropology and Ethnology, Lwow, Poland 113
14. The Effect of Migration on the Natural Increase of the Negro. Dr. S. J. Holmes, University of California, Berkeley, California..... 119
15. Assortative Mating for Color in the American Negro. Irene Taeuber, Mt. Holyoke College..... 124

SECTION IV. EDUCATION AND EUGENICS; SOCIETY AND EUGENICS

16. Eugenics and Education. Dr. G. P. Frets, Rotterdam, Holland..... 131
17. The Dominance of Economics over Eugenics. Dr. H. J. Muller, University of Texas..... 138
18. The Soong Family—An Example of great Ability in the common Man. Rudolf M. Binder, Ph.D., New York University..... 145
19. Types of Data available for Eugenics Research in the United States. Frank Lorimer, Eugenics Research Ass'n., Washington, D. C..... 152
20. The Need of a Course in Medical Genetics in the Medical Curriculum. Dr. Madge T. Macklin, University of Western Ontario, London, Canada..... 157
21. Special Capacities of American Indians. W. Carson Ryan, Jr., Director of Education, U. S. Indian Service..... 159
22. Heredity and Environment—Their Relative Roles in the Development of East Tennessee Mountain Children. Lester R. Wheeler, State Teachers College, Johnson City, Tennessee..... 164
23. Some Aspects of Instruction in Eugenics. Dr. Otis W. Caldwell, Teachers College, Columbia University, New York..... 167
24. The Inadequacy of Census Data for certain Eugenic Investigations. Charles C. Grove, College of the City of New York..... 171
25. Race and Family in the History of the American Institutions. Dr. Wilhelmine E. Key, Somers, Connecticut..... 175
26. Contributory Factors in Eugenics in a Rural State. Professor H. F. Perkins, Director, Eugenics Survey of Vermont, Burlington, Vermont..... 183

SECTION V. POSITIVE AND NEGATIVE EUGENICS

27. Is the Abnormal to become Normal? Dr. Lena K. Sadler, Chicago, Illinois.... 193
28. Selective Sterilization for Race Culture. Dr. Theodore R. Robie, Essex County Mental Hygiene Clinic, Cedar Grove, N. J..... 201
29. Marriage Counselling. Paul Popenoe, General Director, Institute of Family Relations, Los Angeles, California..... 210
30. Health Declaration before Marriage. Dr. Jon A. Mj  en. Oslo, Norway.... 222
31. Report of the Committee for the Study of the Eugenic and Dysgenic Effects of War. Professor Corrado Gini, Rome, Italy..... 231
32. Is War Dysgenic? Professor H. R. Hunt, Michigan State College, Lansing, Michigan..... 244
33. The Genetic Effects of War in Hungary. Dr. Theodore Szel, Budapest, Hungary. 249
34. A Study of the Causes of Prostitution, Especially Concerning Hereditary Factors. Dr. Tage Kemp, University of Copenhagen, Denmark..... 255

35. Il Sordomutismo nel Campo eugenetico e sociale. (Deaf-mutism in relation to Eugenics and Society.) Giulio Ferreri, Milan, Italy..... 264
36. Eugenic, Cacogenic and Socially Inadequate Tendencies in our Population. Dr. J. H. Landman, College of the City of New York..... 266
37. Pennsylvania's Problem in Eradicating Foci of Mental Defect. Dr. Florentine Hackbusch, Dept. of Welfare, Harrisburg, Pennsylvania..... 272
38. Considerations on the Social Factors in Mental Development. Florence Powdermaker, M.D., New York..... 276

SECTION VI. SELECTION; DISEASE; INFERTILITY

39. The Physical Factors in Race Survival. Dr. C. G. Campbell, New York..... 283
40. Hereditary Deforming Chondrodysplasia. Dr. Albert Ehrenfried, Boston, Massachusetts..... 295
41. Selective Elimination as a Factor in Increasing the Immunity of Populations. Dr. Charles Herrman, New York..... 300
42. The Inheritance of Allergy with Special Reference to Migraine. Mildred H. Richards and Ray M. Balyeat, Balyeat Hayfever and Asthma Clinic, Oklahoma City, Oklahoma..... 314
43. Human Infertility. Endocrine Aspects. Dr. Allan Winter Rowe, Evans Memorial, Boston, Massachusetts..... 322
44. Ovarian and Pituitary Modifications Resulting from Sterility Induced by Various Means. Dr. Michael F. Guyer, University of Wisconsin..... 329
45. Is Heredity a Causative Factor in the Manic-Depressive Psychoses? Dr. Horatio Pollock, Benjamin Malzberg and Raymond G. Fuller, State Dept. of Mental Hygiene, Albany, N. Y..... 333
46. Child Hygiene in Human Ecology. Dr. E. Blanche Sterling, U. S. Public Health Service..... 343

SECTION VII. DIFFERENTIAL FECUNDITY

47. Measures to Encourage the Fertility of the Gifted. Dr. J. Sanders, Rotterdam, Holland..... 353
48. The Reduction of the Fecundity of the Socially Inadequate. Sir Bernard Mallet, K.C.B., London, England..... 364
49. A Discussion of Sir Bernard Mallet's Paper on "The Reduction of the Fecundity of the Socially Inadequate." E. S. Gosney, President, Human Betterment Foundation, Pasadena, California..... 369
50. Contra-Selection in England. Mrs. Cora B. Hodson, London, England..... 372
51. Mesures à envisager pour favoriser la Fécondité des Individus les mieux doués. (Proposed measures for the encouragement of fecundity of the best endowed individuals.) Dr. Georges Schreiber, Société Française d'Eugénique, Paris, France..... 378
52. "Aristogenics." Dr. C. Ward Crampton, N. Y. Post Graduate Hospital and Medical School, New York..... 380
53. Birth Rates of Coeducational Graduates. Mrs. Caroline H. Robinson, Swarthmore, Pennsylvania..... 387
54. Evidence of the Rapidly Decreasing Birth Rate in Families in which Highly Intelligent Children Occur. Dr. Margaret V. Cobb, Cambridge, Massachusetts. 403

SECTION VIII. HUMAN GENETICS

55. Genetics of the Human Mind. Dr. C. C. Hurst, Cambridge, England.....	409
56. Heredity in Psychoses. Dr. G. P. Frets, Rotterdam, Holland.....	417
57. Remarks on the Explanation of Heterosis. Professor Corrado Gini, Rome, Italy.....	421
58. Some Results of a Family History Study. Dr. Morris Steggerda, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.....	425
59. Sex-Ratio of New Born Infants as an Index of Vitality. Professor V. Bunak, Moscow, U. S. S. R.....	431
60. Bloodgroups and Inbreeding. Dr. M. A. van Herwerden, University of Utrecht, Holland.....	436
61. Is Eugenics Half-Baked? Robert Cook, Washington, D. C.....	441
62. Sex Differences in the Expression of Autosomal Genes Affecting Human Denti- tion. Dr. F. B. Hutt, University of Minnesota.....	447
63. The Inheritance of Mental Test Abilities. Professor Roswell H. Johnson, Uni- versity of Pittsburgh.....	453
64. A Note on Inherited Variations and Fitness Problems. William W. Graves, M.D., St. Louis University School of Medicine, St. Louis, Missouri.....	457
65. Merging of Ancestral Lines. Anita Newcomb McGee, M.D. Southern Pines, N. C.....	483

PART II. THE EXHIBIT

The Opening.....	486
Classification of Exhibits.....	486
In Entrance Hall.....	487
In Main Hall.....	487
Booth I—Anthropology.....	489
Booth II—Physical Anthropometry.....	490
Booth III—Special Capacities.....	492
Booth IV—The Inheritance of Racing Capacity in the Thoroughbred Horse.....	494
Booth V—The Measure of Racing Capacity in the Thoroughbred Horse.....	495
Booth VI—Model Eugenics Library.....	495
Booth VII—The Eugenics Book Store.....	496
Booth VIII—The Special Senses.....	496
Booth IX—Heredity.....	498
Booth X—Heredity and the Endocrines.....	500
Booth XI—Heredity of Mental Defects.....	501
Booth XII—Population Analysis.....	502
Booth XIII—Population Analysis.....	503
Booth XIV—Heredity of the Eye.....	504
Booth XV—Taste Thresholds.....	505
Booth XVI—Ethnic Survey.....	505
Booth XVII—Cancer.....	505
Booth XVIII—Italian Demography.....	505
Booth XXIX—Laboratory for Child Study.....	506
Booth XX—Laboratory for the Study of Race Problems.....	506
Booth XXI—Social Hygiene and Eugenics.....	506
Cases I to VIII—(Opposite Booths 14 to 21, Third Floor Exhibit) The Natural History of Man.....	507

CONTENTS

ix

Collaboration of the American Museum of Natural History.....	509
List of Plates.....	510
Appendix I—Organization and Membership of the Third International Congress of Eugenics.....	511
Appendix II—International Federation of Eugenic Organizations.....	522
Index.....	527

PLATES

I. Portraits:

- Dr. Charles Benedict Davenport, President of the Third International Congress of Eugenics. New York, 1932.....*Frontispiece*
 Sir Francis Galton, Founder of the Science of Eugenics..... opposite p. 1
 Major Leonard Darwin, President of the First International Congress of Eugenics. London, 1912..... opposite p. 2
 Professor Henry Fairfield Osborn, President of the Second International Congress of Eugenics. New York, 1921..... opposite p. 4

II. The Exhibit:

Twenty-eight Plates following page 510

Plate No.

1. The Relation of Eugenics to Other Sciences
2. The General Entrance View. Third International Exhibition of Eugenics, American Museum of Natural History, New York
3. Panel: What Eugenics is All About
4. Bust of Charles Robert Darwin
5. Bust of Sir Francis Galton
6. General View of Exhibition Hall
7. Pedigree of the Galton-Darwin-Wedgwood Family. A group of closely related family stocks characterized by outstanding capacities in philosophy, science and art. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
8. Family stock of George Washington. Pedigree showing the hereditary stuff out of which his family was made. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
9. Abraham Lincoln: Family stock study. Analysis of inborn qualities of near kin of Abraham Lincoln. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
10. The Near-Kin of Theodore Roosevelt. A biological study of natural inheritance in the Roosevelt family. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
11. The Edison Family. Analysis of the inborn traits of the Edison family stock. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
12. Anthropometric studies of Indians. Maya Indians, Yucatan, Mexico; Jamaica Negroes, British West Indies. Distribution of statures and cephalic indices among North American Indians. Exhibited by Dr. Morris Steggerda, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.
13. The Pure-Sire Method of Race Assimilation in North America. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
14. Anti-Miscegenation Laws of the Several States: 1932. Exhibited by Dr. W. A. Plecker, Registrar, Bureau of Vital Statistics, Commonwealth of Virginia

Plate No.

15. Migration of Negroes. 1910-1920. Exhibited by Professor S. J. Holmes, Berkeley, California
16. Types of Body Build. Exhibited by Dr. Charles B. Davenport, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.
17. Three Charts on Nature and Nurture. Exhibited by Kaiser Wilhelm Institut of Anthropology, Berlin-Dahlem, Germany
18. Mental Disorders in Twins. Exhibited by Dr. Aaron J. Rosanoff, Los Angeles, California
19. Construction of Manuaries and Models of Manuaries. Exhibited by Dr. Heinrich Poll, Anatomisches Institut, Hamburg, Germany
20. A Proposed Census Card for Unifying the Population Census, a Population Registry and Vital Statistics Registration. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
21. Race Descent: American Statesmen. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
22. Race Descent. (a) Inventiveness by Racial Stock in the United States. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
(b) Race Descent of Population in the United States. Exhibited by Capt. John B. Trevor, New York, N. Y.
23. Historical and Legal Development of Eugenical Sterilization. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
24. Differential Fecundity. (a) Population Turnover in Hawaii 1823-1930. Exhibited by Dr. Louis R. Sullivan (deceased), American Museum of Natural History, New York City, and Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
(b) Outcome of Differential Fecundity. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
25. Fertility and Population Studies. Exhibited by Kaiser Wilhelm Institut for Anthropology, Berlin-Dahlem, Germany
26. Mechanism of Mendelian Heredity. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.
27. Expectation of Mental Disease, Rates of Incidence. Expectation of Life of Insane and Death Rates of Insane. Exhibited by N. Y. State Department of Mental Hygiene, Dr. Horatio M. Pollock, Director, Albany, N. Y.
28. Specialized Tests for Sense of Elegance. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, N. Y.

III. Panoramic View of the Third International Congress of Eugenics, American Museum of Natural History, New York, August 22, 1932 *opposite page 510*

The officers of the Third International Congress of Eugenics wish hereby to record their appreciation of the generous action of the Carnegie Institution of Washington in making a grant of Eleven Hundred Dollars toward the expense of publishing these Proceedings. Our heartiest thanks are herewith extended to the Institution.

MANAGING COMMITTEE



SIR FRANCIS GALTON
Founder of the Science of Eugenics

HISTORICAL BACKGROUND OF THE THIRD INTERNATIONAL CONGRESS OF EUGENICS

HARRY H. LAUGHLIN

Eugenics Record Office, Cold Spring Harbor, N. Y.

Eugenics as a pure science has for its purpose the discovery of fundamental truth about race and family-stock improvement. It is therefore, like all science, international in character. It belongs to humanity rather than to any one nation or race. Applied eugenics, like religion, is essentially something for belief and practice; it is not a thing which works well if its imposition on one nation or family is attempted by another.

Every nation, race and family-stock must set up its own standards of hereditary constitution in physical, physiological and spiritual qualities. The elements of such ideals do and should vary greatly, for specialization in national purpose and family talent is essential and must be developed and conserved. It is thus that the fundamental elements for eugenics are applicable to all nations, and it is therefore necessary, for the sound advance of eugenics both in theory and application, to develop a strong international organization.

The following summary, here printed as a matter of historic record, shows how such a world-wide organization has been built up.

Sir Francis Galton, the founder of the science, was also the founder of the first modern eugenics society: "The Eugenics Education Society of Great Britain." In the leadership of this Society, Sir Francis Galton was succeeded by Major Leonard Darwin.

FIRST CONGRESS, LONDON, 1912

By 1912 the scientific advance of eugenics in many different countries seemed to warrant an International Congress. Accordingly, Major Darwin, in the name of the Eugenics Education Society of Great Britain, sent invitations for the First Congress to (1) all societies studying eugenics, race-hygiene and heredity; (2) suggesting delegates from public bodies occupied in administration, education, religion, medicine and law; and (3) inviting all who were interested in the various aspects of eugenics and social reform.

Accordingly, the First International Congress of Eugenics duly assembled in London in July, 1912. As intended, it proved to be a congress of

eugenicists from many different countries met to discuss the progress made in their several nations, in both pure and applied science, and for indicating the most profitable lines of future eugenical research and practical endeavor.

A number of interesting and able papers were presented. English, French, German and Italian were on an equal footing, and abstracts of papers were printed in these several languages.

The First International Eugenics Congress, besides offering the opportunity to interchange ideas among individuals from widely separated countries, created a wide-spread interest in eugenics in the public at large.

Publications of the Congress were: Volume I, "Problems in Eugenics," which contained the scientific papers presented to the Congress, and Volume II, the proceedings of the Congress.

Under the direction of the Exhibition Committee, studies in different types of heredity were shown, and a Catalogue of the Exhibition was published.

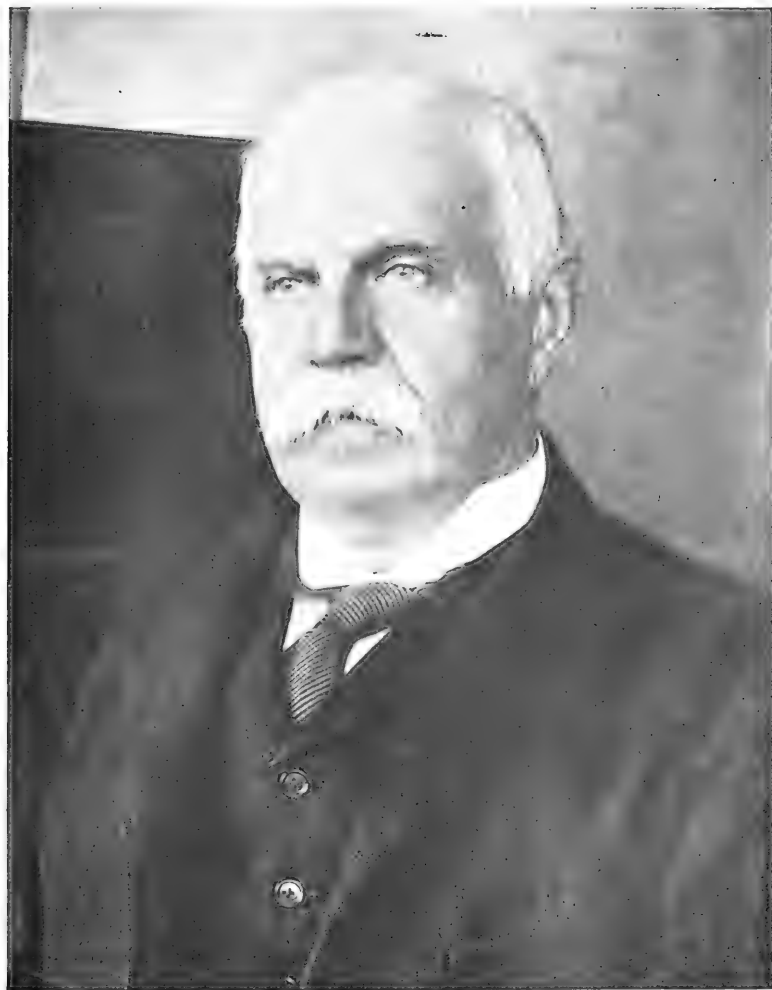
INTERNATIONAL FEDERATION OF EUGENIC ORGANIZATIONS

At this point the relationship between the International Federation of Eugenic Organizations and the International Eugenic Congresses should be explained. The Federation is the continuous body which holds business and scientific meetings in different countries every one or two years, and which provides for holding congresses and exhibits and attends to other international business for the advancement of eugenics. Up to the present time there have been three Congresses and ten meetings of the Federation.

The foundation for permanent international organization was well laid by the First Congress, which asked various groups of gentlemen in different countries to form themselves into consultative committees, and each of these committees was asked to nominate four members to an Executive Committee, which sat in London at the opening of the Congress. Through the passing of resolutions by the Congress, this Executive Committee became the International Committee. Into the hands of this Committee was placed the responsibility for organizing the next Congress and making arrangements as to general policy. Henceforth the public could learn that those branches of science which deal with family-stocks and breed improvement in the several races and had been organized and integrated into a definite science.

FIRST INTERNATIONAL COMMITTEE MEETING, PARIS, 1913

The Permanent International Eugenics Committee, thus provided by the First Congress, met in Paris in 1913, and there made plans to meet in



MAJOR LEONARD DARWIN

President of the First International Congress of Eugenics, London, 1912

Belgium on August 4th, 1914. These plans were upset by the advent of the World War, and the Committee was invited to hold the Second International Congress of Eugenics in America in 1915. This invitation was accepted, but again the war caused the suspension of plans.

SECOND INTERNATIONAL COMMITTEE MEETING, LONDON, 1919

On October 18th, 1919, the Permanent Committee met in the rooms of the Royal Society, London. At this time, the invitation of American eugenicists to hold a Second International Congress in New York City was presented and decided upon affirmatively. Rules were formulated for the maintenance of the International Representatives on the Committee during the intervals between congresses.

SECOND CONGRESS, NEW YORK CITY, 1921

Following the acceptance of the American invitation, the National Research Council, America's representative body for coördinating international scientific activities, appointed a Committee on Eugenics under the division of Biology and Agriculture, which met March 20th, 1920, and voted to hold the Second Congress in New York City, September 22nd to 28th, 1921, inclusive. The invitation of the American Museum of Natural History to hold the meetings of the Congress was gratefully accepted. Dr. Alexander Graham Bell was elected honorary president, Professor Henry Fairfield Osborn, president, and Madison Grant, treasurer. Mrs. Sybil Gotto was named honorary secretary, and Dr. C. C. Little, secretary-general. Vice-presidents from all countries represented were named. A Finance Committee, consisting of Messrs. Madison Grant, John T. Pratt, Austin B. Fletcher, and Dr. John H. Kellogg was appointed, and an Exhibits Committee, with Dr. H. H. Laughlin as chairman, a Publicity Committee, Dr. Lothrop Stoddard, chairman, and an Executive Committee, Dr. C. C. Little, chairman, were created.

The Second International Congress of Eugenics opened with an informal assembly in the Hall of the Age of Man in the American Museum of Natural History, New York City, at 3 P. M., Thursday, September 22nd, 1921. The formal opening occurred at 8 P. M. the same day in the Auditorium of the Museum. The principal features on this latter occasion were an address of welcome by President Henry Fairfield Osborn, a response by Major Leonard Darwin, President of the First Congress, and an address by Dr. Charles B. Davenport, Director of the Department of Genetics, Carnegie Institution of Washington.

The Congress met in four sections. Section I treated the subject of

"Human and Comparative Heredity," under the secretaryship of Dr. Helen Dean King. It presented on the one hand the results of research in the domain of pure genetics in animals and plants, and on the other, studies in human heredity.

Section II on "Eugenics and the Family" was under the secretaryship of Dr. Howard J. Banker. This section considered factors which influence the human family, the control of such factors, the relation of fecundity of different strains and families, and the question of social and legal control of such fecundity. It considered also the differential mortality of the eugenically superior and inferior stocks and the influence upon such mortality of special factors, such as war and epidemic and endemic diseases.

Section III, "Human Racial Differences," with Dr. Clark Wissler, Secretary, concerned itself with racial differences, with the sharp distinction between racial characteristics and unnatural associations often created by political and national boundaries.

Section IV, with Dr. Louis I. Dublin, Secretary, was named "Eugenics and the State." This section covered studies on certain practical applications of eugenic research and the value of such findings to morals, to education, to history, and to the various social problems and movements of the day.

In each section were presented carefully worked out facts and the immediate and practical conclusions to which they lead. Special stress was laid on the results of experimental and statistical research.

The design of the Congress was to advocate no revolutionary changes, but to discuss the whole subject of pure and applied eugenics fairly and temperately in such a manner as to make clear the beneficent effects of the application of eugenic standards among men and women, as man has long since learned to apply them to the improvement of races of animals and plants. Because of the devastating effects of the war, the Second Congress met at a time of exceptional interest, and the need of international coöperation and enlightenment was being felt.

The Eugenics Exhibition, organized by Dr. Harry H. Laughlin, and presented concurrently with the Congress, was of such a nature that the man of ordinary intelligence and education, but without special scientific training, could readily comprehend and appreciate it. It was divided into five groups as follows: Group I, "Heredity"; Group II, "The Human Family"; Group III, the "Factor of Race"; Group IV, "Applied Eugenics"; Group V, "Special Institutions and Methods".

An Interim Committee, to promote eugenics in America and to gain widespread coöperation, was appointed by the President of the Second



PROFESSOR HENRY FAIRFIELD OSBORN

President of Second International Congress of Eugenics, New York, 1921

Congress. This Committee, under the leadership of Professor Irving Fisher of Yale University, finally developed into the American Eugenics Society.

The Executive Committee of the Congress appointed a Publication Committee, of which Dr. Charles B. Davenport was chairman and Dr. Harry H. Laughlin secretary. The following publications about the Congress were issued: Scientific papers presented to the Congress. Volume I, "Eugenics, Genetics and the Family"; Volume II, "Eugenics in Race and State"; abstracts of scientific papers, and a Book of Exhibits.

THIRD INTERNATIONAL COMMITTEE MEETING, NEW YORK CITY, 1921

The officers of the International Eugenics Commission, nominated and elected by the Second International Congress of Eugenics, to hold office until their successors should be installed by the Third Congress, were: Chairman, Major Leonard Darwin, London, England; Vice Chairman, Professor Henry Fairfield Osborn, New York City; Secretary, Dr. Albert Govaerts, Bruxelles, Belgium. These officers and other members of the national committee present, assembled as the Third International Committee, at the American Museum of Natural History, New York City, September 28th.

FIRST FEDERATION MEETING, BRUXELLES, 1922

On the 7th and 9th of October, 1922, the International Commission of Eugenics met at the rooms, Maison des Médecins, Bruxelles, of the Société Belge d'Eugénique. At this meeting it was voted unanimously to invite German delegates to the Commission. Decision was made provisionally to hold the next meeting of the Commission at Lund, Sweden, and the next congress in 1924 at Prague, contingent upon the possibility of making appropriate arrangements for the meetings.

SECOND FEDERATION MEETING, LUND, 1923

The Mendelian Society of Lund, Sweden, invited the Commission to hold its 1923 meeting at Lund in September. This meeting was held in the rooms of the Medical Faculty of the University of Lund on the 1st and 3d of September, 1923. Representatives from the United States, Denmark, Norway, Sweden, Holland, and Great Britain were present. Consideration was given to a proposal by Professor Gini that the Commission interest itself in a Bibliothèque Internationale d'Eugénique, in which the chief researches concerning genetics and eugenics might be published; the proposal of Dr. Van Herwerden that an international terminology for references to publications and for the abbreviations in pedigree charts met with general

approval. The constitution and rules of the Commission were amended and codified.

THIRD FEDERATION MEETING, MILAN, 1924

At Milan, Italy, September 20th to 22d, 1924, in the Sala Pasta della Societa del Giardino, the International Eugenics Commission held its next meeting. Minutes of the Lund meeting were read and passed and statements of the accounts of the Secretary-Treasurer were circulated and approved.

FOURTH FEDERATION MEETING, LONDON, 1925

At the 1925 meeting, held in the rooms of the Royal Society, London, the Commission (previously changed from Committee to Commission) voted to change its name to the "International Federation of Eugenic Organizations." A resolution was also adopted to make the meetings of the Federation scientific eugenical conferences in addition to sessions for transacting business. This permitted the host country to develop the conference into the dignity of an international congress and exhibit. Valuable scientific reports were presented at this meeting, in addition to its purely business aspects.

FIFTH FEDERATION MEETING, PARIS, 1926

At the meeting of the Federation held in Paris, June 2nd and 3rd, 1926, the proposal of the International League of the Red Cross that the Federation coöperate with them and make its headquarters at the League headquarters, 2 Avenue Valasquez, was adopted with some modifications. Committee reports were presented, and many interesting papers were read.

SIXTH FEDERATION MEETING, AMSTERDAM, 1927

The Federation duly assembled at the Colonial Institute at Amsterdam, September 20th to 23rd, 1927. Major Leonard Darwin, having served as President of the Federation since its inception as a National Committee, retired, and Dr. Charles B. Davenport was duly elected President. The Federation then unanimously elected Major Darwin as Honorary President.

The meeting provided for a Research Committee on Race Mixture and for collaboration with the proposed Geneva Conference on World Population Problems. It provided also for a Committee on the Eugenic and Dysgenic Effects of War. A number of scientific papers were presented and the Conference of the Federation was held jointly with the section of Heredity of Man and Eugenics of the Anthropological Congress, which assembled in the Colonial Institute at Amsterdam on September 22nd.

President Davenport presented a redraft of the Federation Rules which, after minor alterations, were duly adopted.

SEVENTH FEDERATION MEETING, MÜNCHEN, 1928

The Federation met at the Hygienic Institute in München, September 13th to 15th, 1928. Many nations were represented by their delegates, and the representative of the Pan-American Eugenics Office in Havana was invited to sit with the Federation. Several scientific committees reported the results of their researches and recommendations. On Thursday Professor E. Rüdin lectured at the Anatomisches Anstalt on "Geistesstörungen und Rassenhygiene." On Friday Professor H. Lundborg's paper "Die Rassenmischung beim Menschen" was read. Dr. C. B. Davenport gave an illustrated lecture on "Race Crossing in Jamaica" and Dr. H. H. Laughlin's paper on "Eugenical Sterilization in the United States" was read.

The agendum of accumulated business was duly carried out.

EIGHTH FEDERATION MEETING, ROME, 1929

In September, 1929, the Federation held session in the library of the Istituto d'Italia at Rome. It was proposed that the interests of human heredity be included with the genetics congress in Ithaca, New York, in 1932, for which preparations were being made. The EUGENICAL NEWS was adopted as the official organ of the Federation to give publicity to its activities. Various reports were made on eugenical research work.

NINTH FEDERATION MEETING, FARNHAM, ENGLAND, 1930

In the absence of the President, Vice-President Sir Bernard Mallet presided over the ninth meeting of the Federation, which was held at Farnham, Dorset, England. The meetings were held in the Larmer Tree Grounds on the estate of Captain G. L. F. Pitt-Rivers. On Friday, Captain Pitt-Rivers and Sir Bernard Mallet gave a garden party at Hinton St. Mary for the Federation.

Scientific papers and committee reports were presented, and the current business transacted.

The Federation formally accepted the invitation of the American delegation to hold the Third International Congress of Eugenics in New York City in 1932. Dr. Charles B. Davenport was formally selected as President of the Third Congress.

The Federation recommended that an exhibit be held in connection with the Third Congress, the purpose of which exhibit should be to show the history, content, present researches and trends of eugenics both as a pure

and an applied science; and to seek to emphasize the fact that eugenics is concerned primarily with racial and family-stock quality in the turn-over of population from generation to generation. Dr. Harry H. Laughlin of the Carnegie Institution of Washington was selected chairman of the exhibits committee.

THIRD CONGRESS, NEW YORK CITY, 1932

The Third International Congress of Eugenics was held in New York City August 21st to 23d, 1932.

VISIT TO COLD SPRING HARBOR

On Sunday, August 21st, most of the delegates having arrived in New York City, the group made an automobile excursion thirty miles eastward on Long Island to Cold Spring Harbor, where they were the guests of the Department of Genetics of the Carnegie Institution of Washington. This Department comprises the Station for Experimental Evolution and the Eugenics Record Office. By means of prepared demonstrations, the visitors were shown the research work of the several investigators. The neighboring friends of the Institution entertained the guests for luncheon, and they were served tea on the grounds of the Eugenics Record Office. About 200 visitors enjoyed the demonstrations and participated in the tea. The party returned to New York City by automobile about dusk.

TENTH FEDERATION MEETING, NEW YORK CITY, 1932

*Held in the Members' Room of the American Museum of Natural History,
New York, Monday, August 23, 1932*

First Session 1:30 P.M.

Present: Dr. C. B. Davenport, president, in the chair; Dr. Frets, Dr. Bijlmar, Mrs. Hodson. The minutes of the last meeting were taken as read, approved, and signed.

Elections: The president proposed the election of the two English organizations standing for membership with a view to admitting representatives present in New York to the further business meeting. The Department of Animal Genetics in the University of Edinburgh had, the secretary announced, through its Director, Professor F. E. A. Crew, written to ask for membership, Professor Crew himself standing as representative member. The election of this organization and of Professor Crew was put from the chair and voted without dissent.

The secretary reported that Professor R. Ruggles Gates, now a member of

the Human Heredity Committee, had formed in England a provisional National Committee on Human Heredity with the view to securing an affiliated bureau in Great Britain. This committee desired to be admitted as a co-operating organization with Professor Ruggles Gates, chairman, as constituent member. The election was duly moved from the chair, that the Human Heredity Committee of Great Britain be invited to maintain membership with the Federation and that the nominee be hereby accepted as a member of the I. F. E. O. This was voted.

The secretary brought up the names of the members-at-large for the Netherlands and Belgium as being due for re-election. Dr. Frets and Dr. Govaerts were duly re-elected.

The Honorary Secretary's Report was then placed upon the table, and the chairman asked the secretary to read the sections dealing with finance. The report was thereafter approved.

Audited financial statement: The chairman called attention to the audited accounts upon the table, and after examination these were duly approved.

The president then outlined important items of business standing on the agenda, and after informal discussion proposed that these should be referred to an adjourned meeting to be held in the afternoon. This was agreed to and the session adjourned.

Second Session 4:30 P.M.

Present: Dr. Davenport, Dr. Laughlin, Dr. Frets, Dr. Kemp, and Professor Gates. The president announced that two new co-operating countries stood for election, Canada and Hungary. Some enquiries had been made as to the standing of the new Eugenics Society of Canada with headquarters at Toronto, and the office had received the statutory nominations from Professor Fischer, Dr. R. A. Fisher, and Dr. Mjoen. On the proposal of the chairman it was voted that Canada be elected a co-operating country, and the Eugenics Society of Canada be invited to maintain membership and to nominate a delegate as constituent member. This was approved.

The president further announced that he had received information of good scientific work and strong eugenic interest in Hungary, and he proposed the election of this country as a co-operating country within the I. F. E. O. for which the above 3 supporters stood. The secretary was directed to make inquiries as to the best organization to maintain membership and to inform its adherents. This was voted.

Election of President. The chairman reminded the meeting that his term of office, extended at the wish of the Federation to this year of his

presidency of the Third International Congress of Eugenics, was now at an end, and that the responsible task of electing his successor devolved on the meeting. He reviewed the work of the Federation as including two categories of eugenists, those wholly engaged in research and those also occupied with education and the practical development of eugenics, bringing up the names of members whose long services and high standing would entitle them to consideration for this office. He announced that the proposal made previously for the nomination of Professor Eugen Fischer had been vetoed by Professor Fischer on account of his present many onerous duties. Dr. Laughlin then proposed for president Dr. Ernst Rüdin of the Heredity Department of the Kaiser Wilhelm Institute of Munich. His nomination was unanimously accepted and the secretary was instructed to inform Professor Rüdin of his election.

Vice Chairmen. The chairman reminded the meeting that the election of two vice chairmen, requiring one to be elected at large and one representing the host country of the next meeting of the Federation, was the next item of business. This raised the question deferred from the meeting in 1930 as to the frequency of assemblies. It was proposed that the next meeting be called for 1934, but that an attempt should be made to hold a Congress simultaneously with the next meeting of the International Congress of Eugenics. The secretary announced that no invitations are as yet before the Federation for its next meeting, and then it was agreed to refer to the new President the duty of securing such an invitation and of nominating one of the vice presidents. Dr. Laughlin proposed the name of Professor Hermann Lundborg as Vice President-at-large.

This was duly seconded and unanimously approved.

Election of Honorary Administrative Secretary. The chairman reminded the meeting that the question of the secretariat had been carefully considered during the past few years. The committee that reported on the matter in 1930 advised that a secretariat be attached to the office of the president in the future. At that same meeting a resolution was passed stressing the desirability of a permanent secretariat and allotting to the present Congress the duty of collecting funds for such an office.

In view of the present impossibility of securing adequate finances, Dr. Laughlin proposed that the present arrangement of a permanent honorary secretary to be elected by the Federation, be retained. Dr. Frets proposed the election of Mrs. C. B. S. Hodson, F.L.S. This was agreed *nem con.* The honorary secretary expressed her appreciation of the vote and said she would be very glad to continue in office with the proviso that she be permitted to place her resignation in the hands of the new president, as she

felt it be most important (he being not present) that a fresh arrangement be made by postal vote if such prove to be more convenient to Dr. Rüdin.

Research Committees. Dr. Frets, Chairman of the Human Heredity Committee, reported members already participating, namely, Dr. Hermann Lundborg, Dr. Mjoen, Professor Nilsson-Ehle, Dr. Fritz Lenz, and Professor R. R. Gates, and he proposed the election of Dr. R. A. Fisher, F.R.S. This was duly approved. The scheme he desired to put forward was the creation of an international office for the exchange of genetical data between the various countries and institutions interested. It was resolved that the Eugenics Record Office be requested to undertake the function of such an International Clearing House, and that Dr. Frets be empowered to nominate, with the approval of the president, additional members of the international committee; that the collection of pedigree material be hereby accepted as lying within the field of work of this committee, and that further standardization of pedigrees hitherto undertaken by Dr. Laughlin and Dr. Van Herwerden be henceforth referred to the Human Heredity Committee. This was voted.

Proposals from constituent societies. Proposals in regard to marriage regulation from Holland and proposals on the work of the Federation from the Eugenics societies of the Dutch East Indies (before the meeting) were referred for consideration to the new President.

The Committee on Standardization of Measurements on the Living. This committee was authorized to proceed with the scheme of work previously initiated.

Reports. The Honorary Secretary announced reports on eugenic work from Austria, Dutch East Indies, the Netherlands, Norway, France, and Sweden, and was instructed to endeavor to secure their publication.

The Tenth Federation Meeting then adjourned *sine die*.

OTHER CONFERENCES AND EXHIBITS ON EUGENICS

In connection with the development of the International Congresses and Exhibits of Eugenics, particular mention should be made, first, of the International Congress and Exhibit of Race Hygiene which was held in Dresden, Germany, August 5th and 6th, 1911, and, second, to the First and Second Conferences on Race Betterment, held under the auspices of the Race Betterment Foundation which was established by Dr. John Harvey Kellogg of Battle Creek, Michigan, in 1906.

(a) *The Dresden Congress and Exhibit of Race Hygiene, 1911*

It should be recalled that the Germanic countries early used the term "race hygiene" in quite the same sense that "eugenics" was later used in

other countries and is now used the world over. The German Congress of 1911 was held under the auspices of the International Society for Race Hygiene, of which Dr. Alfred Ploetz of Munich was the president, and of the German Society for Race Hygiene, of which Professor M. von Gruber, also of Munich, was president. The exhibits of the Dresden Congress were assembled and organized by Professor von Gruber, who again showed many of them in London, in 1912, at the First International Congress of Eugenics. The scientific papers and exhibit of the Dresden Congress aimed to give a survey of the entire field of race-biology and -hygiene. Among the lecturers Pontus Fahlbeck, Professor of Statistics at the University of Lund, Sweden, discussed the eugenic meaning of the decline in birth rate. Dr. Hans Breymann, Chairman of the German Biographical and Genealogical Bureau spoke about the need of coöperation between genealogists and physicians in family-history.

(b) National Conferences on Race Betterment

Two important conferences were held under the auspices of the Race Betterment Foundation; the First National Conference on Race Betterment at Battle Creek, Michigan, June 1-6, 1914; and the Second National Conference on Race Betterment at San Francisco, California, in connection with the Panama-Pacific Exposition, August 4-8, 1915.

It was one purpose of these conferences to develop popular interest in the rôle of sound heredity in good health and in personal achievement, and to work out a practical "Eugenics Registry" which, after adequate pedigree study, would record the hereditary make-up of each person registered.

STATISTICAL SUMMARIES ON THE THREE INTERNATIONAL CONGRESSES OF EUGENICS

While congresses and exhibits of the sort herein described depend for their success primarily upon the voluntary and active collaboration of a large group of persons seriously concerned with the development of the science, the particular sponsorship, the membership, and the financial aspects of each congress are practical matters of vital importance.

The actual money outlay of such a congress depends largely upon (1) whether voluntary work of sponsor institutions can replace a paid organization; (2) the policy of the congress in reference to entertainment and traveling expenses of delegates; (3) leadership of the congress; (4) the "scale" on which the congress is planned; (5) the minimum cash actually needed, and the activity and efficiency of the finance committee; (6) the "times"—whether the economic feeling be "good or depressed"; (7) time-

liness of the congress—time elapsed since last congress was held, sponsorship, place to be held, and progress in the science since the last congress and exhibit; (8) popular interest backing up scientific advance; and (9) cost of publication of proceedings and papers.

For use principally in connection with the organization of the Fourth International Congress of Eugenics at some future date, the following condensed statements are presented.

THE FIRST INTERNATIONAL CONGRESS OF EUGENICS, LONDON, 1912

Number of officers, committeemen and delegates.....	324
Principal sponsoring institutions	
The Eugenics Education Society of Great Britain	
Galton Laboratory, University of London	
Number of scientific papers published.....	42
Number of exhibitors.....	18
Number of individual items of exhibit.....	263
Cash outlay for the Congress, the Exhibit and Publications not stated.	
Publications:	
Scientific papers.	
Vol. I "Problems in Eugenics."	
Vol. II "Problems in Eugenics."	
Pamphlet entitled "Catalog of the Exhibition'."	

THE SECOND INTERNATIONAL CONGRESS OF EUGENICS, NEW YORK, 1921

(Postponed from 1915 on account of the World War)

Number of officers, committeemen and delegates.....	312
Number of members	
Patrons.....	8
Sustaining members.....	19
Subscribing members.....	9
Active members.....	365
Principal sponsoring institutions	
Eugenics Record Office, of the Carnegie Institution of Washington	
American Museum of Natural History	
Eugenics Research Association	
Number of scientific papers published.....	108
Number of exhibitors.....	131
(Each exhibitor presented from one to fifty individual items of exhibit)	
Cash outlay for the Congress, the Exhibit and Publications.....	\$13,016.49
Publications:	
Scientific papers.	
Vol. I, "Eugenics, Genetics and the Family."	
Vol. II, "Eugenics in Race and State."	
The Exhibits Book.	
A pamphlet entitled "The Official Report."	

THE THIRD INTERNATIONAL CONGRESS OF EUGENICS, NEW YORK, 1932

Number of officers, committeemen and delegates.....	73
Number of members	
Patrons.....	2
Supporting members.....	8
Sustaining members.....	14
Active members.....	376
Principal sponsoring institutions	
Eugenics Record Office of the Carnegie Institution of Washington	
American Museum of Natural History	
Eugenics Research Association	
Galton Society	
Number of scientific papers published.....	65
Number of exhibits.....	267
(Each exhibit comprised from one to many individual items. The whole exhibit completely filled the entrance hall and the several booths of the Education Hall. Its charts and other wall exhibits covered approximately 10,000 square feet of wall space.)	
Cash outlay for the Congress, the Exhibit and Publications.....	\$6,716.96
Publications:	
One volume, "A Decade of Progress in Eugenics."	
Part 1, Scientific papers.	
Part 2, The Exhibit.	

SCIENTIFIC PAPERS

SECTION I

OFFICIAL ADDRESSES AND MESSAGES

PRESIDENTIAL ADDRESS: THE DEVELOPMENT OF EUGENICS

CHARLES B. DAVENPORT

Carnegie Institution of Washington, Cold Spring Harbor, Long Island

It is a privilege and an honor to occupy the place on this platform occupied at the last Congress by my friend Professor Henry Fairfield Osborn. It is an honor to succeed more remotely that grand old man of Eugenics, whom distance and extreme age are keeping from us,—Leonard Darwin. He has a message for us which he sends through the voice of the biologico-statistician of his country, R. A. Fisher.

We rejoice that so many from abroad have been able to come, even at great sacrifice, financially. They have come from England, the Scandinavian Countries, the Netherlands, Germany, Italy, Spain and Poland. From the Americas we welcome Canada, Cuba and representatives of other countries of Pan America. From the United States the representation is good; some have come as far as those who crossed the ocean to participate in the activities of this Congress.

We regret that so many European leaders in eugenics have been prevented from coming because of economic or political considerations. We were urged by some of them to postpone the Congress but the appeal came too late, after we had accepted and spent considerable funds. Their disappointment is shared by us. We miss particularly Ploetz, that grand old leader of eugenics, in Germany, Fritz Lenz, his associate; Marianne Van Herwerden, beloved by all for her graciousness and esteemed for her researches. Time fails to tell of all whom we miss here tonight. We hope they will come to the next Congress in America.

We meet again in Congress after 11 years. What progress has been made by us as Eugenicists since 1921?

The Federation of Eugenics Organizations has met regularly in European Countries and we have come to know and esteem each other and have gradually increased the scope of the Federation. Indeed now most of the principal countries of the globe have eugenical organizations. We have made contacts with each other's countrymen and have a better understanding of their social viewpoints. But what have we accomplished to advance the science and application of eugenics? First, we may not underestimate the advantages of mutual contact in stimulating research. Since the publication

of Holmes' Bibliography of Eugenics, the number of papers on the subject has increased enormously. We may share part of the credit for this advance so well recorded in the textbooks of Baur, Fischer and Lenz. In application there has been a slow but steady spread. Sterilization as a useful aid in negative eugenics has been adopted by Denmark, largely through the activities of our colleague Soren Hansen. England and the Netherlands are considering legislation on the subject. Sterilization is being at least widely discussed. The principle of national determination of immigration has become recognized. One country may not relieve itself of its socially inadequate by slyly exiling them to another country. Each country must bear the burden of caring for the socially inadequate that it breeds.

The seriousness of the act of mate selection is, I think, becoming increasingly recognized partly as a result of increasing instruction on eugenics given in the schools. Marriage advice stations have sprung up in Germany and Gosney and Popenoe are responsible for an active center in Los Angeles.

Eugenical ideals are as old as mankind and have their roots in the instinct of mate selection which is found through the largest part of the vertebrate phylum, if not below.

The necessity of emphasizing these ideals now is partly the spread of non-biological theories of equality of breeding stocks; the doubt entertained by many sociologists whether there is any difference in quality of fitness among humans (despite the difference between an idiot and a scholar; an epileptic and a person with controllable emotions); the undue emphasis on economic, rather than biological, considerations in mate selection and in reproduction.

We honor Galton for arousing the conscience of civilized peoples on these matters, and starting a movement to mend them. Galton saw clearly that the conscious improvement of mankind must be based on the laws of heredity and he turned his attention to its study. But in his day a knowledge of this subject was very incomplete; so that he failed in more than demonstrating in general the importance of heredity in human affairs.

With the rise of Mendelism a new era opened. In place of average results in inheritance it now became possible to state more precisely the consequences of a given mating; or at least the way was opened to acquire knowledge toward such a statement. Such at least was the idea that led to the establishment of the Eugenics Record Office at Cold Spring Harbor by Mrs. E. H. Harriman. Such an ideal was doubtless in Galton's mind when he made the Galton Laboratory at London the residuary legatee of his estate. Unfortunately it got into the hands of an opponent of the new method of analysis.

Let us note some of the advance in the study of human genetics made in the new era. In the first glance the inheritance of a lot of normal varying characters has been placed on a Mendelian basis, such as stature, body build, pigmentation of hair and skin, eye color, hand form; also temperament, mental traits and quality of the special senses. Similar progress has been made in studying defects and diseases on a genetic basis. Twins, endocrine conditions and a number of sex-linked characters have had their factors investigated.

One of the greatest advances of this period of research has been the change in attitude of pathologists toward the hereditary factor in disease. We have come a long way from the standpoint of the medical man who said, in effect, tuberculosis is due to the bacillus tuberculosis and that is all there is to it—despite the fact that practically every adult harbors the tubercle bacillus. Rather the conclusion of Professor Jobling of the College of Physicians and Surgeons in this city is being reached, who said; Henceforth the physician and geneticist must work together.

But, as we are constantly reminded, human genetics is only part of eugenics. Research in eugenics must also be concerned with mate selection. This field is indeed little worked; yet it will yield and is yielding great results.

During the past two decades the importance of eugenics to mankind has become recognized by thoughtful leaders and an attempt has been organized to “put it across,” as we say; to secure the adoption and practice of the principles established. Eugenic societies have been organized with that high aim. While one can only applaud the purpose and wish god-speed to the effort, still, on the other hand, one may be excused if he does not enter with enthusiasm into such propaganda.

Propaganda, as I understand it, is the organized effort to get accepted some principle the truth and value of which have not been, or can not be, demonstrated but of whose importance the propagandists hold a strong opinion. They are, if not morally surely *emotionally*, certain of its truth and undertake a crusade, or indeed, a warfare to lure or force others to accept their way of thinking. Thus we have had the prohibition propaganda, the laborless-child propaganda, the birth control propaganda and the rest.

Now it is hoped and expected that human genetics will, in due time, be placed on a basis, not of opinion but of fact, like the facts of animal breeding. When that time comes, indeed probably before it comes, writers of textbooks for the schools or writers of books for general reading will have presented the facts and even drawn immediate deductions from them. Just

as one does not need to organize propaganda in favor of the theorems of geometry, just so little is propaganda required in favor of the laws of inheritance of haemophilia, polydactylism or moronity.

WHAT OF THE FUTURE?

First, research on human genetics, as the foundation of eugenics, should be continued. We need to know more about the genetical factor present in various morbid conditions, such as cancer and arterial and heart disease. We need to know the genetical factors present that favor self control—inhibition—or the lack of it. We need to know more about the genetical factor that favors output in music, mathematics, invention, organization and the rest. By a knowledge of the laws of inheritance of these special capacities the chance of breeding them can be increased. And the day may come when this country (which at the very beginning lured artisans, blacksmiths, mechanics, because of the houses, towns and cities that had to be built) will offer a large premium for the inventive capacity which, once gone, can be recovered only by importation.

Second, extensive research is needed on mate selection and its instinctive action. It is obviously important to know the biological basis of correct choices.

On the active control of mate selection we have heard much today. It is probably well that the principle has been established in this country that the fertile marriages of the feeble-minded, and the inheritably insane should be reduced to a minimum. Of course, we recognize that even if none of the inheritable feeble-minded reproduced in this generation, there would be new cases of inherited feeble-mindedness in the next generation; though reduced in number. This, because the defect is carried recessive, in normal individuals. Our experience at the Eugenics Record Office indicates that very many people with hereditary defect in the family are aware of the danger of reproducing it: and many either avoid marriage or at least parentage on account of this family defect. Probably, in time, this practice will become widespread, and thus the supply of the hereditarily feeble-minded will gradually diminish. At least I think we may look for this result in consequence of wider knowledge of the facts of inheritance.

You have heard today discussed the possibility of increasing the marriage rate and fecundity of the more effective, socially more efficient classes. I can not add to that discussion; but, as an optimist and as a result of numerous contacts with young people who are contemplating marriage, I believe that more and more will be guided consciously (as well as instinctively) to make matings that will ensure physically, mentally and tempera-

mentally well-endowed offspring. Advance in knowledge of human genetics will aid in this advance.

THE FUTURE OF A DIFFERENTIAL BIRTH-RATE

The interests of the eugenicist are in improving the quality of those born and increasing the proportion of the socially adequate. So far, the only method of improving the quality of those born, apart from prevention of infection in the mother, is to improve the matings. We have heard discussed today the possible methods of securing a higher birth rate in the most effective groups of the population. Let us hope such methods will be successful. Were birth control differential it would have possibilities. The most intellectually successful strains are slow and tardy breeders. The proletariat will for a long time, as in the classic age, be the fecund class. All honor to the fecund. It will be a long time before we can improve practically on nature's method of race improvement—a high birth rate and a high death rate.

Eugenics is not interested in death rates any more than it is in birth rates. It is interested only in quality. One may even view with satisfaction the high death rate in an institution for low grade feeble-minded, while one regards as a national disaster the loss of a bold and successful aviator, or even the infant child of exceptional parents.

CONTROL OF THE QUALITY OF THE BREEDING STOCK THROUGH CONTROL OF MIGRATION

Any nation will, in the long run, be what the quality of its breeding stock permits it to be; fair conditions of life assumed. Every nation wants to secure for itself its ideals of high quality of manhood. Even if we could carry out a program of improved breeding with the people within our gates our problem might be complicated by the immigration of other peoples which, perhaps, had no such program.

The immigration problem has indeed two aspects on the biological side. One is the problem of a possible biological disharmony arising in the hybrid offspring of peoples widely unlike genetically; i.e., having marked, structural, including neuronc, differences. Today, in the absence of precise information on the matter each person feels entitled to his own opinion. I know of no subject today of vaster eugenic, as well as political, moment than that of the genetical consequences of the union of dissimilar races of mankind. The results of breeding dogs obtained by Stockard suggest that marked morphological differences of the parental stocks may result in morphological disharmonies in the hybrid offspring; also, the

hybrids between blacks and whites in Jamaica show an excess of persons over either parental stock who are incapable of tackling even slightly difficult mental tests. Despite these facts there are even geneticists who doubt if wide crosses result in disharmonies.

It would seem as if mankind was entitled to know the facts as to human crosses. The practical problem is not one of inferiority or superiority of races, but primarily of racial differences. We must all rejoice that Eugen Fischer is entering with enthusiasm into the problem of human race crossing over the world.

The other aspect of immigration is that of a clash of instincts in groups with unlike temperaments and mores. For a highly individual people the mores and laws of a population with strong social instincts may be intolerable. A mixture of heterogeneous peoples thrown into intimate contact, is apt to be a more or less turbulent people. This is a biological principle that has strong sociological bearings.

While there are apparent dangers in the free mixture of very dissimilar races, we have reason to look for certain advantageous consequences of out-breeding, providing the breeds be not too extreme. Thus the mixture of north Europeans in the United States seems to have produced many especially virile persons of which the Theodore Roosevelt family is a brilliant example. It is probable that the principle of heterosis is effective in man also. On these matters we look to the future for a clearer light. Meanwhile any people is justified in going slow in bringing together into its land very diverse races of mankind. If future research supports present suspicions as to dangers, the mixtures can not be unscrambled. If the suspicions of danger prove to be unfounded, then it will not be too late to throw the doors open to free intermigration of the most diverse peoples. The present safe course is to pursue the ideal of race homogeneity.

Finally, we may inquire: Can we by eugenical studies point the way to produce the superman and the superstate? Progress will come slowly. Man is a poor subject for experimental study; still worse to get to apply to himself established principles. But I think we are justified in having faith that the future will bring precise knowledge in human biology, and education will establish the desired mores.

The past two decades have seen the new eugenics rise from a mire of ridicule to the solid foundation of a recognised important social factor. It is probable that in the next two decades it will rise still further in public esteem and become regarded as *the most* important influence in human advancement. For, man is an animal, and permanent racial progress in eugenics, must be based on the laws of biology.

MESSAGE TO THE INTERNATIONAL CONGRESS OF EUGENICS

LEONARD DARWIN

Sussex, England

I hope that I may be allowed to send this message wishing every success to the International Congress of Eugenics now assembled at New York. I am tempted to do this because of the great honour conferred on me, and the pleasure given to me, by my appointment as one of the two honorary Presidents of the Congress. I most sincerely wish I could be present to take my place beside my colleague, Dr. Fairfield Osborn, whose unbounded hospitality in New York and on the banks of your beautiful Hudson River, when he was acting President of the Congress of 1922, have left an indelible impression on my mind. A journey to America is, however, unfortunately out of the question in my case. Though I must not now allude to all the memories vividly recalled by this reference to that pleasant gathering, perhaps I may be allowed to mention one particular incident. At a tea given by Dr. Davenport and Dr. Laughlin in the charming grounds surrounding their Eugenics Record Office, at the very close of that Congress, I was asked by the other visitors to undertake the onerous task of thanking all our hosts for the kindnesses we had received on innumerable occasions. What I then said I do not remember, but I am certain that what I was feeling was that every Englishman always returns to his own country after a visit to the United States with the feeling that he will never be able to repay the debt he has incurred on account of the hospitality received, much as he would like to be able to do so. Luckily for us, everything was done in such a generous and open-hearted manner as to make the recollection of this debt to be a pleasure rather than a burden. But please be assured—and here I am also speaking from personal experience of a visit to your country more than half a century ago—that all the kindnesses we have received remain bright and untarnished in our memories.

I want also to congratulate all those who have been working so hard at the preparation for this Congress, not only that their preliminary labours are now over, but on the success of their efforts—for I know that they will be successful. Some may be asking themselves whether all their efforts have been worth while; but if so, may I say that the experiences gained at the two last international congresses make me feel certain that your

exertions will have been well spent. You will have made known to each other many persons previously bound together by a common interest, and you will have brought the Eugenic ideal clearly before the minds of many thousands of your fellow countrymen, by whom it had been previously only but dimly realised. My firm conviction is that if wide-spread Eugenic reforms are not adopted during the next hundred years or so, our Western Civilization is inevitably destined to such a slow and gradual decay as that which has been experienced in the past by every great ancient civilization. The size and the importance of the United States throws on you a special responsibility in your endeavours to safeguard the future of our race. Those who are attending your Congress will be aiding in this endeavour, and though you will gain no thanks from your own generation, posterity will, I believe, learn to realise the great debt it owes to all the workers in this field.

RESPONSE TO THE PRESIDENTIAL ADDRESS

CORRADO GINI

Rome, Italy

[English translation]

It is a great honor for me to take part in the Third International Congress of Eugenics as head of the delegation sent by the Italian Government, and as representative of the Italian Society of Genetics and Eugenics, the Italian Committee for the study of Population Problems, and the Central Institute of Statistics. It is also a great honor to have been invited by the Organizing Committee to address the General Assembly. I presume it is the wish of the Organizing Committee that I express my own personal point of view, and that of the scientific bodies I represent, on the Congress we have just opened and on the program of our science.

The adherence and the contribution I have given to the two previous International Congresses of Eugenics held at London and New York, my initiative in favor of the two Italian Congresses of Eugenics in 1924 and 1929, whose success was made more complete by the participation of eminent representatives of the foreign Eugenic Societies and of their International Federation, the prominent part I assigned to Eugenics at the International Population Congress of Rome (September 1931) show the importance I attach to international meetings of the followers of our science. Indeed, they afford an opportunity to sum up what has been done and what we should do, and they also enable us to become personally acquainted and to exchange our own ideas with those of men of theory and men of practice, who in very different fields of science and of life take an interest in the problems of heredity and the improvement of the human races.

The interest taken by eugenists of many countries in the recent International Population Congress of Rome, and the official participation at this New York Congress of the Italian Committee for the study of Population Problems, afford, I believe, a further recognition of the truth that in the matter of population, as in other fields, the problems of quantity and quality are indissolubly connected. As I see it, they are indissolubly connected not only because in practice it is difficult to think of a measure affecting the number of inhabitants which does not also affect their qualitative distribution, or of a measure hindering or encouraging the reproduction of certain

categories of people which does not also modify, directly or indirectly, the number of the population, but also and above all because population is a biological whole, subject, as such, to biological laws which show us that mass, structure, metabolism, psychic phenomena, the reproduction of organic life are all indissolubly connected, both in their static conditions and in their evolution, so that it would be vain to try to modify some of these characters without taking into account the stage of development attained by the others. In conformity with the strictly scientific character, explicitly laid down in its statutes, the Italian Committee for the study of Population Problems which I have the honor to represent, leaves out of account all questions of demographic policies, but that does not prevent it from noting with satisfaction the interest which nearly all Governments now officially take in quantitative and qualitative population problems, and the fact that many of them are guided in their action by the results secured by science.

The very fact that genetic and eugenic studies in Italy are coördinated by the same Society, and, as was the case at the Second National Congress in 1929, are frequently discussed at the same scientific meetings, indicates that we recognise the necessary connection between the two sciences. We are therefore much pleased to see the Third International Congress of Eugenics, and the Sixth International Congress of Genetics rise and grow as twin Congresses.

If we accept Galton's definition of Eugenics, that is, the study of agencies under social control which may improve or impair the racial qualities of future generations, it is clear that Eugenics is quite distinct from Genetics. And that is so not only because Eugenics is exclusively concerned with man, not only because factors apt to improve or impair the qualities of the human species, exist outside of "genes," but also and essentially because Eugenics considers the factors, apt to improve or impair the racial qualities of humankind not only from the view-point of their causes, as does Genetics, but also from that of their practical consequences, of their history, of their diffusion, of their economic, political, moral, cultural reflexes, and because, last but not least, its ultimate purpose is the social control of the factors in question. Even those who think, as I do, that we, at least in the majority of cases, are still too ignorant to exercise such control, cannot help acknowledging that, if the character of a science is determined by its purpose, the character of Eugenics is prevalently sociological. And here allow me to seize this occasion in order to point out the danger which, according to the opinion of others and myself, is hovering threateningly above Eugenics; the danger, namely, that, by considering Eugenics from a narrow point of

view as a chapter of Genetics applied to man, or worse still, of experimental Genetics applied to man, and by neglecting all other problems, so vast, complex and delicate, which it embraces, we do not attain the aim of assuring for our national and international organizations the support of the majority of biologists, who may feel justified, on the strength of such a viewpoint, in considering Eugenics as absorbed by Genetics, and that we lose, on the other hand, the support of the students of social sciences who may find that the eugenists are not sufficiently prepared to face the ultimate and most difficult problems of their field or endeavor. I feel it my duty to emphasize here this warning not only on my behalf but on behalf also of the Italian Eugenic and Genetic Society, and as a unanimous expression of the feeling of the Italian Delegation.

Although its prevalently sociological character does not allow Eugenics to be merged with Genetics, yet it is undoubtedly true that the science of Eugenics must obtain from that of Genetics many of the fundamental facts on which to base its theories and their applications. This is true even, indeed especially, if Eugenics is to outstrip, as in my opinion it will have to, its old program, limited to the negative purpose of eliminating beings inferior by heredity, and to the positive purpose of increasing the reproductivity of the best, and if it is to acquire, as in my presidential address at the Second Italian Congress of Genetics and Eugenics (Rome 1929) I expressed the hope it would, the character of regenerative Eugenics. Regenerative Eugenics has the special purpose of studying, through series of successive generations, how new stocks rise, what circumstances determine their formation in the midst of the obscure mass of the population—a formation which can hardly be explained by the heredity of superior factors heretofore non-extant—and what importance may be ascribed in their formation to the influence of happy combinations arising from cross-breeding and favored by natural selection, such as the change of environment caused by emigration, or the selection of the original populations which occurs in emigration.

If we thus enlarge the horizon of Eugenics, it becomes evident on the one hand, that its work cannot be based solely on laboratory research but will demand wide research in the field of history controlled by statistics. Statistics above all, if I am not blinded by the affection due to long familiarity with that branch of knowledge, together with Genetics, brings an indispensable contribution to Eugenics. Genetics and Statistics appear to me to be the foundations on which rest, as on a bridge built between the biological and social sciences, the whole structure of Eugenics. If Genetics supplies, on the one hand, the foundations and directing principles of Eugenic research and programs, Statistics on the other hand enables us

to verify by strict methods the results over an adequate number of observations. Statistics enables us, moreover, to carry our enquiry into fields where laboratory experimentation would be impossible or inadequate. This explains the keen interest the Central Institute of Statistics, which has acquired so much importance of late years in Italy, has always taken in Eugenic problems. Not only has that Institute desired to be officially represented at this Congress, but it has also wished to make a worthy contribution to the annexed exhibition by sending a series of large colored diagrams showing density of population, birth-rate, and death-rate of the several Italian Communes, and two collections of graphs showing the variations in the Italian death-rate during the past forty years, and the composition of large Italian families, as well as many aspects of the marriage and death rates of their members.

Were you to ask me what the program of Eugenics should be in the immediate future, I would repeat the opinion I expressed last year at the opening of the International Congress for Population Studies. "Facts, facts, facts." It seems to me that this should be the motto of Eugenists.

No less than natural and economic phenomena, scientific research proceeds with a rhythm in which periods of theoretic elaboration alternate with periods of fact collecting. In the field of Eugenics it seems to me that in the past too much time has been spent in building up theories and in multiplying programs, and too little attention has been paid to broadening and consolidating the foundations on which the edifice was rising with a disproportionate excess of superstructures.

Those who share my views on this matter will be encouraged by seeing at the head of this Congress Dr. Davenport, who has devoted so much of his activity in the field of Eugenics to the collection of facts.

On behalf of the Italian Government and of the scientific bodies I represent, I take pleasure in extending to him and to the organising Committee of the Congress our cordial wishes for the success of our meeting.

BIRTH SELECTION VERSUS BIRTH CONTROL

HENRY FAIRFIELD OSBORN

Honorary Vice President, Third International Congress of Eugenics

This International Congress is singularly opportune. It is not merely an academic problem we are met to discuss, or a problem of the future. It is not a theory but a condition which confronts us. It is a problem of the immediate present, and, like all sociological problems, the more fascinating because of its very complications. Man does not rise to his best endeavor in face of small problems; it is in the genius of modern humanity to meet and attempt to solve the most difficult. Eugenics is not a human invention by Francis Galton or any of his predecessors or successors. It is a long-known and universal natural law, namely, the survival of the fittest and the elimination of the unfittest.

It has always required a cataclysm to force a natural law upon the attention of man. Cataclysmic plagues of malaria, of typhus, of yellow fever, of tuberculosis, of cancer, forced upon human genius the imminent crisis of discovery, of palliation, of prevention, of cure. So in this world cataclysm of over-population, of over-multiplication of the unfit and unintelligent, of the reign of terror of the criminal, of the tragedy of unemployment, eugenics ceases to be the cult of the few pioneers like Galton and Leonard Darwin; it is forced upon our attention. Once more man is humbled because he is suffering from prolonged ignorance or actual defiance of and transgression of the most central and fundamental of all natural laws.

Prisons, reformatories, asylums, great public financial offerings, great national and local appropriations, great tides of human kindness and generosity, are merely palliatives and temporary expedients. They may for a time gloss over the cataclysm; they can not permanently cure it or avoid its recurrence. *The only permanent remedy is the improvement and uplift of the character of the human race through prolonged and intelligent and humane birth selection aided by humane birth control.* This is the burden of my address; it is the keynote of our third congress.

I by no means profess to be an expert eugenicist. I think, I write, I speak, rather as a trained and experienced observer of animal and of human evolution, and I bring to bear upon this problem my own original researches and observations on the intelligence and behavior of man. Altogether, and

in lucid intervals between other more immediately pressing researches, I have been directly or indirectly studying human evolution, individual, racial and creative, since the year 1880.

Within the present year, however, my thoughts have been forced to take an entirely new trend, namely, the bearing upon human evolution and human progress of the present wholly unanticipated conditions of human life and environment subsequent to the world war. I am deeply impressed with the practical unity of all world problems—sociological, economic, educational and religious. My world tour began in the Polynesian and Melanesian islands, where certain isolated communities are to be found still untouched or unmarred by civilization, with all primitive human activities still in force among the once superb and self-sufficient races of the South Sea and Cannibal Islands, such as Fiji, New Caledonia, New Guinea.

The pristine isolation which enabled every country to pursue its own evolution independently of all other countries, in Japan before Perry's advent, in Korea before Japan's conquest, an isolation still so sharply exemplified in the greater part of China, is all a condition of the past now submerged or even banished by commercial invasion, by military conquest, by the far more potent forces of modern inventions which unify once remote and isolated countries and bring them, whether they will or no, within the barbaric or civilizing influences of the entire modern world.

In Java I first perceived the disturbing influence of the introduction of machinery and mass production on the old uncivilized economic order. While checked by introduced diseases in the South Sea Islands, the Javanese population is mounting with alarming rapidity, having jumped from 12,000,000 to 40,000,000 in an incredibly short space of time, a naturally fertile race being protected from disease and multiplying under their original mating customs. But even in these countries, relatively immune from the dangers of civilization, we begin to observe the initial effects of world interaction.

The outstanding generalizations of my world tour are what may be summed up as the "six overs"; these "six overs" are, in the genetic order of cause and effect:

Over-destruction of natural resources, now actually world-wide;

Over-mechanization, in the substitution of the machine for animal and human labor, rapidly becoming world-wide;

Over-construction of warehouses, ships, railroads, wharves and other means of transport, replacing primitive transportation;

Over-production both of the food and of the mechanical wants of mankind, chiefly during the post-war speculative period;

Over-confidence in future demand and supply, resulting in the too rapid extension of natural resources both in food and in mechanical equipment;

Over-population beyond the land areas, or the capacity of the natural and scientific resources of the world, with consequent permanent unemployment of the least fitted.

Added to these "six overs" in many but not in all countries, there has been over-speculation and a consequent over-capitalization which places an intolerable burden of debt on individuals and communities which at the present outlook there are few means to repay. Every port I visited revealed over-population, over-production and unemployment—whether in the South Seas or in the great cities of Europe and America. Everywhere ports were full of empty vessels. Everywhere the number of employees in all grades was being cut down, and everywhere the world's staples, even rice, stood about in quantities far exceeding the world's demand.

Certainly the fears of the great physicist Sir William Crookes, a contemporary of Francis Galton, have not been realized that a time would be reached when the feeding of the rapidly increasing population of the world would be a problem of the first economic importance for which he suggested such a remedy as harnessing Niagara Falls in order to secure an adequate amount of nitrogen for the reinvigoration of depleted soils. On the contrary, modern agricultural science and invention have more than met these apparently insuperable dangers besetting certain over-populated countries, such as Java, with a superabundant rice supply even for its teeming 40,000,000—rice being produced so cheaply that it is not commercially profitable to sell it—just as wheat is being produced in America so cheaply that we have an over-supply of wheat for our 112,000,000 people. Java's over-population, therefore, can still be fed. But the taking up of every acre of land, even to the mountain tops, has not solved the overcrowding problem of Java, as evidenced by her endeavor to export her surplus of people to other less populated islands.

With this prologue let us for the moment concentrate on several of the outstanding social conditions of the day and hour, namely, over-population and unemployment. Is over-population a reality? Is unemployment a temporary or a permanent condition? Is birth control the best means of checking over-population, or is birth selection aided by birth control the better means? We shall consider over-population from the double standpoint of birth selection and of birth control. Even the lives sacrificed in the world war, apart from the ethical and intellectual problems of human advancement, are entirely negligible compared with the natural increase of mankind, when no longer checked by disease, by infant mortality and by internecine wars. The International Statistical Institute estimates that the world added 125,550,000 to its total population in the years 1920–1928.

DISTINCTION BETWEEN BIRTH CONTROL AND BIRTH SELECTION

First, let us clearly distinguish between birth selection and birth control.

Birth selection is the cardinal principle of the whole eugenic movement as first propounded by the great biologist Francis Galton, defined in 1884 as follows: "Eugenics is the study of agencies under social control which may improve or impair the racial qualities of future generations either physically or mentally." Birth selection is directly in the order of the Darwin-Spencer law of the survival of the fittest. Birth selection is known as "positive" eugenics, of which eugenically administered birth control should be only a subsidiary "negative" principle. As conceived by Galton it is an ameliorative, curative and positive force in the advancement of mankind and the uplifting of society as a whole by improving human quality as distinguished from quantity. It aids and encourages the survival and multiplication of the fittest; indirectly, it would check and discourage the multiplication of the unfittest. As to the latter, in the United States alone it is widely recognized that there are millions of people who are acting as dragnets or sheet-anchors on the progress of the ship of state. Some radicals propose that they should all be sterilized so as to inhibit the multiplication of their kind. This would be the negative or birth control method of birth selection.

Birth control, primarily designed to prevent the over-population of the unfittest or dysgenic, may prove to be a two-edged sword eliminating alike the fittest and the unfittest. Whatever its benefits in limiting the unfittest, birth control is always in danger still more of limiting the fittest and thus becoming positively dysgenic or against the interests of the race as a whole in which it is practiced. I have in mind the French, among whom birth control has been practiced in the upper classes for centuries, with disastrous racial results. My doubts about the present propaganda and purpose of the birth control movement are that they are so largely negative and death-dealing rather than positive and birth-encouraging. Only by some wise and selective means of limiting the number of births can the world find a solution for its disturbed economics. I return from a tour around the world more impressed than ever with the principle of "not more but better and finer representatives of every race." I hold that true for America as well as for foreign stocks.

For the time at least, I am very doubtful about birth control. In fact, on eugenic as well as on evolutionary lines I am strongly opposed to many directions which the birth control movement is taking, chiefly because I believe them to be fundamentally unnatural and hence destined sooner or later to fail of their original more or less benevolent purposes.

Finally, it must be clearly understood that we eugenists are chiefly concerned with birth selection measures which go to improve the general physical, moral and intellectual qualities of mankind, while measures which are designed to serve personal, individual ends and more or less temporary social demands are outside our province. Positive eugenics strives to improve racial quality on the one hand by *increasing* breeding and offspring among the eugenic element, and on the other negative eugenics by *diminishing* breeding and offspring among the dysgenic element. The eugenic element of the population includes that portion which is able to exert the greater amount of physical and mental energy, by so doing the better to pull its own weight in the social group, and through a superior moral, temperamental and intellectual endowment to make the greater contribution to the understanding of human life conditions, to cultural progress and to general racial improvement. It would be a mistake, however, to regard this element as confined to a narrow class of intellectual superiority, fully granting this class to be highly essential. Many diverse abilities and aptitudes are required for the consistent and balanced development of humanity. In short, the eugenic element of the population may be defined as that portion of existent humanity which is competent to produce the best resultant evolution of the species.

IS THE WORLD OVER-POPULATED?

Two high authorities in the anthropological world differ widely on the question whether or not the world is over-populated. From my recent voyage around the world and observations in many lands I have reached the opinion that over-population and underemployment may be regarded as twin sisters. From this point of view I even find that the United States is over-populated at the present time. Dr. Louis I. Dublin, third vice-president of the Metropolitan Life Insurance Company and an experienced statistician, takes a different view as regards the United States when he says: "As to the United States, I can not see that from any standpoint whatever we can regard our own country as being over-populated. Our exports exceed our imports and we are quite able to feed and house our present population and many more that may be born or come in from abroad in later years." Dr. Dublin does not agree with me as to either the pressing danger or the best preventives of over-population. He writes (June 6, 1932):

I have not been greatly impressed with the warnings of certain writers that the world is suffering from over-population. When East's "Mankind at the Crossroads" appeared and made such a stir, I wrote a review in which I took issue with his views. Wiggam and

quite a number of the men associated with the eugenic movement have aired much the same views as East and their almost uniform suggestion has been to spread birth control knowledge throughout the world and, in this way, avert the calamity of over-population and worldwide misery, which was otherwise inevitable.

Apart from a few countries such as China and India, possibly Japan, there is no evidence of over-population, certainly not of serious over-population at the present time, because never before in the history of the world has there been so much food available and so much of other necessities of life. The reason that many people now are ill-fed and otherwise destitute is not that there are too many people, but that our systems of distribution and of consumption have broken down. Or to put it another way, it would not help the present economic or social situation one bit if by some hocus pocus the population could be uniformly reduced 50 per cent. I make this point because it is implied in the whole theory of over-population. Those who have such views forget that people are producers as well as consumers. The crux of the problem is not the absolute number of people but rather the relation of the numbers of the people to the necessities available to them through our existing channels of commerce.

China and India are, as I have said, over-populated. My test is the low standard of life in those two countries. The people are immeasurably worse off than are the people of Europe or of America. Yet, it is of great interest to find that unemployment is not a problem in those two countries. The masses are employed but their industry is so unorganized, their channels of transport and distribution are so primitive, that there is a very meager existence possible for the people.

It is in a country like ours or in industrial Europe that we suffer from unemployment. But here again, I am not at all sure that such unemployment is closely related to over-population. We in the United States are certainly not over-populated by any test that I know. England and Germany would be over-populated if they depended on themselves for their food supply. But those two countries have launched on another program. They are highly industrialized and exchange their surplus products for food. Ordinarily, they have got along very well. The present crisis in which they and we and the rest of the world are plunged is not the result of over-population. It is rather the result of disorganization and of a number of causes, some of which you have very clearly specified in your category of "overs."

I do not agree with Dublin as to the population in the United States, for I think the present unemployment figures represent a condition likely to be in part permanent.

A recent unemployment estimate, revised by Dr. Dublin on July 30, is as follows:

Germany.....	5,500,000
France.....	1,000,000
United States.....	10,000,000
England.....	4,000,000
Total.....	20,500,000

While some highly competent people are unemployed, the mass of unemployment is among the less competent, because in every activity it is the

less competent who are first selected for suspension while the few highly competent people are retained because they are still indispensable. In nature these less-fitted individuals would gradually disappear, but in civilization we are keeping them in the community in the hopes that in brighter days they may all find employment. This is only another instance of humane civilization going directly against the order of nature and encouraging the survival of the unfittest.

Recent world population figures

1927	Dutch East Indies, total.....	51,882,842
	Dutch Java.....	41,719,524
1921	British Possessions:	
	Asia (1921).....	364,646,807
	Africa (1921, 1928, 1925).....	46,948,380
	America (1921).....	11,149,110
	Australia (1921, 1926).....	7,886,217
	Europe (1931).....	46,216,099
		<hr/> 476,846,613
	American Philippine Islands.....	12,082,366
1928	Europe.....	478,114,000
	North and South America.....	238,332,000
	Africa.....	140,269,000
	Asia.....	1,070,483,000
	China.....	474,000,000
	Japan.....	69,336,000
	Korea.....	21,058,000
	Oceania.....	9,369,000

RIGHTS AND WRONGS OF BIRTH CONTROL

In civilized countries the birth control people are on strong theoretic but not practical grounds as regards the mechanical prevention of over-population, but in half-civilized or uncivilized countries their principles have already been anticipated by more or less barbaric, cruel or inhuman measures, such as the control customs of the Australians, or the killing of female children by the Chinese.

Birth control has become a national and in a measure an international movement. The country which has birth control in its most radical form is Russia, where it is said to be connected with a great deal of sexual promiscuity. There the State is coming to the aid of young women with whom contraceptive methods have miscarried. Birth control has been welcomed by radicalism in several countries, especially in England, as an opening means whereby the two sexes will be placed on the same level of sexual freedom. One eminent American eugenicist who attended the birth control

congress in London last year, although a medical man accustomed to looking such matters in the face, was so shocked by what he heard and saw that he retired on the second day, and has since written a very able paper against birth control as now practiced. While not materially affecting the more ignorant and less desirable classes, he found birth control diminishing births among superior individuals and families. Let us therefore consider birth control as one of the more or less radical departures from fundamental principles of our present social structure not only in the religious but in the ethical and moral fields. More or less sincere advocates of contraception claim that it is one of the greatest social discoveries ever made by man, an ideal method of controlling over-population, a promising agency of social regeneration, and that it goes further than any previous social measure in the emancipation of womankind.¹

Directly bearing upon the purposes of the present Eugenics Congress is the claim that contraception is wholly eugenic. A considerable section of the public has thereby been persuaded that contraception and eugenics are identical and that in general birth control has a eugenic endorsement. The fact that the subject of birth control was not admitted to the two previous International Congresses on the ground that it had not yet met the full tests of scientific inquiry is sufficient answer to the most extravagant of these claims. The fact that birth control is being indirectly considered in the present International Eugenics Congress embodies the admission that eugenics must now take their part in more or less worldwide inquiry and inductive testing of claims which thus far have been largely theoretical or hypothetical.

As regards the limiting of population in the overcrowded communities of Europe the birth control propagandists advocate contraception on the one hand as indirectly eugenic by the reduction of offspring among the undesirable element. According to Dr. Louis I. Dublin, this need not apply to the United States. As quoted by Campbell, Dublin "has lately made a most thorough and painstaking estimate of population trends in the United States, and, not allowing for the further success of contraceptionists, he reaches the conclusion that the birth rate and the death rate will become equal in the United States in about thirty years, after which the population will not increase. This should quiet the fears of the neo-Malthusians, and at the same time it negates the contention that the general practice of

¹ This paragraph, and parts of the succeeding discussion, are quoted or expanded from a paper by Dr. C. G. Campbell, "Birth Control and Its Implications," published in altered form as "The Bio-Social Implications of Contraception," Proceedings of the Second International Congress for Sex Research, 1930.

contraception is mandatory on account of the danger of over-population." Campbell is disposed to "credit Dr. Dublin's forecast, partly because the largest life insurance company in the world depends upon him to calculate its vital statistics, and even more because his calculations have proven correct in other instances." Campbell further observes, "the population problem, in the United States at least, can be seen to be far more one of quality than of quantity. And if we seek to improve racial quality by the *restriction* of births, especially if such restriction seemed urgent, it should be evident that sterilization is a far more effective and dependable means of accomplishing this purpose than contraception. Hence contraception needs to find justification for itself other than on its eugenic value."

To promote the practice of contraception the birth-control propagandists claim to be benefactors of womankind whose great object is to relieve women of unnecessary suffering and unnecessary burdens. The attempt to relieve womankind of what may be termed the prehistoric and historic burden of the female of the species naturally enlists the sympathy both of the individualists of our time, who are ready to support any measure to give women greater freedom of profession and of action, as well as of the sentimentalists, who do not realize that women's share in the hard struggle for the existence of the race is a very essential element in the advance of womankind. The relief of the struggle for existence pressure from any animal or plant organism is an extremely dangerous experiment, for it may be said without exaggeration that the struggle for existence is the *sine qua non* of every great human or animal quality. Campbell recalls the fact that "the continuance of the race and the quality of the race rests primarily with women. In short, women are more essential to racial survival than men. If, for example, half the female population were exterminated—or chose to be unproductive—the possibilities of reproduction would perforce be diminished one-half; if, on the other hand, half the males were exterminated there need be no such diminution, the ovum being the indispensable factor. It is not difficult to see that the social organism rests upon this biological condition; both racial instincts and social mores decree that the protection and preservation of women is precedent to that of men, manifestly because women are racially the more precious. We might recall that ageless example in the Iliad of Hector's parting from Andromache, when he consciously went forth to his death in the forlorn hope of saving her and her children. . . . In any woman who possesses valuable traits which she has inherited and which she can pass on to offspring, the disposition to evade this obligation is a manifest racial delinquency. In order that those who are racially-minded might more often be saved from what they would

later regret as a major error in their lives, it is highly desirable that all intelligent individuals, particularly women, should understand these and other simple biological facts as early as the period of adolescence."

By unimpeachable statistics it has been found that two-children families are quite inadequate, three-children families fall short, and that an average of four-children families is essential to secure the perpetuation of a desirable family strain. Contraceptionists, who are apparently devoting their chief propaganda to the restriction of births, are more or less unsympathetic to proposals on behalf of "positive eugenics" which would tend to *increase* breeding in the desirable racial element. As to this crucial point we do *not* discover that the birth-control advocates have ever proclaimed four-children families among the desirable population as an article of their creed. It is to be noted at once that contraception does not promise to increase the proportionate breeding in the racially desirable element of humanity, namely, to the four-children family standard.

On the contrary, certain proponents of birth-control are now compelled to admit that contraception has gone to diminish such breeding. In other words, *birth control, as distinguished from birth selection, the dynamic plank in Galton's eugenic platform, must thus far be classed among the neutral if not among the adverse influences of racial betterment.* As observed by Campbell, "The investigations of Dr. Himes into the results of contraceptive instruction in England wholly confirms this inference. The dysgenic element can be led to water but it cannot be counted upon to drink. Hence as between eugenic and dysgenic results, the present unfavorable balance against contraception has small prospect of being changed into a favorable balance by the universal access to contraceptive information. In other words, contraception promises, in the future as in the past, to prevent more eugenic births than dysgenic births."

ETHICAL ASPECTS OF SCIENTIFIC MODERNISM

As regards the ethical aspects of these problems, the contrast between the moral standards of Thomas Henry Huxley as seen in his "Aphorisms and Reflections"² up to the year 1895, and the satirical forecast in the year 1932 of the future "Brave New World" by his distinguished grandson, Aldous Huxley, gives us a vivid realization of the moral revolution of the past forty years. Such extreme modernism is more than a revolution. It is com-

² "Aphorisms and Reflections" from the works of T. H. Huxley, selected by Henrietta A. Huxley, London, 1908.

The principles expressed in this address were adopted by a standing vote of the Congress. Cf. SCIENCE, August 26, 1932, Vol. 76, No. 1965, pp. 173-179.

plete extermination of one great historic and prehistoric family code based upon hundreds of thousands of years of human experience. The new code is essentially nihilistic as far as all old codes are concerned, whether pagan or Christian.

In young Huxley's satire extreme modernism enters the final phase of its logical consequences, from which he recoils while he satirizes. The "Brave New World" opens with the chemico-mechanical reproduction of children, the obsolete ideals of courtship, family and the home being eliminated as well as all the romances and traditions adherent thereto:

"I shall begin at the beginning," said the D. H. C. and the more zealous students recorded his intention in their notebooks: *Begin at the beginning*. "These," he waved his hand, "are the incubators." And opening an insulated door he showed them racks upon racks of numbered test-tubes. "The week's supply of ova. Kept," he explained, "at blood heat; whereas the male gametes," and here he opened another door, "They have to be kept at thirty-five instead of thirty-seven. Full blood heart sterilizes." Rams wrapped in theremogene beget no lambs. . . . He pointed. On a very slowly moving band a rack-full of test-tubes was entering a large metal box, another rack-full was emerging. Machinery faintly purred. It took eight minutes for the tubes to go through, he told them. Eight minutes of hard X-rays being about as much as an egg can stand. A few died; of the rest, the least susceptible divided into two; most put out four buds; some eight; all were returned to the incubators, where the buds began to develop; then, after two days, were suddenly chilled, chilled and checked. . . . Fertilize and bakanovskify—in other words, multiply by seventy-two—and you get an average of nearly eleven thousand brothers and sisters in a hundred and fifty batches of identical twins, all within two years of the same age. . . . "Only just eighteen months old. Over twelve thousand seven hundred children already, either decanted or in embryo. And still going strong. We'll beat them yet." . . .

The Controller shrugged his shoulders. "Because it's old; that's the chief reason. We haven't any use for old things here.

"Even when they're beautiful?"

"Particularly when they're beautiful. Beauty's attractive, and we don't want people to be attracted by old things. We want them to like the new ones." . . .

"The world's stable now. People are happy; they get what they want, and they never want what they can't get. They're well off; they're safe; they're never ill; they're not afraid of death; they're blissfully ignorant of passion and old age; they're plagued with no mothers or fathers; they've got no wives, or children, or lovers to feel strongly about; they're so conditioned that they practically can't help behaving as they ought to behave. And if anything should go wrong, there's *soma*." . . .

"Our Ford himself did a great deal to shift the emphasis from truth and beauty to comfort and happiness. Mass production demanded the shift. Universal happiness keeps the wheels steadily turning; truth and beauty can't."

The elder Huxley, as I know from delightful personal acquaintance of the winter 1879-1880, was, with Charles Kingsley, one of the finest exponents of religious realism *versus* religious hypocrisy and sentimentalism. He ad-

mired virtue just as much as he despised cant. Of all my long and noble list of scientific acquaintances I can think of no one who would have so shuddered and revolted against the chemico-mechanical concept of future society as pictured in such unsparing, bold colors by his grandson. To the elder Huxley as to Goethe and far back in time to Cicero, nature was the supreme court of appeal; as in the following epitome of Huxley's natural code:

The life, the fortune, and the happiness of every one of us, and, more or less, of those who are connected with us, do depend upon our knowing something of the rules of a game infinitely more difficult and complicated than chess. It is a game which has been played for untold ages, every man and woman of us being one of the two players in a game of his or her own. The chessboard is the world, the pieces are the phenomena of the universe, the rules of the game are what we call the laws of Nature. The player on the other side is hidden from us. We know that his play is always fair, just and patient. But also we know, to our cost, that he never overlooks a mistake, or makes the smallest allowance for ignorance. To the man who plays well, the highest stakes are paid, with that sort of overflowing generosity with which the strong shows delight in strength. And one who plays ill is checkmated—without haste, but without remorse.

I owe to Thomas Huxley the two outstanding principles of my own naturalistic philosophy; first, that nothing which is true can be harmful to the body, to the mind or to the soul; second, that whatever is natural in the wondrous and beautiful order of nature can not be fraught with danger. On the contrary, whatever is unnatural may not be essentially immoral but may be fraught with hidden dangers. Herein lies my general purpose and standpoint with regard to the main subject of this article. Birth-selection is natural; it is in the order of nature. Birth control is not natural and while undoubtedly beneficial and benevolent in its original purpose, it is fraught with danger to society at large and threatens rather than insures the upward ascent and evolution of the human race.

Such ascent, it seems to me, is the greatest responsibility with which we biologists and eugenists are charged to-day. I returned from my world tour more impressed than ever with the Galtonian principle of "not more but better and finer representatives of every race."

To begin at home, "not more but better Americans," which raises the question, What is an American? recently debated in the *New York Times* (January 17, 1932) with a number of my distinguished compatriots. The substance of my contention in this symposium was that the "Simon-pure" American is not hyphenated. He has all the strong and all the weak points of the ancestral Nordic as well as of the more recent Alpine and Mediterranean stocks. He is possessed of certain qualities which make him far

inferior to men of other races, an inferiority which he should freely admit and, as far as possible, rectify by education. He is now suffering severely from birth limitation which is seriously threatening the best strains of old American stock. He therefore needs to thoroughly understand the principles of birth selection rather than the principles of birth control. For him the Third Congress of Eugenics has a peculiar significance, but since the Congress is international it should carry an equally clear and distinctive message to each of the nations represented as well as to each of the primary races of mankind. The slogan "not more but better Americans" should have its counterpart in every country in the world in which the rising spirit of nationalism and of an entirely natural and reasonable pride should be accompanied by the consciousness that quality rather than quantity is the essential element of progress in every country and in every race.

With such principles in mind, and with the picture of the world suffering acutely from dysgenic reproduction, from the multiplication of the incompetent, and the alarming increase in the power of the criminal class before me, I can not refrain from expressing my deep conviction that, of all remedial and restorative agencies, the well-understood and well-applied principles of birth selection advocated by Galton, with birth control as a subsidiary principle, stand in the very front rank of progressive civilization.

SECTION II

ANTHROPOMETRIC METHODS
TESTS



ON THE NEED OF CHECKING IN ANTHROPOMETRY

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Every measurement, no matter how precise, has a certain error. The more flexible, mobile and ill defined the object measured the larger is the probable error of the measurement. It is possible to measure the length of a moving earthworm, but the error is very large. On the other hand, the diameter of a crystal can be measured more accurately.

Measurements made on the living human body are subject to an error and this, in the case of certain dimensions, is large. In addition to the changes in shape of the pulsating, living body there are possible errors in reading instruments, in calling off the numbers, in hearing the numbers by the recorder, in entering on the record sheet. Just a naked number associated with a particular dimension is worthy of little confidence, especially if it differs considerably from expectation.

Owing to the importance of knowing the error of one's measurements it would seem desirable to take measurements of each dimension on the individual either more than once in exactly the same way, or in more than one way.

For example, I have been in the habit of taking the measurement of stature at least 3 times, each time stimulating the subject to stand as tall as possible. So long as the heel does not leave the floor it is fairly obvious that the tallest stature is the best defined and may well be taken as the required measurement. Similarly in measurements of the height of bilateral points, such as acromion, I am in the habit of measuring both sides of the body. In the case of appendages, they are measured both from the floor and also directly with the anthropometer used as calipers. They may be measured a third time in span, elbow span and elbow to dactylion. Similarly the length of the legs is roughly checked by the sitting height, by the measurement of symphysis, anterior iliac spine, gluteal fold and, where possible, trochanter height.

In my own work I have found it useful to have a so-called checking sheet in which the measurements of particular organs, taken in different ways, are recorded during the course of measurement. If they do not check within expected limits then the dimensions are measured again. Thus the distance

of porion from the floor, subtracted from vertex height should check very closely with ear-head height. The horizontal distance of the glabella from the occiput in contact with a vertical wall should approximate the maximum head length. Foot length may be measured directly with calipers and also upon an outline traced upon a paper on which the subject is standing. An ingenious person will think of various ways in which approximately the same dimension can be measured, and by a little experience can work out the difference that has to be applied to the slightly differing dimensions in order to make them comparable. Thru such repeated and diverse measurements of the same organ one at last acquires a sense of reliability or unreliability of the measurement as finally accepted. It is to be hoped that the day may come when to each individual measurement of a living body may be attached its probable error; a method which has been found so useful in connection with means in statistics in general.

PLAN FOR OBTAINING AN INTERNATIONAL STANDARD TECHNIQUE IN PHYSICAL ANTHROPOLOGY

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At the meeting of the I. F. E. O. at Farnham, Dorset, in September 1930, a discussion took place on the Standardization of Human Measurements, with Sir Arthur Keith in the chair. Miss M. L. Tildesley read a paper on the subject, which was the basis for discussion of the physical measurements. Miss B. Schieffelin (Mrs. Bosanquet) introduced a similar discussion on the standardization of mental measurement. At the final meeting it was recommended to the I. F. E. O. that a provisional Committee be formed to bring about coöperation between eugenists and anthropologists, and also a committee of psychological experts and psychiatrists.

Since then, a committee formed by the Royal Anthropological Institute has drawn up proposals for a scheme by which the international standardization of anthropological techniques might be achieved. These were printed in *Man* (No. 193) and accepted as preliminary proposals by the Council of the Institute. Copies will be circulated at the meeting, together with a covering letter. It is suggested that these tentative proposals might be circulated by translation or otherwise, to the anthropologists in the various countries interested. Each country would then form a committee to work out an agreed scheme for anthropometric measurements. It was decided at the Farnham meeting that the measurements required for purposes of eugenic investigation did not differ in any way from those needed for anthropological purposes. The Royal Anthropological Institute is proceeding with steps to obtain agreement among British workers on the technique to be adopted for the various types of measurement, including anthropometric, psychological and blood groups. If anthropologists in each country will take similar steps, the various resulting programs drawn up may ultimately serve as the basis for securing international agreement. The formulation of proposals for the latter purpose would naturally come later. The first action suggested is the formation of a preliminary committee with a representative from each country, who would undertake to form a committee for that country which would discuss and prepare a scheme representing their concerted opinion regarding the best methods to be adopted.

STANDARDIZING MEASUREMENTS OF THE LIVING

RICHARD H. POST

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During the summer of 1929 the undersigned visited 17 leading anthropometrists in Europe and the United States to learn their techniques. The conclusions drawn from these visits are that many of the common measurements of the living are made from a variety of different anatomical points and with a variety of different techniques; that data on the same measurements gathered by different observers are therefore quite apt to be incomparable; consequently that there is great need for anthropometrists selecting the best techniques for taking their measurements and abiding by these at least in all work which might be useful in making comparisons with other workers' data.

Further differences were found in the choice of measurements, such as whether to take chest girth or the transverse and anterior-posterior diameters; whether to take sitting height directly or to compute it from stature and iliospinal height; etc. Agreement as to such questions would increase our total amount of comparative data.

Examples of the most outstanding differences in technique and anatomical landmarks follow.

Sitting height was found to be taken with the subject sitting on a table with the feet hanging free, and sitting on stools 50 cm. high, 40 cm. and 30 cm. high. Some investigators require that the knees be bent at right angles, others that they be extended straight. These differences are enough to cause differences in the tilt of the pelvis which would affect the total measurement. Some investigators make the subject lean his back against a wall; others do not. Some require that the eye-ear plane be drawn on the subject's skin so that the head may be kept horizontal. Some do not require the subject to "sit up straight."

Bicristal diameter is taken both from the lateral margins of the iliac spines and from the most anterior points of the spines.

Head height is measured by some as the distance above tragon and by others as the distance above the center of the auditory meatus. This distance may be at right angles to the eye-ear plane or it may be the

“greatest distance in the sagittal plane from the center of the line between the two trignon points.”

Nasion, a most important landmark because several small measurements are computed from it, is determined in a number of ways: by feeling the suture with the index finger nail; by visualizing it without palpation through the observer's knowledge of its position on skulls; by determining the most posterior point on the profile below glabella; and by choosing arbitrarily a distance of 5 mm. below glabella.

Further differences of technique and landmarks were found, particularly in measurements of span, the arm segments, and the chest diameters. There are differences of opinion in how much pressure to exert with the terminals of the instruments on the skin, and of which instruments to use,—all of which would make certain differences in the results.

The need for standardization in anthropometry was brought out clearly and emphatically by P. C. Mahalanobis and by M. L. Tildesley in their articles in *Biometrika* (1928). When this is achieved, the data of anthropometrists will become far more reliable (accurate, dependable) and also more significant since an increasing proportion will be comparable.

Until standardization of measurements, instruments and anatomical landmarks is achieved, it is urgently recommended that all publications of anthropometric data should include a complete description of the technique employed in each measurement.

THE UNIFICATION OF THE ANTHROPOLOGICAL TYPE OF ITALIANS AND ITS EUGENICAL EFFECTS

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[English Abstract]

The author shows, on the basis of a body of statistical data, that, within a period of more than 50 years, the body height of Italian males, at 20 years of age, has considerably increased, and the variability of stature has decreased. Evidence obtained from experimental genetics and the statistical investigation of human hybrids suggest that these phenomena depend both on amalgamation between the three main racial stocks of Italian population and the improved economic situation in Italy.

By racial amalgamation the Italian population slowly tends toward physical unity and the acquisition of some Eugenic benefits, viz., the reduction of the frequency of some disadvantageous features, whose recessive type of heredity is favoured by inbreeding, and the production of hybrid vigor, both physical and mental.

BLOODGROUPS IN RELATION TO RACE IN THE DUTCH EAST INDIES

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During the fourth Pacific Science Congress held in Java in 1929, Prof. Kleiweg de Zwaan suggested the forming of a "standard committee" on bloodgroups, which committee was afterwards established under his chairmanship.

My position as military medical inspector of the Moluccas enabled me to study bloodgroups in several parts of this group of islands, which forms the eastern half of the Indo-Australian Archipelago. This was of special importance because of the fact that the Moluccas have a population that differs principally from that of the western part of the said Archipelago. The latter includes mainly the four Major Sunda Islands Java, Sumatra, Borneo and Celebes, which are populated for a great deal by Malay tribes of Mongoloid appearance. The eastern part of the Indian-Australian Archipelago however is inhabited by Malay tribes, in which the Mongoloid strain is far less apparent. Instead the frizzly-haired Papuan has clearly put his seal and therefore the population of the Moluccas as well as that of the Minor Sunda Islands might be called with reason Melanesians, as we may understand by that denomination a mixture of Malayo-Polynesians and Papuans. Now Mongols and Papuans are anthropological antagonists and so it naturally follows that one should look for a conspicuous difference in bloodgroup condition.

In the western—as we might say Mongoloid—part of the Archipelago the bloodgroup B is predominant and according to the four fairly large investigations on Javanese and men of Sumatra of Bais, Verhoef, v.d. Made and Einthoven-Schuil it amounts to some 30 per cent. The A group is somewhat lower and so the Biochemical Race Index is less than 1, viz. 0.8 to 0.9. Only Dr. Miss v.d. Made in her large investigation on 10,000 Javanese got an index of a little above 1 for the men and one of exactly 1 for the women. The zero group amounts for the Javanese to 35 to 40 per cent and for the Sumatra men from 34.5 (Einthoven-Schuil) to 43.7 (Bais-Verhoef).

Passing to the eastern, more Melanesian part of the Indian Archipelago

it is best to begin with the Papuans themselves whom I was able to examine in the southwest part of New Guinea. I tested 500 persons, which number has sufficient typifying strength as this region is very thinly populated. I was surprised to find there a bloodgroup formula of nearly European type: O 37.6 per cent ± 1.44 , A 44.4 per cent ± 1.48 , B 13.2 per cent ± 1 . AB 4.8 per cent ± 0.64 ; BRI = 2.7 and following Bernstein's interpretation $p = 0.29$, $q = 0.10$, $r = 0.61$. Now there is morphologically and even psychologically much more in the Papuans that reminds us of the Whites than that reminds us of the Mongols. Nevertheless I have to record two other investigations of racially pure Papuans of other parts of New Guinea that resulted in quite another formula and so things will not go so easy as seemed at first sight. Dr. Kalthofen found for 1000 Papuans of the south coast: O 56.2 per cent, A 22.2 per cent, B 17.1 per cent, AB 4.5 per cent and Dr. Bos found for the Schouten Islands, which are inhabited by nearly the same sort of Papuans as the southwest coast: O 63.7 per cent, A 17 per cent, B 17 per cent, AB 2.3 per cent (1300 individuals). So the O group grew in both cases very high and A lowered to the slightly increased value of B. A very astonishing divergence indeed.

Taking to the isle of Ceram there has been found something of the same kind. I got for the Aloene-tribe an A majority and for the Wemale-tribe not only no leading A but on the contrary a small B predominance, moreover an exceedingly high zero. Now those two tribes are really of different descent, but not at all of different race. They are on the contrary closely allied. However the figures show a really enormous difference, as may be seen here:

765 Aloene ϕ 34% ± 1.13 ; A 42% ± 1.19 ; B 17% ± 0.89 ; AB 7% ± 0.62 ; $p = 0.285$; $q = 0.13$; $r = 0.585$; BRI = 2.04
 281 Wemale ϕ 68% ± 1.85 ; A 10% ± 1.19 ; B 21% ± 1.62 ; AB 1% ± 0.4 ; $p = 0.055$; $q = 0.12$; $r = 0.825$; BRI = 0.50

I succeeded in establishing once more a similar divergence in Halmaheira, another of the larger islands in the Moluccas. Two villages, situated at a distance of two or three hours from each other, provided formulae, wherein for one the A was 3 times B (for 200 individuals respectively 33.5 per cent and 11.5 per cent) and for the other the B was 4 times A (for 300 individuals respectively 27 and 7 per cent) and O groups of respectively 54 per cent and 67 per cent. In this case the B-village had been subject to more intrusion from abroad than the A village, but there could be no question about any significant difference in race.

So the investigations in the three islands New Guinea, Ceram and Halma-

heira lead to the important conclusion, that in a race the bloodgroup distribution may diverge widely in different resorts and that this divergence of the local groups is really larger than that which can be expected between races themselves. This is not to be understood as if race should not have an important relation of its own to bloodgroups, but only that rural resorts, generally subject to a great deal of inbreeding, result in giving a blood-group formula of quite a local nature. Indeed inbreeding takes place to a considerable extent in the small inland communities of all these islands and not until we have surveyed and perused a great many groups are we in a position to get an idea of the bloodgroup condition of the concerned race. Having done so, I expect to have sufficient evidence to forward the following points, resulting from a material of more than 5000 individuals in the Moluccas. This is not the place for figures and calculations, they can be found in the Medical Periodical of the Dutch Indies 1931-1932.

Indeed the bloodgroup distribution is for the Melanoid Malays otherwise than for the Mongoloid Malays. For although the B group as I showed you before, predominates more or less in some groups, the A predominates to much greater extent and in more extensive areas. Moreover the B percentage itself stands far behind that of Java and Sumatra, it scarcely exceeds 20 per cent. There is an inclination towards the A group that has not been found in the latter islands and that seems to be bound up with the most isolated tribes. In this connection it is important that Dr. Miss v.d. Made also found A affinity for the more isolated villages in the mountains of West Java. So there is the probability that the original—and that is non-Mongoloid—population of the Dutch Indies is inclined to A majority. This holds further for the Papuans especially although it must be said that even there the A predominance is not so uniform as might be expected of a race with such specific and exclusive properties.

STABILITY OF THE SEASHORE MEASURES OF MUSICAL TALENT AS SHOWN BY RETESTS

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of Rochester*

The inheritance of musical talent is a subject which has been actively uppermost in the minds of many who are interested in the question of the inheritance of specific capacities. About a decade ago an experimental investigation was initiated by the writer, under the immediate direction of Charles B. Davenport, to determine tendencies in families to inherit specific musical capacities and, if possible, to open any leads as to the method of inheritance.¹ Certain measures of specific musical capacities were available for such an investigation. These tests, the Seashore Measures of Musical Talent, were being released at that time from their experimental development in the laboratory and in the field. Prediction had been made on the basis of experimental knowledge that these measures of musical talent were measurements of innate capacities for musical growth rather than the measurement of accomplishment or achievement. Such information has been substantiated by further application to a real situation; therefore these particular measures are exceedingly valuable for the accumulation of knowledge as to the musical capacities among members of families.

After ten years' application of the Seashore tests to entering students at the Eastman School of Music, The University of Rochester, the results of the retests of these students at three year intervals have confirmed and established the capacity nature of these tests. Three studies covering the material in the retests, one for adults and two for children, have been made. The first study, concerned with the retests of music degree applicants, was temporarily closed for published record when 157 cases had been retested.² The second and third studies of retests are concerned with children who have

¹ Stanton, Hazel M. The Inheritance of Specific Musical Capacities. Bulletin No. 22 Eugenics Record Office, Carnegie Institution of Washington, April 1922. Reprint from Vol. XXXI, No. 1 of the Psychological Monographs, Princeton, N. J.

² Stanton, H. M. and Koerth, W. Musical Capacity Measures of Adults repeated after Music Education. University of Iowa Studies, published by the University, Iowa City, Iowa. October, 1930.

been tested twice and thrice, and in a few cases four times, with an interval of three years intervening between tests. The children's retest studies are now in preparation for publication.

This paper is concerned primarily with the adult retest study in which 157 students who were applicants for the four year bachelor of music degree courses were given the Seashore tests before entrance to the course and re-tested at the beginning of their senior year after a three year interim. The three year interim of study included the prescribed course of practical music, theoretical music, and academic subjects. If the results of the Seashore tests can be improved by intensive musical training and education, such a prescribed course over three years would cause a noticeable increase in test scores, but if the results of the Seashore tests are not significantly influenced by musical training and education there will be a similarity between first and second scores for the same individuals. In other words, if the Seashore tests are measures of capacities fundamental in musical growth, these capacities when once matured will remain approximately the same in retests. When maturation of capacities has occurred it is assumed that there will be a normal fluctuation between first and second test scores, especially in tests which involve the threshold of hearing. It is absolutely necessary that the tests in a study of this nature be given under strict scientific conditions by an experienced examiner, assuring the best scores individuals are capable of making. Figures, tables, and direct quotations presented in this paper are taken from the adult retest study by Stanton and Koerth referred to previously.

The five Seashore tests used were the tests of Pitch, Intensity, Time, Consonance, and Tonal Memory.³ Referring to the scores of the first tests as T_1 and the scores of the retests as T_2 , we find a variation in T_2 over T_1 as shown in figure 1. The range in scores is expressed in steps of three units gained or lost. The variation in retests is noticeably negative as well as positive. In other words, one tends to drop below the exact first score of a test as well as raise that score in a retest. The natural individual fluctuation occurring in the repetition of fundamental human responses is observable in the range of these scores. In each test a certain per cent of the students retained the same scores in both T_1 and T_2 , ranging from 6 per cent with the same pitch scores to 11 per cent with the same tonal memory scores. Since the peak of the curves for both gains and losses occurred in the ± 3 units, the writers are indicating this span of ± 3 unit fluctuation in retests as a normal fluctuation span and not to be designated as either a gain

³ Seashore, C. E. *The Psychology of Musical Talent*. Silver, Burdett and Company. Boston, Massachusetts, 1919.

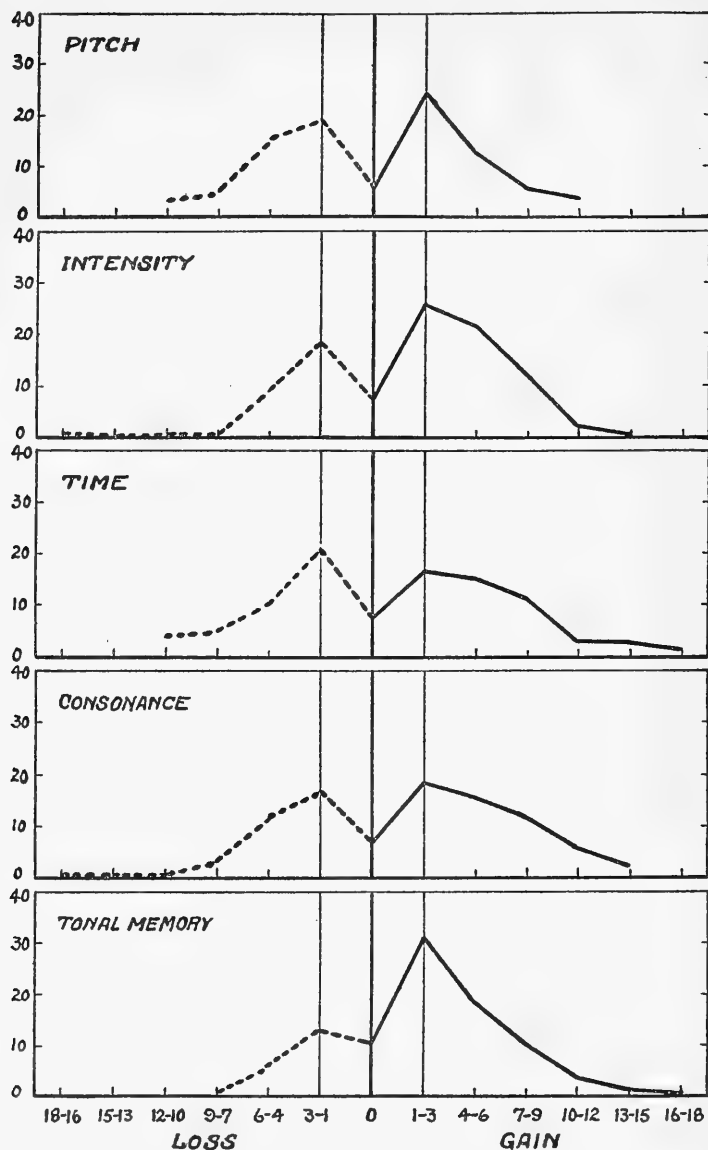


FIG. 1. DISTRIBUTION OF RAW SCORES GAINED OR LOST IN T_2 OVER T_1 . $N = 157$

Ordinates represent percentages of cases.

Abscissae to the left of zero represent losses in score, to the right, gains. Zero indicates no gain or loss.

or a loss. The percentages of students with retest scores the same or within the ± 3 unit variation are 50 per cent in pitch, 52 per cent in intensity, 46

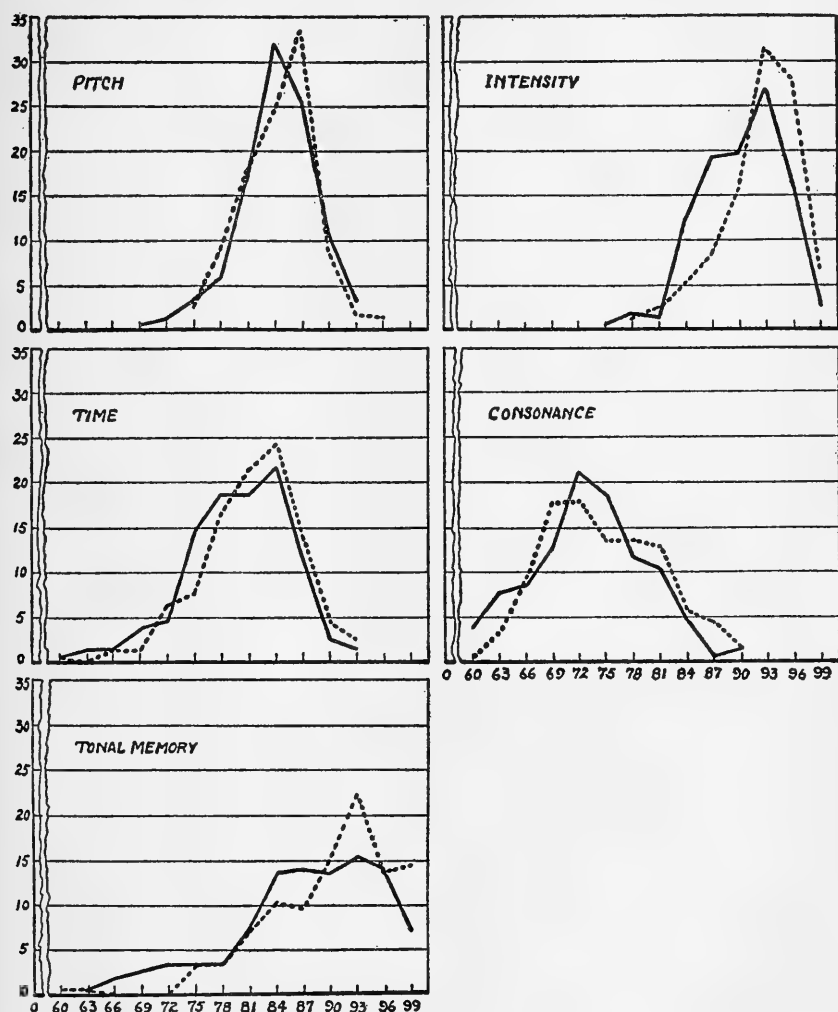


FIG. 2. DISTRIBUTION OF T_1 AND T_2 RAW SCORES IN FIVE MUSICAL CAPACITY TESTS AFTER AN INTERIM OF THREE YEARS. $N = 157$

The ordinates represent percentages of cases.

The abscissae represent the mid-point of each three-unit step in raw scores.

The solid line represents T_1 .

The dotted line represents T_2 .

per cent in time, 45 per cent in consonance, and 55 per cent in tonal memory. This places approximately one-half of the cases in the expected normal fluctuation span and the other half showing either an increase or decrease in scores. Approximately 75 per cent or three-fourths of the cases fall within the ± 6 unit span of fluctuation.

The distribution of raw scores for T_1 and T_2 is shown in figure 2, the solid line for T_1 and the dotted line for T_2 . In each test the two distribution curves tend to occupy the same area and show very little fluctuation. The T_2 curve shows too little gain in scores to be indicative of the effect of musical training. These distribution curves lead to further interpretation of the variation in retest scores by noting the arithmetic means of raw scores and the Pearson r in T_1 and T_2 for each of the five tests. These are shown in table 1.

TABLE 1

Arithmetic mean scores in T_1 and T_2 and the correlations of these scores. $N = 157$

	MEAN T_1	MEAN T_2	DIFFERENCE	r	P.E.
Pitch.....	84.0	84.1	+0.1	.54	$\pm .04$
Intensity.....	90.3	92.2	+1.9	.80	$\pm .02$
Time.....	80.2	81.4	+1.2	.45	$\pm .04$
Consonance.....	72.8	74.4	+1.6	.62	$\pm .03$
Tonal memory.....	87.2	90.0	+2.8	.83	$\pm .02$

According to Garret's interpretation of correlation values, p. 298 of his *Statistics in Psychology and Education*, the correlations of T_1 and T_2 for pitch, time, and consonance, which fall within the range of .40 and .70, denote substantial or marked relationship. The correlations for intensity and memory which occur from .70 to 1.00 are said to have high relation.

"These facts substantiate the statement that when the Seashore tests are given under controlled conditions by an experienced examiner, the physiological threshold can be reached to such a degree in T_1 that there will be little appreciable average variation in T_2 . The median and mode show similar relationships. Musical education and training for a three-year period effected little change in the test scores. This severely tested evidence verifies the fact that the Seashore tests here considered are measurements of capacity and not of achievement. It is possible for adults to attain their greatest measurable degree of capacity which will not vary significantly with musical training and education. When reliable results are obtained, these results indicate the capacity for achievement and for this reason they

have real prognostic value. Herein lies the greatest scientific value of the Seashore tests. Shall we then say that musical capacities as measured by the Seashore tests reach a certain degree when one becomes an adult with no significant variation after that time? Evidence herein presented substantiates an affirmative answer, but this question will again be considered in further discussion of this fact in a forthcoming study by the writers on the retests and re-retests of children after musical training.

"The correlations (Pearson r) shown for each of the five tests in table 1, range from $+.45$ in the time test to $+.83$ in memory. Within the knowledge of the writers there is no published interpretation of correlation values for measurements in which the threshold of hearing is involved, apart from intelligence tests, vocational tests, et cetera. It is suggested that correlations for these measurements be interpreted with some consideration of this factor (threshold of hearing). At best there is a wide divergence in the interpretation of correlation values for any tests."

The discussion up to this time which has referred to raw scores only will now be directed to the centile ranks obtained by these music degree students. In the group of 157 students, 103 of these were entrants in the first four years of the school's organization, hence they were not subjected to as exacting a curriculum as were the remaining group of 54 students who entered after that time. For this reason the 54 students were considered separately to discover if possible whether or not their greater discipline mentally and musically would produce a greater positive variation in the test results than was found for the somewhat less disciplined group of 103 students. Before proceeding to the discussion of centile ranks for the split group, the writer wishes to take a moment to cite the average variation in units of raw scores in T_2 over T_1 for the more disciplined group of 54 students. These are: -0.1 in pitch, $+1.6$ in intensity, $+1.8$ in time, $+2.1$ in consonance, and $+3.0$ in memory. While all but one is a positive variation, none exceed the normal fluctuation span of ± 3 units established for the whole group. The increase of T_2 over T_1 is not sufficient to conclude that the more rigid training and education experienced by this group produces any significant improvement in the Seashore tests.

When test scores are transferred to centile ranks according to the adult norms, each student's musical capacities are expressed in the form of a talent profile. All centile ranks for each test were averaged in order to present the talent profile for each group of students. In figure 3 these group talent profiles are presented for T_1 (solid line) and T_2 (dotted line) for the split groups of 54 students and 103 students respectively and for the total group of 157 students. It is apparent that at the time of the first tests the

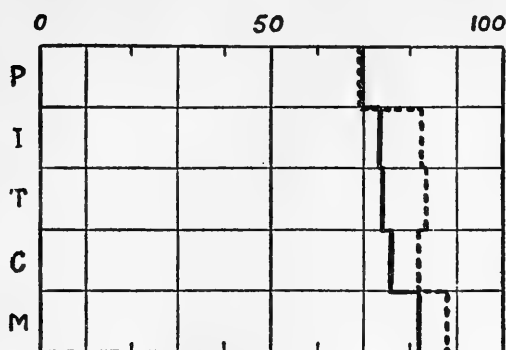
talent of the 54 students was higher than the talent of the 103 students as shown by the solid talent profiles for each group. The variation in the average centile ranks for the 54 group extends from .8 unit in pitch to 9.2 units in intensity, with an average variation for the five tests of 5.1 units. For the 103 group the average centile rank variation extends from 1.1 units in pitch to 12.3 units in intensity, with an average variation for the five tests of 5.4 units. For the combined groups of 157 students the average centile ranks in each test vary from .5 in pitch to 11.2 in intensity, with an average variation of 5.6 units for the whole profile.

The variations of T_2 centile rank averages over T_1 are very similar in both groups and cannot be said to be a significant increase. These average variations in centile ranks of T_2 over T_1 should be interpreted in the light of the fact that the same centile rank norm was used for both test series. Had there been a separate norm for retests, the centile ranks in T_2 would have been lower and the variation span in the two average profiles would probably tend to disappear.

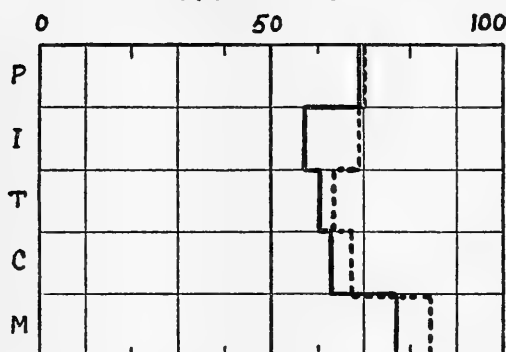
Talent profiles are classified empirically into a six letter group of A, B, C+, C-, D, E (E the lowest). The individual talent profile classifications for the 157 students fell in the first four letter groups of A, B, C+, C-. These classifications were used for a further correlation of T_1 and T_2 by means of the coefficient of mean square contingency (C) which was found to be .695. When the number of classes is 4, which it is in this case, the C cannot exceed .866, hence the correlation of talent profile classifications is significantly high. Therefore, those students who have an A talent profile, a B, a C+, or C- talent profile at entrance to the school can be expected to have a similar talent profile classification in a retest.

Subsequent study of these and similar data have not changed the conclusion cited in the following quotation from page 18 of the study noted: "Interpret as the reader may, the fact remains that did these tests not come somewhere near measuring native capacities there should be much greater gains after three years of intensive musical study. Not having data on retests of groups that had no musical education in the interim between tests, we are not justified in ascribing the slight gains shown for these groups to the effects of music education . . . the gains as well as the losses can easily be due to cognitive factors as well as other attendant circumstances."

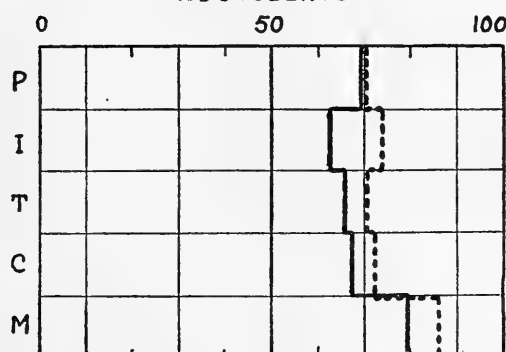
The last part of this paper deals briefly with the retests of 645 children over a period of ten years. These children have been divided into three groups for study according to their day school grades at the time of the first test; the pre-adolescent group, grades 4, 5, 6, includes 285 pupils, the adolescent group, grades, 7, 8, 9, includes 208 pupils, the post-adolescent



54 STUDENTS



103 STUDENTS



157 STUDENTS

FIG. 3. PROFILES OF TWO GROUPS AND OF THE TWO GROUPS COMBINED DERIVED FROM THE AVERAGE CENTILE RANKS IN EACH OF THE FIVE MEASURES OF MUSICAL TALENT, PITCH, INTENSITY, TIME, CONSONANCE AND TONAL MEMORY

T₁, the solid profile. T₂, the dotted profile

group, grades 10, 11, 12 and a few special students from sixteen to thirty years of age, includes 152 pupils. At the time of T_1 , the average ages for each group were 10.4 years, 13.2 years, and 18.9 years; at the time of T_2 , the average ages were 13.6 years, 16.5 years, and 21.6 years. The interval between tests is approximately three years. According to the above division into three groups and the elapsed interval between T_1 and T_2 , the pre-adolescent group had their retests when they were in their adolescent grades, and the original adolescent group had their retests when they were in their post-adolescent grades.

Numerous questions arise as to the changes and variations which may occur for the same children as they progress into the adolescent age in one case and out of the adolescent age in the other case. Will an expected growth in capacities occur up to the ages of maturity comparable in any way with the natural and regular growth in height? In other words, is there a maturation of capacities? Is there any order or regularity or system in such growth of capacities? Is there a tendency for those who have high capacities to continue with high capacities during growth? Likewise, do those with low capacities in the first place continue with low capacities? Are there losses in retests as well as gains? Is the loss, if any, more evident from the pre-adolescent to the adolescent than from the adolescent to the post-adolescent? Space and time do not permit the presentation of all the facts obtained up to this time which would furnish the basis for discussion of the queries mentioned above and others which have come to mind; therefore only certain data relevant to raw scores in each of the five tests for the three groups, and certain other data relevant to the centile ranks will be presented in this paper.

The arithmetic mean of raw scores for T_1 and T_2 were presented for the music degree students with the positive or negative variation which occurred. Similar data for the pre-adolescent, adolescent, and post-adolescent groups are shown in table 2.

From observation of the facts above the mean scores of T_1 for each group tend to be higher according to age. This does not necessarily mean higher talent for the older groups but may be an expected increase in scores due to the fact that the ultimate scores to be made by individuals depend upon their development not alone as to chronological age but also the educational age. The T_2 mean scores are higher for the adolescent group than for the pre-adolescent, but a similar tendency does not continue into the post-adolescent group. It can be inferred that those pupils who remain in the school long enough for retests, a three year interim, are, for the most part, the high talent of the original groups who entered the school, but this may not neces-

sarily be true. It is curious that the mean scores of T_2 for the pre-adolescent group are so similar to the mean scores of T_1 for the adolescent group.

Particular attention is called to the differences in the mean scores of T_1 and T_2 in each test from the pre-adolescent group to the adolescent group to the post-adolescent group. There is a noticeable decrease in the mean differences in these scores for all tests except consonance. Recalling the

TABLE 2

Arithmetic mean scores and the mean differences for three groups, the pre-adolescent, adolescent, and post-adolescent

	PRE-ADOLESCENT			ADOLESCENT			POST-ADOLESCENT		
	N = 285			N = 208			N = 152		
	Mean		Differ- ence	Mean		Differ- ence	Mean		Differ- ence
	T_1	T_2		T_1	T_2		T_1	T_2	
Pitch.....	76.5	81.2	+4.7	81.2	83.3	+2.1	80.6	81.9	+1.3
Intensity.....	78.7	86.3	+7.6	84.7	90.2	+5.5	86.8	90.1	+3.3
Time.....	70.2	76.3	+6.1	76.1	79.8	+3.7	78.1	80.7	+2.6
Consonance.....	68.9	70.6	+1.7	70.8	72.7	+1.9	70.6	72.5	+1.9
Memory.....	65.3	78.2	+12.9	77.7	84.5	+6.8	80.6	84.2	+3.6

TABLE 3

Differences in mean raw scores of T_1 and T_2 for four groups in order from left to right, pre-adolescent, adolescent, post-adolescent, music degree students

TEST	POSITIVE DIFFERENCE IN MEAN SCORES OF T_1 AND T_2			
Pitch.....	4.7	2.1	1.3	0.1
Intensity.....	7.6	5.5	3.3	1.9
Time.....	6.1	3.7	2.6	1.2
Consonance.....	1.7	1.9	1.9	1.6
Memory.....	12.9	6.8	3.6	2.8

mean difference of scores for the music degree students, each test shows the positive variation in mean differences for all four groups according to the order of pre-adolescent, adolescent, post-adolescent, and music degree students (table 3).

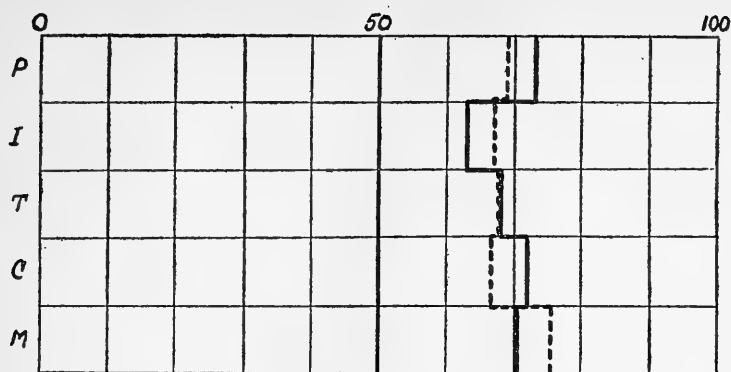
From such a descending series as these tests present from the pre-adolescent group to the music degree students, one is inclined to interpret, since there is less gain in retest scores as the ages increase, that some maturation of capacities occurs up to the college prepared pupils. This maturation

is evidently due to the natural development and growth of children schooled through the twelve grades of our day schools.

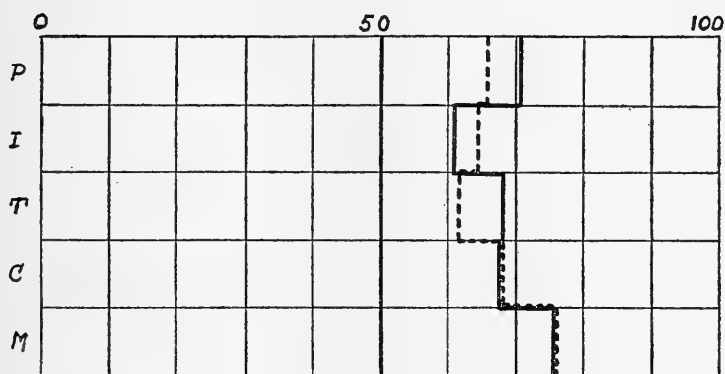
The norms made from unselected groups for the transfer of raw scores to centile ranks are school grade norms rather than age norms. Since raw scores are naturally higher for children as they advance in school grade, the norms for each school grade offer an interpretation of that developmental growth at successive periods commensurate with the natural increase. The process might be compared to the known fact that a child who is tall when young tends to be tall during successive periods of his growth. His height increases with growth, but when he is compared at successive ages to a group of similar age his height has increased at sufficient rate to classify him as tall at those successive periods. Have we a similar tendency of increase in test scores such that they increase at sufficient rate to classify a pupil high in capacities at successive periods, low in capacities, or average, et cetera?

Our study of 146 re-retests, those children who have been measured three times with two three-year intervals occurring between tests over a period of seven years' development for each child, and about one dozen pupils who have been measured four times with three three-year intervals over a period of ten years' development, will give us further light on this subject, but no attempt will be made in this paper to present data for pupils with three and four tests.

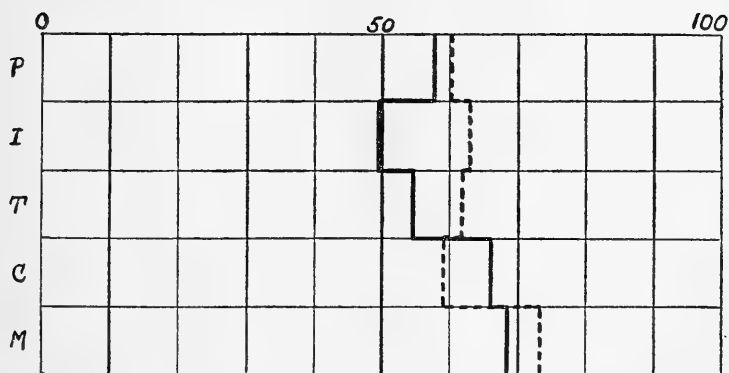
With the brief discussion of raw scores for the children's groups, we will now consider the talent profiles of the retest groups. The three groups of children's retests show the following variation in talent profiles, each group profile of T_1 and T_2 representing the average centile ranks. T_1 is the solid profile and T_2 , the dotted profile. Notice the interlacing of the T_1 and T_2 profiles in each group. The centile rank variations in each test are negative as well as positive. On the whole, the average talent profile for each group tends to remain in the same area for T_1 and T_2 . These data suggest the tendency for each pupil's talent profiles for T_1 and T_2 to be similar; for example, if a child has high capacities, average capacities, or low capacities when in the fifth grade of day school, that child tends to have the same capacities when in the eighth grade of day school. Such a prediction holds true from the viewpoint of talent profile classifications for 54 per cent of the children's groups. In other words, 54 per cent of the pre-adolescent, adolescent, and post-adolescent groups have the same talent profile classification in the retests as they did in their first tests, 43 per cent of the groups had a classification either one step higher or one step lower, so that 97 per cent had the same or similar talent profile classifications in



285 PRE-ADOLESCENT



208 ADOLESCENT



152 POST-ADOLESCENT

FIG. 4. TALENT PROFILES FOR T_1 AND T_2 OF THREE GROUPS OF CHILDREN, THE PRE-ADOLESCENT, ADOLESCENT, AND POST-ADOLESCENT, DERIVED FROM THE AVERAGE CENTILE RANKS IN EACH OF THE FIVE MEASURES OF MUSICAL TALENT, PITCH, INTENSITY, TIME, CONSONANCE AND TONAL MEMORY

both tests. This leaves only 3 per cent varying beyond one letter step in the talent profile classification scope of A, B, C+, C-, D, E.

Therefore, in conclusion, on the basis of information available from the repeated tests of musical capacities over a period of years for children and adults, as well as other cogent data not presented in this limited time, the Seashore measures of musical capacities are recommended as scientific tools to be used in basic studies of musical inheritance in families. It would seem most advantageous that studies of the inheritance of musical capacities should in the future contain more and more of the factual data obtainable through quantitative measurements supplemented and substantiated by the qualitative data that have been thus far depended upon almost exclusively.

THE HANDWRITING OF INTROVERTS AND EXTRAVERTS

JUNE E. DOWNEY

University of Wyoming

To determine whether the temperamental patterns conventionally described as introversion and extraversion show themselves in handwriting, written samples of an alphabetical sentence were collected from a group of some one hundred sixty individuals, of whom one hundred and two were members of a university faculty and the rest college students. The samples were obtained in connection with returns from Root's Short Test of Introversion-Extraversion,¹ so that it was possible to select on the basis of the Root scores two groups of penmen definitely contrasted with respect to the characteristics in question. To increase accuracy, ratings by friends were obtained for this selected group in terms of the two introvert tendencies of withdrawal from society and seeking of satisfaction in imagery, day-dreaming and problem-solving, and the contrasting extravert tendencies of mixing freely with people and expressing imagery and thought in overt behaviour. The combined procedure finally yielded twenty-five specimens of handwriting which could be assigned to definitely introverted individuals and twenty-five which could be assigned to definitely extraverted individuals. A few specimens carried question-marks concerning their inclusion in the group but the collection as a whole was fairly satisfactory. It was found, it may be said, easier to validate the questionnaire results by the judgments of friends in the case of university faculty members than in the case of college students.

From the material obtained twenty-five pairs of handwriting samples were arranged by coupling together the writing by an introvert and that by an extravert, keeping constant the sex and the approximate age. A group of fifteen pairs was obtained for faculty subjects and ten for student subjects, twenty-five in all. Again the pairs are fairly satisfactory but a few pairs were recognized as showing incompatibilities, one particularly with reference to a discrepancy in age, which will be referred to later.

It was not possible to select judges or assistants for the test with the same care used in selecting specimens. Individuals differ very greatly in their

¹ A. R. Root. A Short Test of Introversion-Extraversion. The Personnel Journal, x (1931), 250-253.

sensitiveness to graphic form. It was, however, necessary in the present test to rely in choosing assistants merely upon the author's general impression as to an individual's interest in and sensitiveness to personality differences and, particularly, his "feeling" for the characteristics covered by the terms extravert-introvert. The instructions were very simple. Each judge or assistant was given the collection of paired writings of the same sentence, each marked with its identifying number, and asked to choose which sample had been written by an extravert, which by an introvert and to record his choice by number under the properly headed column on the record sheet. No names were given. The writing of the faculty group and that of the student group was kept separate and the records listed in two distinct series.

It was discovered later that the experiment might be conducted as a group test by use of a Bausch-Lomb balopticon. The pairs mounted together on a card could be projected upon a screen. The resulting magnification was found to be helpful to many judges. In the present paper, however, the results with the balopticon will not be discussed.

The results may be summarized by giving the percentage range of right judgments for individual judges; the mean for the group of twelve judges with the average variation from this mean; and the percentage of right judgments on each pair. In the case of samples obtained from the faculty group, an objective study was made of the writing in order to determine whether certain measurable graphic characters could be associated with temperamental tendencies.

In terms of percentage, the range of right judgments for the individual judges was from 52 per cent made by one judge, to 80 per cent made by three judges. The mean percentage of correct judgments was 72 per cent with a mean variation of 6.6. Mere chance would give 50 per cent correct judgments. The actual result is 72 per cent correct or 22 per cent better than chance. Seven of the twelve judges scored above 75 per cent right judgments, or 25 per cent above chance. The results, as a whole, are somewhat better than those reported when sex was judged from handwriting. In the latter investigations, however, no selection of subjects was attempted while in the present instance very definite selection was made of the penmen whose writing should be used in the experiment. It should be emphasized that this selection was in terms of penmen and not in terms of graphic samples—a procedure which would have invalidated the whole experiment. In judging sex in handwriting a similar procedure would involve choice of handwriting specimens on the basis of scores received by penmen on a questionnaire relative to sex characteristics.

For the purpose of the present test, namely the study of graphic characters, the results relative to each sample of handwriting are of more significance than the results in terms of a mean. In percentage terms the range of right judgments was from 8.3 per cent on one sample to 100 per cent on two samples. The group judgment in the first instance is, of course, not a chance one; it suggests a distinct reversal of temperamental signs.

As a convenient method of studying the results the samples may be thrown into three groups: seventeen on which the group judgments were from 66.6 per cent to 100 per cent correct; five on which the group judgments ranged from 41.6 per cent to 58.3 per cent correct; three on which the percentage of correct judgments was from 8.3 to 33.3. In checking these results the first procedure was to get the average difference in scores on the Root Test for the three groups. They were as follows: first group, 25.3; second group, 18.5; third group, 29.2. The difference between the first and second group is in the direction anticipated but the third group offers a curious problem.

Study of the eight individual pairs of the second and third groups is, of course, of interest but cannot be given any very great weight because of the inclination to rationalize such results. A few remarks may be ventured. Of the five pairs in which right judgments were scarcely more than chance, one was the handwriting of a woman of seventy matched with that of a much younger woman, an unfortunate pairing mentioned earlier. In another case backslant influenced unduly the judgments given. Of the three cases in which there was a reversal of judgment there is, possibly, in spite of the care used in selection, a wrong classification of one individual. The outstanding reversal (8.3 per cent right and 91.6 wrong) is of considerable interest. Eleven of the twelve judges agreed on classification of the members of this pair; the one discrepant judgment came from the poorest judge of the group although he was in this case the only one objectively correct. The penmen themselves are outstandingly extravert and introvert. The latter is characterized by a certain amount of bluster and affectation and writes a sharply individualized hand with many flourishes, one of the most pretentious of the group. Two of the best judges stated that it was definitely an introvert hand, one pointed out the evidences in it of hesitancy and angularity and remarked on the tightening of the muscles apparent in the final Y-loop. But, however introvert it appeared, its mate appeared more so since this sample was marked by excessive control throughout. This writing, that of the extravert, is small, regular, controlled. The writer of it is a naturally left-handed individual who had been shifted to right-hand writing; he is, moreover, a teacher in a school of Com-

merce who had strong motives for developing a set hand. He has often remarked that his hand doesn't look in the least like him, a true description.

Characteristics of the writing of introvert-extravert as listed by the judges are of some interest although of course the lists have only exploratory

A (Extravert) Right Judgments 100%
*The quick brown fox jumps over
 the lazy dog.*
Laramie, Wyoming

W (Introvert)
The quick brown fox jumps over the lazy dog.
Laramie, Wyoming.

C. (Extravert) Right Judgments 100%
*The quick brown fox jumps over
 the lazy dog.*
Laramie, Wyoming

L. (Introvert)
*The quick brown fox jumps over the
 lazy dog.*
Laramie, Wyoming

and limited value. The extravert writing is described as free, symmetrical, unrestrained, bold, flowing; the introvert as cramped, restrained, perhaps backslanted. Concentration on certain details in a mechanical way was a less successful method of classification than preoccupation with general quality of the writing—an attempt to get the “feeling” of the hand. One

of the most successful judges did not even compare the pairs but labelled each specimen on sight. On the whole, however, careful study of the hands, although not obsession with one or two details, was more successful than snap-shot judgments. The best judge brought to the experiment experience

207 (Introvert)

Right Judgments 91.6%

The quick brown fox jumps over the lazy dog.

401 (Extravert)

The quick brown fox jumps
over the lazy dog.
Laramie, Wyoming.

X (Extravert)

Right Judgments 91.6%

The quick brown fox
jumped over the lazy dog.
Laramie, Wyoming

O. (Introvert)

The quick brown fox jumps over the
lazy dog.

in studying freedom or cramp in movement and gave close attention to the angularity of strokes in the "n's" and "m's."

There was difference of opinion among the judges as to which hand might be expected to conform more to conventional standards and which hand would be the more highly individualized. As a matter of fact the con-

ventional hand appears in both groups,—as does the backslanted hand,—and the introverts exhibit the greatest variety of hands.

In order to obtain material for an objective study thirty samples of writing, namely those collected from the faculty group, were scored in accordance with Freeman's instructions given in his book, "The Teaching of Handwriting," for the five following characteristics: uniformity of slant, uniformity of alignment, line-quality, spacing, and letter-formation. For uniformity of slant the average was used of measurements by two individuals with a protractor on fourteen two-space letters of the sample. The mean angular slant of each sample was calculated and also the mean variation from this average slant. For the study of line-quality the samples were projected upon a screen by means of a Bausch-Lomb balopticon with a con-

700 (Introvert)

Right Judgment 83.3%

The quick brown fox jumps over
the lazy dog.
Laramie, Wyoming.

118 (Extravert)

The quick brown fox jumps over the lazy dog.
Laramie, Wyoming.

sequent magnification. Again, two observers scored each specimen. The three other graphic characteristics were measured according to Freeman's instructions with the help of guide lines. Total scores on general quality of writing were obtained by adding the partials, letter-formation being given double weight in the final score.

The scores on the contrasting samples may be compared (1) for general quality and (2) for each graphic characteristic.

The average total score for the fifteen extraverts was 20.23 with a mean deviation of ± 3.18 ; for the fifteen introverts 16.13 with a mean deviation of ± 4.11 . The extraverts would seem to have a slight advantage in general quality and to be slightly more coherent as a group.

The range of total scores is from 13.5 to 25.5 for extraverts; from 6.5 to

27.5 for introverts. Four of the latter were rated lower in general quality of handwriting than any extravert and two who wrote very conventional hands, higher than the highest extravert.

The most interesting item in comparison is, however, the following: in twelve out of the fifteen pairs the extravert scored higher than the introvert. Except for extremely controlled hands the introvert departs more than the extravert from the conventional letter-design and for this reason is penalized in the scoring.

It was thought that quite possibly the measurements of slant for the thirty graphic specimens would show some outstanding differences between the two groups since judges cite backslant or irregular slant as an introvert characteristic. Actually, however, the average measurements show little or nothing. The average slant to the right was for the extravert 23.94° with a mean deviation of ± 12.96 ; for the introverts, 22.63° with a mean deviation ± 12.58 . Moreover, when uniformity was determined by finding the mean variation of each sample from its own average slant, the extraverts were found to vary $\pm 4.68^\circ$ and the introverts $\pm 4.80^\circ$. The only thing that would seem possibly significant is the fact that, just as in the case of total score, so too for uniformity of slant the range of variation for introverts is greater than for extraverts. With a larger number of samples something of interest might develop here in terms of a different distribution curve for variations from the mean.

Letter-formation has already been discussed under general quality. To repeat: the introverts depart more from conventional letter design than do extraverts except for cases of highly controlled writings. So far as line quality is concerned there is little difference shown by the averages.

An investigation somewhat similar to the one I am reporting was carried on by Jislin² who concerned himself with the handwriting characteristics of Kretschmer's constitutional types. His mode of procedure was purely observational with no measurement of either graphic samples or penmen, and consequently no statistical treatment. A collection of one hundred fifty specimens was made from male subjects between the ages of twenty and forty selected because of their conformity to certain bodily types,—seventy-four pyknic, seventy-four asthenic and two athletic. Jislin describes the characteristic handwritings of the two main groups as analyzed by himself and found considerable general agreement between body-build and handwriting, although there were many discrepant cases. Some of these he attributed to peculiarities of the peripheral apparatus, peculiarities

²S. G. Jislin. "Körperbau, Motorik, Handschrift." *Ztschrift f. d. ges. Neur. u. Psychiat.*, xcvi (1925), 518–523.

which might occur in the dysplastic pyknic. He reports that the pyknic man writes a rounded, fluent hand, one pyknic hand being very much like that of another. Asthenic individuals write a much greater variety of hands and more sharply individualized hands, characterized by angularity, split words and letters, sometimes by micrography. When writing by an asthenic is rounded it gives the impression of great effort made in producing the individual letters and hence results in a childlike handwriting, in irregularity and insecurity.

Jislin's graphic characterizations have much in common with mine for the writing of extravert and introvert. Kretschmer's bodily types are by him and his followers associated with the cyclothymic and schizothymic make-up, while the accepted view among psychologists for extraversion-introversion is that probably such characterizations apply to extremes of a normal distribution curve with the possible intensification at each end into pathological patterns such as the manic-depressive and the schizophrenic. Such an interpretation shows a possible connection between body-type and extraversion-introversion, and suggests an interesting field of exploration. Casual observation would, I believe, classify five (possible seven) of my faculty extravert group as pyknic in build; six (possibly seven) of the introverts would be classified as asthenic in bodily-type. One of the introverts would seem to be dysplastic pyknic in build. Besides this, no other discrepancy was noted. Half of the group do not lend themselves to casual classification. During the course of the experiment, it may be said, a number of rather outstanding pyknic individuals were checked for extraversion with negative results.

It is the writer's belief that the concept of introversion-extraversion as ordinarily used contains two and perhaps more variables which may or may not be interrelated. In her opinion one of these variables refers to the ease or difficulty with which a motor discharge occurs or to the evidence of presence or absence of neural and motor tension. Just why and how such motor characteristics tie up with temperamental traits is, of course, the crucial question. The fact that in the present experiment the handwriting of selected introverts and extraverts should have shown, in the main, differences in fluency and ease that led to an identification that is distinctly superior to a chance identification is most promising and, so far as the author's expectation was concerned, most surprising.

The effort to find an objective test for any variable that is included in the introversion-extraversion makeup is certainly worth pushing. The results of the present test are to be amplified by studying graphic automatism in relation to introversion-extraversion. It is possible that a test for motor

automatism may prove to be the objective test desirable for checking the temperamental characteristics with which we are now concerned. If one were able to validate such a test by a sufficiently large group it would then be possible by its employment to avoid the large margin or error that occurs in the use of verbal questionnaires and in the judgments of acquaintances.



SECTION III

RACE AMALGAMATION

CONTROL OF IMMIGRATION

D. F. RAMOS

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At the present moment the control of immigration has become a matter of supreme importance to all nations of the globe in its relation to economics owing to its influence on the cost of labor; but efficient control is far more important from the viewpoint of its influence on the biological constitution of each country, since upon this are based its social, cultural and political conditions. Unfortunately, not all statesmen are capable of seeing clearly this last, and most important aspect of immigration control.

I believe that it is not only a duty at this moment to present to you the subject assigned to me for consideration in this congress, but that it is of paramount importance to call the attention of all communities and Government to the tremendous and far reaching effects that the scientific selection of immigrants will have on their futures.

I would like to submit two aspects of the problem in our discussion today. First: The biological study necessary for the selection of the immigrant. Second: A practical method to effect this selection.

(A) BIOLOGICAL STUDY FOR THE SELECTION OF THE IMMIGRANT

Eugenics, of course, pertains to biology with its greatest importance in anthropology. In our biological study of immigration we could consider, the influence of the introduction of new animals and plants in the fauna and flora of a country, but this does not constitute at the moment, that part of the subject which we wish to discuss. When we say Immigration, we refer to the entry of men into a country where they intend to establish themselves permanently; they, with their descendants, bringing as an almost fatal consequence the biological intermingling with the native population.

The newcomers will influence biologically the native population or rather I should say, the population that will result from the intermingling of the natives and immigrants, or the descendants of these, in turn, will be profoundly affected in their characteristics, which will comprise in their total and individual value, the distinct hereditary factor that primarily were carried in the Germ Plasm of both groups.

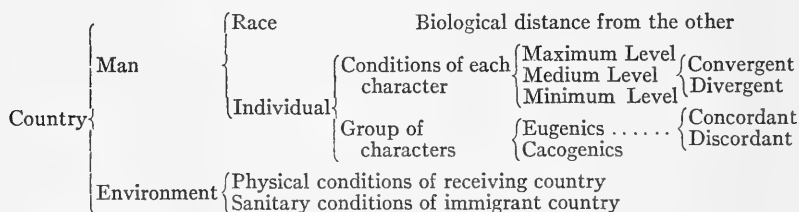
In a biological study of immigration control, therefore, we must consider the racial and individual differences existing between the native and the immigrant population; this in both their mental and physical characteristics, taking into consideration that in each group there exists dominant and recessive inherited characters, and that in order to find this last group mentioned, it will be necessary to study all of the factors of two generations and still be uncertain of obtaining a complete result in our investigation.

It will be well to bear in mind, too, the environment in which the immigrant will live in relation to his biological condition, as well as that from which he comes in reference to sanitary conditions.

The above suggested study forces us to consider the following:

- A. In relation to race—biological distance from each other.
- B. In relation to individuals.
 - 1. In each character:
 - (a) Maximum, average and minimal level in both countries.
 - (b) Convergence or divergence of each character with reference to both countries.
 - 2. In a group of characters:
 - (a) A study of the dominant and recessive cacogenic characteristics of the immigrating people.
 - (b) A study of the principal eugenic characters of both people in relation to the harmony that its mixture may produce.
- C. In relation to environment:
 - (a) Adaptability of the immigrant to physical demands of the new country.
 - (b) Possible transportation of infectious germs by the immigrant.

It is indispensable, therefore, that in all problems relating to immigration control, the eugenicist should study the points indicated in the following chart so that he may decide on the conditions above referred to:



(B) PRACTICAL METHOD FOR CONTROLLING IMMIGRATION

I have mentioned, thus far, the scientific points which must be considered in the study of immigration so that the movement may be guided along a path leading to biological improvement of modern countries. But eugenics, is a science of practical application that endeavors to facilitate measures

which may permit the use of scientific knowledge embodied in this study. Thus, I deem it necessary to study what may be termed the application to eugenics of the biology of immigration.

Civilization at present may be said to have eliminated the barriers that formerly prevented the migration of masses. Today any group of men may move to almost any place on earth. But the natural physical barriers of other times have been replaced by political ones. Access to nearly all nations is regulated by special legislation and it may be said that our main object should be to influence legislation so that it may coincide as far as possible with the biological requirements of the people who inhabit the country, and with a common international plan for the well-being of humanity.

The right of a nation to forbid immigration beyond the point which could be termed a sanitary defense has been challenged without realizing that from the standpoint of biology it may be said that a cacogenic factor has a more serious or prejudicial effect than has any infectious germ. Against the latter an immunity can be established which, up to the present, we do not possess against the former.

It is my belief, and this opinion has been accepted by the First Pan-American Conference on Eugenics and Homiculture, that free immigration should be established for individuals biologically classified as healthy, physically and mentally, somatically as well as germinally, but that each nation should be granted the right to make a complete biological investigation of all individuals desiring to reside within their respective territories, and to have the right of accepting or refusing these individuals after considering the racial characteristics and environments of both natives and aliens.¹

¹ I am, hereby, submitting the four basic principles with reference to immigration sanctioned by the First Pan American Conference on Eugenics and Homiculture, in case it may be deemed advisable for the Third International Congress on Eugenics to recommend them to other countries.

(SIX) 1. "Individuals classified as biologically healthy, will possess free migration with the exception of those whom the regulations of each government in the exercise of its sovereignty, may debar.

(SEVEN) 2. Any nation has the right to investigate the complete biological condition of individuals, somatic and germinal, desiring to reside in its territory, or to bar or limit to the citizens of those nations that do not allow said investigation, as well as those individuals who, as the result of the investigation, may prove capable of transmitting undesirable conditions.

(EIGHT) 3. To the nations of America is recommended the enactment of laws that may defend them from entry into their territory of individuals classified as biologically unhealthy somatically; or who may be considered as biologically undesirable.

It is also necessary that an investigation be organized by all governments interested in immigration in regard to conditions existing in their respective home countries so that investigations may be made with reference to transmission of recessive characters. This is impossible to accomplish at present with solely an individual inspection of the immigrant, even if said inspection were as thorough as it is possible to make it.

It may also be stated that we will not be absolutely assured of being able to defend ourselves against the possible transmission of cacogenic factors of recessive nature if the right to select immigration in the country of origin is not complemented with a right to exercise deportations as far back as the first generation after immigration, whether this be pure or hybrid. In the second case, there should exist the defensive right to prove the existence of cacogenic factors in the native gamete.

As far as this subject has been discussed we have considered a native people of racial uniformity, but this is not always the case. The majority of nations today are formed by various sub-races and some by different races.

A nation is an artificial unit; its organization and stability depend upon political developments. A race is composed of natural human units subject only to biological modifications that man can improve by exercising a control on its mixture, or through selection among individuals of the same race, as it is done at the present and has been done in the past for sometime, with various species of animals and plants.

The defence of one's Race and Nation is not incompatible, and National and International laws should not make it so. This statement also refers to the relationship between nation and family stock, adding that in the future, Race and Family Stock will be considered above all.

In every nation composed of a heterogenous race it is necessary to consider the quantitative proportion, and, this ratio in the native population should be taken into account in computing the admission of immigrants.

To resume the study of methods of application, as we resume the biological study on which these methods should be based, we must allow the right of each nation to only admit the immigrant that is suitable, without this right being in any way a matter of offense to any other country.

The same should be taken into consideration as a base for the right of a racial body to preserve the purity of its physical and mental characteristics

(NINE) 4. The nations of America will issue and apply immigration laws that will bar entry to their territory of individuals of all races whose association may be considered as biologically undesirable."

or mix them in any form deemed desirable, and to see that individuals, or better still families, that may constitute these racial groups, are within what we could call their biological rights in demanding that the individual characteristics possessed, or that form eugenic characters, are not mixed with those resulting from cacogenic factors, nor should they disfigure themselves when resulting in divergent or discordant mixtures in their descendants.

We should also tend to facilitate the movement throughout the whole world, of those individuals whom biologically, in no way harm the natives where they may desire to reside.

All in all, migratory restriction, and non-restriction of certain types of men all over the earth, should be based on the different biological constitutions of each individual and each race, to the final biological betterment of humanity, and its proper grouping, which constitutes the only sure basis of happiness, the principal ways of obtaining which are the biological selection of the individual as the fathers of each generation to come, and the eugenic considerations of the mixing of the races.

At this moment the most feasible measures for enabling the nations to secure control over immigration, in my opinion, are the following:

1. The studying and listing of the biological characters of the native population; and of the migratory one. Its classification of desirables and undesirables (*eugenics* and *cacogenics* and also of those who can be considered as *convergent*, *divergent*, *concordant* or *discordant*).

2. A study of racial groups constituting the native population and the relative proportion of each group. The same study applied to the immigrant population.

3. A study of the relation existing between each racial group and the condition of environment existing in the receiving nation. A sanitary study of the immigrating population.

4. Determination of the type, or types, of desirable and undesirable immigrants from the viewpoints of race and individuality and also in relation to sanitary conditions.

5. Determination of the total immigration permissible, and the assignment of convenient quotas for each group.

6. Biological selection of the immigrant in the country of origin.

7. Sanitary selection of immigrants on arrival.

8. Deportation of immigrants or their descendants of the first generation when it is proven that they possess inadmissible characteristics. In case of mixed descendants, verification of possible inheritance of said characteristics from immigrant gamete, and if not found, to proceed to final admission of the individual.

9. International agreements, through Eugenic organizations, to facilitate the free migration of those individuals and nations previously agreeing to this biological study, with the resultant free admission; with the insertion of certain conditions in said agreements for when:—only partially acceptable.

10. The establishment of sub-offices of eugenics dependent on international organizations that will carry into effect the biological study of individuals, and certify as to the physical, and mental—somatic as well as germinal—constitution of each.²

“PROJECT OF A PAN AMERICAN CODE ON EVANTROPY (EUGENICS AND HOMICULTURE)”

“The governments of the Nations pledge themselves to take all legal measures that may be necessary to insure compliance with the principles contained in the following:

PAN AMERICAN CODE ON EUGENICS AND HOMICULTURE—GENERAL PRINCIPLES

SECTION I

ART. 1. All Nations, Dominions, Colonies, Provinces, Municipalities, Families and Individuals, shall be grouped in accordance with their observance of the principles set forth in the Code of Eugenics and Homiculture.

A. Classified.

B. Non-classified.

ART. 2. All Nations, etc., in order to secure the benefits derived from this code shall establish Eugenic Record Offices, with all necessary data and information pertaining to individuals; moreover, said Nations, etc., shall be obligated to establish Anthropology and Homiculture Institutes, preferably connected with a university or similar institution of scientific research.

ART. 3. The Pan American Central Office of Eugenics and Homiculture and its council will be located. and shall have subordinate stations at.

The Central Office and subordinate stations among other functions, will certify and inspect individually, or through duly authorized representatives, the Record Offices of the States, Provinces, Municipalities, etc., and, moreover, shall supervise and standardize the work of the Institutes.

Coast Stations shall be connected with the Immigration departments of the neighboring regions and will cover all American coasts.

² I submitted to the consideration of the First Pan American Conference on Eugenics and Homiculture a project for the enactment of a code embodying several bases, among which are to be found those referred to above.

In this project, and in sections which were not sanctioned, may be found, I believe, some ideas that will prove useful in regard to the ninth and tenth measures proposed above. For this reason I shall take the liberty of calling attention to them since they may be applicable to the control of immigration:

For the equipment of the Central Offices and that of the Stations, shall be appropriatedand for the regular annual expenses, shall be appropriated..... These appropriations will be collected as follows.....

The Central Office as well as Stations, Record Offices and Institutes, shall enjoy complete independence to receive and apply all funds contributed by institutes or private parties.

The Office shall be organized and will be a dependency of the Pan American Union; and once established, shall provide the necessary regulations for the application of this Code and for the supervision and standardization of the Record Offices and National Institutes.

Said regulations shall be submitted to the Pan American Union for study and approval.

SECTION II. THE BIOLOGICAL CONDITIONS OF THE INDIVIDUALS

ART. 4. All individuals are, hereby, obliged when necessary to contribute and promote the investigation of their biological standing, either *somatic* or *germinal*. The same rule shall be applied to the Nation, etc., to which the individual belongs.

ART. 5. The germinal condition of individuals, after careful research and investigation, shall be classified according to the accepted technical knowledge for the unite of characters, as follows: (A) *Good*; (B) *Suspicious* or *Doubtful*; (C) *Bad*.

Individuals shall be somatically classified in accordance with their liberty of action as: *Responsible* and *Non-responsible*.

Responsibles are:

(It shall be studied by the Central Office and submitted to the approval of the Pan American Union.)

Non-responsibles are: (Same).

The conditions hereafter described, are germinally good: (Same).

The conditions hereafter described, are germinally suspicious: (Same).

The conditions hereafter described, are germinally bad: (Same).

Each individual, etc., as soon as somatically and germinally classified, shall comply with all indications regarding his case.

ART. 6. Individuals somatically *responsible*, bearing *good germinal* conditions, shall be responsible for their own sexual and procreative lives, taking care, for the condition of their conjugal partner.

ART. 7. Individuals carrying *bad* or *suspicious* germinal conditions, if somatically *responsible*, shall be granted permission to conduct their sexual lives under the advice and indication of Eugenic and Homiculture authorities.

ART. 8. Individuals having *bad* or *suspicious* germinal conditions if somatically *non-responsibles*, shall be isolated or segregated, or subjected to sterilization.

ART. 9. Infractors of the foregoing articles will be declared somatically *non-responsibles* or taken out of the classified group.

SECTION III. MIGRATION

ART. 10. Individuals grouped as somatically *responsible* and germinally *good*, shall be entitled, from the biological standpoint, to *free migration*.

ART. 11. All Nations shall possess the right to practice a complete biological research, (somatic and germinal), of individuals declaring their intention to reside within the territory; or may prohibit the residence or limit the time of that residence, to aliens from those

countries refusing to comply with the investigation or research herein stated. The same rule shall be applied to all individuals who after investigation, prove to be liable to hereditary transmission of any undesirable quality.

ART. 12. All Nations of the American Continent shall enact and apply immigration laws forbidding the entrance of those somatically *non-responsibles*, or those having *bad* germinal conditions, or coming from nations refusing either to accept this code or that do not comply with its provisions.

SECTION IV. RACES

ART. 13. In every nation signatory to this Code, Individuals of a determined race are entitled to establish all pacific and legal social measures that may be deemed necessary to maintain the purity of their race.

ART. 14. Every nation shall possess the right to select those new races that may enter and form a part of its population."

—From "Transactions of the First Pan American Conference on Eugenics and Homiculture of the American Republics."

THE EURASIAN COMMUNITY AS A EUGENIC PROBLEM

HENRY E. ROSEBOOM AND CEDRIC DOVER

Bangalore, India

The Eurasian community extends throughout the Orient, blending in itself the characteristics of East and West. At a conservative estimate it numbers 0.5 million, more than one hundred and fifty thousand Eurasians being found in India alone. The community is increasing rapidly, and is undoubtedly an important factor in Eastern economics. In fact, as Roberts (1927) has said of race-mixture in the Pacific, the growth of the Eurasian community is "one of the most transforming agencies at work" in the East, but its importance in this connection remains to be appreciated. One of us (Dover, 1929) has, however, stressed this point in a brief review, elaborated by Wallace (1930).

These two works¹ mark the beginnings of a scientific approach to the problems of the community, but they do no more than touch the fringe of an important subject. The object of this note, therefore, is to direct scientific attention to the need of detailed studies, for we feel that an extensive eugenic survey is not only an essential preliminary to adequate consideration of the community, but is also indispensable to a comprehensive study of miscegenation and the problems arising from it. We shall not attempt, therefore, to do more than review the history, economics, characteristics and future of Eurasians as an argument for a thorough investigation of their problems.

HISTORY

The history of the Eurasian community has been discussed by Stark (1926), and briefly reviewed by Dover (1929). It would appear that this mixed race is not the result of the "temporary weaknesses of Europeans in an unaccustomed climate" or, as Minney (1929) puts it, the "pathetic evidence of the incontinence of Tommy Atkins." On the contrary, intermarriage in India was deliberately encouraged by the European conquerors of the country, who were impelled both by proselytising fervour and economic considerations. The growth of an indigenous community, owing

¹ We have unfortunately not been able to consult *The Eurasian: a Social Problem*, by Lee. (Published in the United States about fourteen years ago.)

allegiance to their fathers, was obviously an asset in sovereignty, besides encouraging trade and extending the Christian horizon. For example, the Court of Directors of the East India Company, addressing the President of Madras in 1678, wrote:

The marriage of our soldiers to the native women of Fort St. George is a matter of such consequence to posterity that we shall be content to encourage it with some expense, and have been thinking for the future to appoint a pagoda to be paid to the mother of any child, that shall hereafter be born of any such future marriage, upon the day the child is christened, if you think this small encouragement will increase the number of such marriages.

In the circumstances, the fate of the community was more than ordinarily affected by political misfortunes and a changing perspective. With the decay of Portuguese, Dutch and French power, the growth of the hybrid offspring of these peoples was naturally arrested. With the expansion of English power and the progress of communications, the economic value of Indo-Britons diminished. And, as India became a more pleasing proposition for Englishmen, the community was not only neglected but even repressed. In 1791, persons with Indian blood in their veins were excluded from the Services of the East India Company, though they had previously enjoyed complete social and political freedom and had filled posts of importance in every branch of the Company's activities. This condition prevailed till 1833 when the Company's Charter was renewed and it was decreed that no person "shall by reason of his religion, place of birth, descent, colour or any of them be disabled from holding any place, office or employment under the said Company." At the same time, however, it was also decreed that the higher posts in the Services of the Company, and later of the Crown, should be filled by recruitment only in England. This effectually debarred the majority of Eurasians from competing, and even the few who surmounted the barrier found themselves victimised by preferential treatment and social ostracism.

So the community, deliberately propagated and encouraged, first by the Portuguese and lastly by the English, was left to grow up in an atmosphere charged with an overt but cruel ostracism, affected by racial and religious prejudices and economic fear. The damaging effects of this attitude are readily imagined though difficult to assess. We need not consider the subject further, for it has been discussed in some detail by Stark, Wallace and Dover. It may only be added that, excepting in the Dutch colonies (Kielstra, 1929), prejudice against Eurasians was (and still is) even more pronounced further East. The community, however, still survives. And a literature of proportions shows that it has not only survived, but that it

has distinguished itself in military service and produced outstanding men and women in every walk of life.

ECONOMIC POSITION

The history of the Eurasian community shows that there was a time when it was relatively prosperous, but this phase was of short duration. Continued repression and oppression resulted in its degenerating into a community of clerks, railway-men and telegraphists, forced to be content with employment leading nowhere, and in receipt of wages that merely enabled it to exist in a slough of despond. To-day the community, though unique among Eastern peoples in being fairly literate, is characterised by an abnormally high incidence of poverty and the inability to follow productive pursuits associated with such an economic condition.

Indeed, the problem of the Eurasian community, as the Simon Commission (1930) points out, is essentially economic. A detailed economic survey must therefore be regarded as the foundation upon which a constructive policy of improvement can be built. Impractical schemes for colonisation within and without India, for ruralisation, for coöperation and for vocational, or so-called higher, education, will not provide the required solution. Under conditions in India, emigration or colonisation implies recognition of defeat, of incapacity for competition in spite of numerous advantages, which must militate against success under the more rigorous conditions of a new life.

Back-to-the-land schemes, which periodically claim the enthusiasm of certain leaders, can only be regarded as antiquated specifics for the economic ills of the community. An urban community, possessing no affinity for rural life, can never be effectively ruralised. Moreover, it is living in an age of industrialism in which effort is being increasingly directed towards the industrialisation of rural areas. To believe that such a community can be ruralised, to ask it to suffer the impediments to cultural and economic advance associated with rural life, can only be dismissed as an utterly ridiculous policy.

Regarding education and coöperation, Wallace has provided a theoretically able discussion, which need not be paraphrased here. We should, however, point out that any effective policy of education or coöperative effort must be part of a determined plan of reconstruction, based on extensive statistical data (Dover, in Wallace, 1930). And under existing conditions in India there is, unfortunately, no machinery for providing the required knowledge. This is the reason for the failure of numerous schemes and sentimental petitions to the Government during the last hundred years,

which it was optimistically believed would contribute to economic rehabilitation. Quite recently, for example, the memorandum of a deputation to the Secretary of State for India did little more than provoke an official criticism of the accuracy of the figures contained in it. And other schemes that are now being promoted, such as a scheme for the establishment of Eurasian agricultural colonies in various parts of India, display so marked a disregard for the conditions to be encountered, the obstacles to be surmounted, and the capacity and adaptability of the people, that they can only be successful by Providential interference. Unfortunately, however, the age of miracles has passed.

CHARACTERISTICS

The characteristics of the Eurasian community have never been investigated in any detail, but have been the subject of comment by many novelists and not a few scientific observers. Thus, E. B. Reuter (1918; quoted by Dover, 1929) writes:

Physically the Eurasians are slight and weak. They are naturally indolent and will enter into no employment requiring exertion or labour. This lack of energy is correlated with an incapacity for organisation. They will not assume burdensome responsibilities, but they make passable clerks where only routine labour is required. . . . In manhood they are wily, untrustworthy and untruthful. They are lacking in independence, and are forever begging for special favours. . . . They recklessly resign from any and every post when, for some reason or without reason, their feelings are hurt. . . . They are despised by the ruling whites and hated by the natives.

To these criticisms other writers would add a host of defects, including cultural inferiority, immorality, cowardice, and slave mentality.

The candid student must admit that such statements contain an element of truth, but there is a difference between deliberate vilification and a calm statement of facts as a preliminary to constructive suggestions for improvement. We should not only observe effects but endeavour to seek their causes. And the causes of the unfortunate characteristics of the Eurasian community are to be traced to environmental conditions, to generations of repression, prejudice, and economic and social boycott. To be fair, therefore, the critics of the community should not ignore its potentialities, its many successes in the face of unusual difficulties, and the rôle it may play in the future progress of the East and the growth of internationalism. Indeed, until a comprehensive scientific study of the community has been made, it would be wiser to refrain from criticism at all.

Such investigations as are available may, however, be considered. Mahalanobis (1922) has studied a fairly extensive series of measurements, taken

by the late Dr. N. Annandale in Calcutta, and found that Eurasians are superior in stature to other natives of Bengal, and that there is little to choose between them and Europeans in this respect. Mahalanobis (1928) also found, as a result of his analyses of race-mixture in Bengal, that "intermixture between Europeans and Indians occurred more frequently among the higher castes than the lower. Evidently cultural status played a considerable part in determining Indo-European unions."

In athletics, the community, in India at any rate, has distinguished itself in every branch. In times of trouble they have not only furnished the backbone of defence, but have produced a long list of famous soldiers; during the Great War they flocked to the battlefields of France, Mesopotamia and East Africa. In the circumstances, it seems unscientific to dismiss the entire community as consisting of indolent and cowardly physical weaklings. In fact, those who know the community believe that anthropometric study will demonstrate the physical equality of its members with those of any other community in the East, even if it does not suggest the possibility of their physical superiority under improved conditions.

On the cultural inferiority and psychological traits of the community, it is neither necessary nor altogether possible to refute its critics. The point at issue is whether these conditions are due to nature or nurture. And we maintain that they are essentially the functions of a deficient educational system, adverse economic conditions, and an environment vitiated by bigotry, religious and other prejudices, both within and without the community, and generations of dependence upon the favours of the ruling race. If these are the causes of the defects of the community, then they will certainly respond to adequate measures for improvement.

In this connection, it is significant that, under stimulating conditions, many Eurasians have distinguished themselves in every field of intellectual activity, while a large number have reached a high level of intellectual attainment. On the other hand, we know several Eurasians of undoubted capacity, though not of excessive purposiveness, whose environment and poverty have prevented them from rising above the economic strata into which they were born. Another point of some interest is that the outlook of Eurasians whose fathers are Indians is very different to those whose fathers are Europeans or Eurasians. Moreover, prejudices that are generally regarded as ingrained are invariably absent in Eurasians who have had the benefits of liberal contacts. These facts support the argument that wider causes than miscegenation alone must be found to explain the peculiar characteristics of the community.

An example of the reasons for the curious psychological traits of the

community, and of their susceptibility to improvement, is afforded by their attitude towards the name applied to them (Dover, in Wallace, 1930). The term *Eurasian* was first used by the Marquess of Hastings (1813-1823), but several other designations are also known. These range from epithets like half-castes, mixed-bloods, and country-borns to more euphemistic names such as Burghers, Anglo-Burmans, Anglo-Chinese, Anglo-Indians and so on. In India, when they cannot, for obvious reasons, claim to be Europeans, they endeavor to establish their connection with the ruling race by referring to themselves as Anglo-Indians. This attitude is reflected in Stark's historical narrative, where they are pathetically referred to as England's *Hostages to India*. The reasons for this attitude, and the disabilities associated with it, need no emphasis. That it is associated with economic conditions is proved by the fact that, with the changing perspective in the East, an increasing number of Eurasians now feel no shame in being known as such, and realise the advantages of a logical, universal name. Yet it was only some thirty years ago that the Secretary of State for India was petitioned by a special deputation to sanction official recognition of the term *Anglo-Indian*, the leader of the deputation rhetorically declaring on his return that:

Britishers we are and Britishers we ever must and shall be. Once we relinquish this name (Anglo-Indian) and permit ourselves to be styled "Eurasians" or "Statutory natives of India" we become estranged from our proud heritage as Britishers.

THE FUTURE OF EURASIANS

This brief survey of the Eurasian community does not furnish a cheerful picture of the present position. The people are depressed and repressed, and consist mainly of subordinates who are poverty-stricken and ill-educated though literate. Their political, economic, and social positions are precarious and unhealthy. In their character make-up there are many weaknesses and defects, but there seems to be no proof in support of the contention that the half-caste is inherently inferior to either of his parents. Indeed, scientific studies, such as those of Shapiro (1929), Reuter (1931), and Davenport and Steggerda (1929) have shown² no evidence of hybrid inferiority. On the contrary, Shapiro's and Reuter's work provide definite indications of hybrid vigour.

Lord Olivier believes that in "so far as there survives in a mixed race the racial body of each of its parents, so far it is a superior human being, or

² See also the discussion in Heynes-Wood and Dover (1932).

rather, I would say, potentially a more competent vehicle of humanity." And one of us, after some consideration, has written:

Indeed, the scales of biological evidence clearly swing in favour of the theory that the carefully nurtured hybrid is superior to either parent. And those who hold this view in regard to human hybrids rightly believe that the inter-racial difficulties of the world will be solved by the development of mixed breeds, and that the removal of racial friction by marriage will ultimately lead to the peaceful occupation of the whole world by one composite race.

It would seem therefore that, in spite of the present position, the future of Eurasians is not only hopeful but of international interest. The community has already shown potentialities that deserve to be encouraged. It has survived great disabilities and given evidence of inherent vitality, adaptability, and capacity for intellectual attainment. For such a people there must be a bright future, but they stand in need to-day of dispassionate study and constructive assistance.

In other words, the Eurasian community furnishes a eugenic problem of both academic and practical value, and we hope that this note will direct attention to the unusual interest which would attach to a eugenic survey of Eurasians in the more important centres in the East. Such a survey would evaluate their physical and psychological characteristics, compare them with those of the parent races, assess the importance of the environmental factor, and indicate the methods by which improvements may be effected. It would provide data on their health, religious views, and education; also on their economic position and social and political environment, employing for these purposes an extensive questionnaire, in addition to records from direct observation. The literacy of the community, and an evident desire for self-improvement as partly shown by the growing strength of Eurasian associations in Indo-Malaya, would ensure a wide response to questionnaire investigations. Finally, the survey should include a critical record of their history and achievements, on which a wealth of data awaits collation, and furnish the outlines of a constructive policy for the consideration of its leaders and the governments to which they are subject.

Such a survey would require of those who undertake it a capacity for extensive investigation, as displayed, for example, in Davenport and Steggerda's study of race-crossing in Jamaica. It also requires an intimate knowledge of the community, and critical ability that must be supported, but not obscured by, sympathy, if the investigations are to meet with whole-hearted co-operation from the people themselves. With the assistance of their associations, and of biological institutions in the East, a year's earnest work, by two or three investigators, in the principal towns of Japan, China,

Borneo, Sumatra, Java, the Malay Peninsula, India, Burma and Ceylon, would complete the survey. And the cost, with due regard for economy, should not exceed ten thousand dollars. It is a small price to pay for data of unusual scientific interest and the future of a growing race, destined, perhaps, to lead progress in the East and to cement universal brotherhood.

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VOLKSTUMSVERBREITUNG UND IHRE URSACHEN

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Eine der wichtigsten Grundlagen aller eugenischen Bestrebungen wird durch die genaue Kenntnis der gegebenen *Tatsachen* gebildet, einerlei, ob man in der Reinrassigkeit oder in der Rassenmischung das Heil des Volkes erblickt oder in dem Bestehen beider nebeneinander; auf jeden Fall muss man alle Mittel zur richtigen Feststellung des Tatbestandes ergreifen.

Eines der hier sich bietenden zuverlässigen Hilfsmittel der Forschung ist die *geographische Methode*, welche jede einzelne Erscheinung nach ihrer örtlichen Gebundenheit, ihrer räumlichen Verbreitung und ihrer geographischen Bedingtheit betrachtet. Diese geographische Methode, angewandt auf das Volkstum, ergibt die *Volkstumsgeographie*, die Wissenschaft von dem örtlich gebundenen, räumlich verbreiteten und geographisch bedingten Volkstum. Das ernste Bemühen, auf diese Weise zur Klarheit über die tatsächliche Verbreitungsart volkstümlicher Erscheinungen zu kommen, zeigt uns bald, dass hier die grosse Gefahr einer unrichtigen Erfassung der Verbreitungstatsachen oder einer unzutreffenden kartographischen Darstellung von richtig ermittelten Verbreitungstatsachen besteht. Wenn man z.B. die niederdeutsche Bevölkerung als blond bezeichnet und in scharfen Gegensatz zu dem dunkeln Typus der oberdeutschen Stämme der Alemanen und Bajuwaren stellt, so sieht das zunächst so aus, als ob die beiden genannten Landschaften, jene an der Meeresküste, diese am Gebirge, sich hinsichtlich der Körperbeschaffenheit grundsätzlich unterschieden. Dem ist aber nicht so. Denn die Unterscheidung liegt nicht in dem ausschliesslichen Herrschen des einen Typus und dem gänzlichen Fehlen des anderen Typus, sondern nur in dem *verschiedenen Grade ihrer Häufigkeit*. Tatsächlich liegt es so, dass der rein blonde und der rein brünette Färbungstypus überall in Deutschland vorkommt; die Bevölkerungen der einzelnen Landschaften sind also nicht in der Körperbeschaffenheit grundsätzlich voneinander verschieden, sondern nur nach der Höhe des Hundertsatzes. So herrscht z.B. in dem deutschen Sprachgebiet südlich der Donau bis zur gesamten Südgrenze des Deutschtums der rein braune Körpertypus durchweg mit mehr als 20% (abgesehen von zehn Einsprengseln mit 10–20%); Mitteldeutschland weist auf der Strecke von Aachen bis Breslau meist den

Hundertsatz von 10–20 auf, Niederdeutschland dagegen weniger als 10% rein braunen Körpertypus (von Ausnahmen an der Havel, Oder und Warthe und von einigen Einsprengseln abgesehen). Neben diesem braunen Typus findet sich der rein blonde Typus, und zwar im ganzen Küstengebiet mit mehr als 40%, einem Hundertsatz, der nach Süden allmählich abnimmt. Alle Teile Deutschlands sind also keine *Reingebiete* mit einem einzigen Typus, sondern *Vermengungsgebiete*, in welchen zwei reine Typen und ausserdem noch eine ganze Reihe von Mischformen auftreten. Unsere Betrachtung führt uns also zu der Notwendigkeit, scharf zu unterscheiden zwischen den Typenbegriffen *Reinform* und *Mischform* einerseits und den geographischen Begriffen Reingebiet und Vermengungsgebiet andererseits.

Was nun begrifflich klargestellt und forschungsmässig richtig erfasst ist, das muss natürlich auch kartographisch richtig wiedergegeben werden. Wir haben hier also auf der Karte, welche die Verbreitung angibt, die Reinform, nämlich die Haupttypen, und die Mischform, welche sich zwischen jenen herausgebildet hat, durch verschiedene Farben gegeneinander abzusetzen. Diese Farben sind in jenen Kartenflächen, welche dem ausschliesslichen Verbreitungsbezirk einer Reinform entsprechen, ausschliesslich vorhanden; dieser Fall betrifft nicht die Körperbeschaffenheit, abgesehen vielleicht von Einzeldörfern, da ja hier durchweg Vermengungsgebiet vorhanden ist, sondern andere Volkstumserscheinungen, wie namentlich Bauernhaus, Mundart und Volksbrauch: diese volkstümlichen Erscheinungen bilden häufig mit ihren Reinformen auch ausschliessliche Herrschaftsgebiete, also Reingebiete. Vermengungsgebiete jedoch, wo in ein und derselben Landschaft zwei oder mehr Reinformen nebeneinander gleichzeitig auftreten, zeigen dementsprechend auch auf der Karte eine Durchkreuzung der beiden farblich getrennt bleibenden Farben.

Nun treten nicht nur hinsichtlich der Körperbeschaffenheit, die wir oben gesehen haben, sondern auch bei sämtlichen anderen Volkstumserscheinungen *Mischformen* auf, deren Vorhandensein nicht nur von der einzelbeobachtenden Forschung, sondern auch von der zusammenfassenden Kartographie genau berücksichtigt werden müssen. Solche Mischformen gibt es hundertfältig im Sprachleben und im Brauchtum, hundertfältig in der Volksdichtung und in der Bauweise. Die kartographische Erfassung solcher Mischformen muss sich natürlich grundsätzlich von den Reinformen unterscheiden und ihnen daher eine neue Farbe geben; diese Farbe ist so zu wählen, dass sie andeutet, in welchem Masse die beiden der Mischform zugrunde liegenden Typen an ihr beteiligt sind. Diese scharfe Unterscheidung, sowohl in der Erforschung wie in der Kartographie, von Reingebiet und Vermengungsgebiet einerseits, Reinform und Mischform

andererseits fördert auch *entwicklungsgeschichtliche* Erkenntnis; denn alle Mischformen sind das zeitlich bedingte Ergebnis vom Zusammentreffen der ihr zugrunde liegenden Reinformen. Wir kommen also mit einer derartigen Volkstumskartographie nicht nur in der Typologie, sondern auch in der Biologie einen Schritt weiter.

Wie aus dem Gesagten zur Genüge hervorgeht, liegt also eine *Ursache* für den gegenwärtigen volkstumsgeographischen Bestand in der Art und Weise, wo und wie lange gegensätzliche Formen zusammentreffen und in welchem Masse die eine der anderen überlegen ist. Es sind also für Formgestaltung und Verbreitungsgebiet der Jetztzeit die Typen der früheren Zeit und ihre ursprüngliche Verbreitung eine wichtige Grundlage, die häufig nicht genug beachtet wird. Ausserdem gibt es eine ganze Reihe anderer Ursachen für die gegenwärtige Verbreitung des Volkstums in seinen verschiedenen Äusserungen. Diese Ursachen können natürlich nach der Art der Einzelaussierung verschieden sein. Welche einzelnen Erscheinungen des Volkstums kommen überhaupt in Betracht? Es sind das eine grosse Menge, welche sich aber nach den vier Gesichtspunkten: Körper, Geist, Sprache, Sache leicht übersichtlich machen lassen.

Zum Schluss sei auf die *Ursachen*, welche überhaupt in Betracht kommen können, eingegangen. Ich habe dieselben kürzlich zusammengestellt.¹ Zunächst hat hier die *Stammeskunde* das Wort, welche die Zusammensetzung der Bevölkerung behandelt. Wenn Volk und Volk, Stamm und Stamm zusammentreffen, so entstehen Volks- und Stammesmischungen, welche natürlich das körperliche Aussehen und den geistigen Charakter, die Sitten und die Mundart, Glaubensvorstellung und Wirtschaftsweise beeinflussen können. Einen Sonderfall bilden die hinausgesiedelten Sprachinseln und die fremden Einschlüsse, welche beide solchen Blutmischungen und auch Kulturdurchdringungen besonders ausgesetzt sind. Von grosser Bedeutung für die Ausbreitung volkstümlicher und kulturlicher Erscheinungen sind bekanntlich die geschichtlichen Herrschaftsgebiete, die *Territorien*, welche durch ihre Aussengrenzen das Hereinströmen fremder Formen hindern, umgekehrt aber den etwa vom eigenen Mittelpunkt ausgehenden Strömungen Vorschub leisten und infolgedessen, wenn es sich um einen langen Zeitabschnitt handelt, ausgleichend auf die Formgestaltung in ihrem Inneren wirken können. Zu den Gegebenheiten der vorhandenen Fläche treten die Gegebenheiten der beweglichen *Verkehrslinie* zu Wasser und zu Lande. Diese erleichtern die Verfrachtung von Lauten und Wörtern, von sachlichen Kulturgütern und auch sogar von Anschauung und Sitte. So

¹ Wilhelm Pessler, Deutsche Volkstumsgeographie (Braunschweig 1931), S. 42ff.

kommt es, dass ausgeprägte Verkehrslinien, besonders wenn sie in der Landesnatur tief eingegraben sind, das Vordringen der einen Form und ein dementsprechendes Zurückweichen der anderen Form bewirken; hier sind besonders höchst mannigfaltige Mischformen die Folge, ebenso aber neue Reinformen auf der Hauptverkehrsbahn, alte entgegengesetzte Reinformen in entlegenen Restgebieten. Zu den treibenden Kräften gehören auch die Wanderbewegungen, welche im Laufe von Jahrhunderten sehr starke Verschleppungen von Mensch und Kultur bewirken.

Neben diesen bewegenden Kräften, welche einmal vorhandene Formen von einer Landschaft in die andere tragen, dürfen die einfach örtlich neubildenden Kräfte, welche durch die Eigenart der *Umwelt*, also des Lebensraumes, gegeben sind, nicht vergessen werden. Denn trotz gleicher Erbmasse der Bevölkerung in verschiedenen Landschaften können durch den ständigen Einfluss der Bodenbeschaffenheit und des Klimas starke Abwandlungen entstehen, welche z.B. im schützenden Wohnbau und in der schützenden Kleidung, bei den erwerbenden Wirtschaftsgeräten und den ortsverändernden Verkehrsmitteln auftreten. Auf diese Weise können ganz einfach ohne menschliche Wanderung neue Formen und dadurch neue Verbreitungsbezirke entstehen.

Im vorstehenden konnte nur das wichtigste über Volkstumsverbreitung und ihre Ursachen gesagt werden. Je mehr die *geographische Methode* die gesamte Volkskunde und Völkerkunde durchdringt, umso mehr Gelegenheit hat die Wissenschaft, die Ursachen von Volkstumsverbreitung zu erkennen und darzustellen.

HARMONIC TYPES AMONG WESTERN EUROPEAN CRANIA

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There is a great human desire for purity, when purity can be obtained painlessly through a mental remolding of ancestral contours. Pure race, pure type, harmony symmetry; blue eyes, yellow hair, pink cheeks, tall stature, long head, long narrow face, high narrow nose; thus a yearning for simple, clear-cut human origins, a sense of the aesthetic and a sense of superiority have clustered around the Nordic, parent of the people one asks to dinner. And did there exist a harmonic race meeting these qualifications? And how close to our own day? For the Nordic concept implies a cultural as well as a physical heritage. Therefore, it would be unfair—as well as impossible—to check these traits against the crude barbarians described by Tacitus in 98 A.D. But five and six centuries later, when the Baltic peoples of the *Völkerwanderung* had settled into the Merovingian sepulchres of France and the *Reihengräber* of Germany, we can attempt to ascertain the number of pure types, as defined by our methods, that were present among these first civilized Nordics.

The material available does not permit knowledge of the distribution of all seven traits of Nordicity. The pigment of eyes, hair and skin are long gone; the skeletal series to be presented here consisted of skulls without limb bones for the reconstruction of stature; therefore, the study was limited to the proportions of head, face and nose.

The crania measured are divided into two main groups, from *Reihengräber* sites in Bavaria, and sites designated as *Gaulois*, *Gallo-Romain* and *Mérovingien* from the departments of France encircling Paris. Of 495 skulls measured by the writer in the Anthropologisches Institut of the University of Munich and in two Paris museums, the Musée Broca of the École d'Anthropologie and the Muséum d'Histoire Naturelle, 238 were in a state of preservation sufficient to permit the six measurements necessary to the study of head, face, and nose form. Permission to use this material was graciously granted by the late Professors Rudolf Martin and Léonce Manouvrier and by Professor René Verneau. The study was made possible by a travelling fellowship from Radcliffe College and a grant-in-aid from the National Research Council. The statistical calculations were carried out by W. Allen Wallis.

The three indices used for ascertaining the degree of harmony in this Western European group were the cephalic, the upper facial, and the nasal. The measurements were taken according to Martin's method and Martin's divisions of the indices were used for isolating types (1). This employment of three arbitrary divisions does not imply a belief that these are three neat compartments; it is merely a rough sorting device which has been supplemented by correlation.

These Western European Nordics as the means show (table 1) were a relatively long-headed group, just on the border of dolichocephaly. Their faces were distinctly mesene, neither broad nor narrow; their noses leptorhine, narrow but at the upper limit of that subdivision. They correspond, then, in these characters to Scheidt's typical Anglo-Saxon of the British

TABLE 1
(153 males, 85 females)

INDEX	MEAN	STANDARD DEVIATION
Cephalic:		
Male.....	76.48	3.90
Female.....	77.22	4.12
Upper facial:		
Male.....	52.67	3.85
Female.....	53.08	2.99
Nasal:		
Male.....	46.82	4.84
Female.....	47.56	4.11

Isles (3). Each index, however, is distributed over almost the entire field of normal human development. The cephalic index ranges from 66 to 91, the facial from 41 to 63, the nasal from 37 to 64.

And how are these traits combined in the individual? The amount of symmetry, the extent to which narrow, medium and broad noses tend to appear in company with faces and heads of harmonic form was measured in two ways. First, from the 153 males and 85 females, the number and percentage of individuals judged harmonic by inclusion in corresponding divisions of the three indices were calculated; second, to include cases actually symmetrical but thrown into divergent classes by the arbitrary division line, correlation coefficients were calculated for the three traits. (tables 2 and 5). Less than one quarter of the males and only one-fifth of

the females fell in three harmonic divisions. The largest division is the long-headed, long-faced, long-nosed males, which is 12 per cent of the entire male series; the second is that of females of intermediate degree of de-

TABLE 2

Harmonic Western European skulls on basis of cephalic, upper facial and nasal indices

	MALE		FEMALE	
	Number	Per cent	Number	Per cent
Dolichocephalic.....	18	11.76	7	8.24
Leptene.....				
Leptorrhine.....				
Mesocephalic.....	12	7.84	9	10.59
Mesene.....				
Mesorrhine.....				
Brachycephalic.....	6	3.92	1	1.18
Euryene.....				
Chamaerrhine.....				
Total.....	36	23.53	17	20.01

TABLE 3

Amount of extreme disharmony in Western European skulls on basis of cephalic and upper facial indices

	MALE			FEMALE		
	Number	Per cent of series	Per cent of disharmonic	Number	Per cent of series	Per cent of disharmonic
Dolichocephalic.....	12	7.84	13.2	1	1.18	1.9
Euryene.....						
Brachycephalic.....	1	0.65	1.1	4	4.71	7.7
Leptene.....						
Total.....	13	8.50	14.3	5	5.88	9.6

velopment; few cases fall in the round-headed, broad-faced, wide-nosed class. Percentages of 24 and 20 on the basis of three traits do not indicate a high degree of Nordic harmony. Of six correlation coefficients, only one is of really significant size, that for upper facial index and nasal index of

TABLE 4
Harmonic crania
 According to 3 indices

	MALE, PER CENT HARMONIC	FEMALE, PER CENT HARMONIC
Western Europe.....	23.53	20.01
Greifenberg.....	19.89	16.00

According to 2 indices

	HARMONIC	DISHARMONIC	EXTREME DISHARMONIC
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Male

Western Europe (153).....	40.52	59.48	14.3
Greifenberg (176).....	32.95	67.02	11.9
Tenerife (208).....	44.23	55.77	7.8
California Indians (73).....	47.94	52.05	10.5

Female

Western Europe (85).....	38.82	61.17	9.6
Greifenberg (100).....	36.00	64.00	8.0
Tenerife (64).....	43.75	56.25	19.4

TABLE 5
Correlation coefficients of indices

GROUP	NUMBER	CEPHALIC AND UPPER FACIAL	CEPHALIC AND NASAL	UPPER FACIAL AND NASAL
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Male

Western Europe.....	153	-.32	+.11	-.51
Greifenberg.....	176	-.34	+.16	-.60
Tenerife.....	208	-.03		
California Indians.....	73	-.38		

Female

Western Europe.....	85	-.17	+.07	-.32
Greifenberg.....	100	-.46	+.26	-.56
Tenerife.....	64	+.25		
California Indians.....				

males (table 5). Therefore, the inclusion of possible borderline cases does not indicate the great amount of interdependence of traits that would produce a large number of clear-cut types.

When the number of associated characters is reduced to two, by disregarding the nasal index, the percentages of harmonic crania rise from 23.53 and 20.01 to 40.52 and 38.82 and the group with the highest degree of symmetry shifts from the dolichocephalic-leptene to the mesocephalic-mesene; the brachycephalic class, partly because of the infrequency of this head-form in the total series, again gives the lowest figures. Even under conditions easier to fulfill, 60 per cent of males and females fall outside the harmonic classifications. Using the two indices, cephalic and upper facial, it is possible to ascertain the type of asymmetrical development most commonly found. On table 3, extreme or, to use Hooton's term (2), first degree disharmony is presented. Only 8 per cent of all males combine a long head with a short face or a short head with a long face, and the other 51 per cent who are classified as disharmonic arrange their features in all the minor grades of impurity. The females have developed in a similar manner.

Although it follows the trend of male development, the female European series shows fewer clear-cut types. Classified according to three indices or two (tables 2 and 4) there is a lower frequency of harmonic individuals; this was true for all four sub-groups as well as for the total series. It is further illustrated by the correlations of table 5 where again, female relationships follow the order of the male but are present in a slighter degree. This tendency for the females to be of less definite type is shown in all correlations of other characters in the series and it is emphasized further by the lower standard errors of group differences between females than between males.

Before the Merovingians and Reihengräber are condemned as mongrels, they must be compared with other races. Is a high degree of harmony of head and face typical of any human groups? Only a few peoples have been hastily assembled to answer this question. The analysis of data on the ancient inhabitants of Tenerife and Indians from the Santa Barbara islands of California by Hooton (2) and on the published measurements of crania from Greifenberg in Carinthia (Shapiro, 4) made by the present writer are presented in contrast to our group (tables 4 and 5). On this list of four, the Nordic males stand second in disharmony and first in extreme disharmony. The Tenerife females, although below the Western Europeans in total per cent of the disharmonic, show a far greater frequency of first degree types. The degree of interdependence of the proportions of head and face as represented by coefficients of correlation show finer group differences than does the crude three-class distribution. Here the Western Europeans take a higher rank in harmony among the four series and, on the basis of the only correlations worked out by Hooton, the Tenerife disharmony becomes more pronounced. Within the Western Nordic

group, the tendency for the females to exhibit fewer striking race types than the males is very clear; a characteristic not shared by the round-headed females from Greifenberg.

Viewed, then, in relation to others, the civilized Nordics of the sixth and seventh centuries do not present quite the most mixed appearance. But on the positive side, there is little to justify the picture of purity and symmetry in that day from which we sometimes trace our cultural and physical superiority.

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VIRGINIA'S EFFORT TO PRESERVE RACIAL INTEGRITY

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It is presumed that no one in this audience will dispute the wisdom and desirability of preserving the different races of man in their purity. This is particularly true as to intermixture between the two extremes—white and black. It is, therefore, deemed unnecessary to argue the question, but I infer that all will accept as a theorem that the preservation of racial purity is one of the fundamental objects of eugenic endeavor.

It must be admitted also that the permanent preservation of the purity of the distinct races when they remain in close contact is the most difficult of eugenic problems, and one which has never yet been solved in any country or in any age except by ultimate amalgamation. In fact, as far as my knowledge goes, but few serious attempts have been made by any nation to prevent amalgamation when different races have been brought permanently together, either by the migration of one race into the territory of another, or by the introduction on a large scale of captives of war from a race of a widely divergent type and the subjection of them to a state of slavery. The Jewish people have perhaps made the nearest approach to retaining their racial identity for a long period of time under many adverse conditions.

Increase in the number of mental defectives may be prevented, or an actual decline may be induced by segregation and sterilization; but when negro admixture with the white begins, there is no accepted method of preventing an increase of the condition except separation.

Laws forbidding intermarriage between members of different races restrain both through fear and through education as to the undesirability of such matings. The serious defect with most laws which attempt to prevent the legal intermixture of races, is that they permit classification as white of individuals with one-fourth, one-eighth, or one-sixteenth negro heritage. The actual situation is that marriage between whites and true negroes or mulattoes would be rare if there were no legal restraint. The privilege, therefore, extended to mixed breeds of less than half negro to be rated as white, permits legal intermixture to go on almost as if there were no law.

The only law worthy of consideration is one defining a white person as one

with no ascertainable non-white heritage, and classifying as negro one with any ascertainable trace of the negro. In the United States, Virginia, Georgia, and Alabama meet this requirement. The states forbidding marriage between whites and negroes or persons of negro descent are: Arizona, Louisiana, Montana, Nevada, Oklahoma, South Dakota, Utah, and West Virginia. Those forbidding intermarriage between whites and persons of one-eighth or more of negro are: Florida, Indiana, Maryland, Mississippi, Missouri, Nebraska, North Carolina, North Dakota, South Carolina, Tennessee, and Texas. Those forbidding intermarriage between whites and persons of one-fourth or more of negro are: Kentucky and Oregon. Those forbidding intermarriage between whites and persons of one-half or more are: Arkansas, California, Colorado, Delaware, Idaho, and Wyoming. Those states with no restrictions as to intermarriage between the races are: Connecticut, District of Columbia, Illinois, Iowa, Kansas, Maine, Massachusetts, Michigan, Minnesota, New Hampshire, New Jersey, New Mexico, New York, Ohio, Pennsylvania, Rhode Island, Vermont, Washington, and Wisconsin.

If any other states or countries of either North or South America, or Europe, offer any legal obstacle to intermarriage between the races, I have no knowledge of it.

Australia is handling the situation with great wisdom, by neither allowing miscegenation nor even permitting the migration of colored races to the country. Absolute separation is the only safeguard against ultimate amalgamation.

In South Africa the early Cape Colony settlers maintained a rigid color line until their efforts were brought to naught by the negrophilism of religious zealots, who influenced the English government to force racial equality and intermarriage upon the Colony. Many withdrew and in the face of great difficulties established themselves in the Orange Free State and the Transvaal, where they have striven against terrible obstacles to maintain their racial ideals. Cape Colony is lost to the white race. The future only can show whether the northern colonies can maintain their new country as a white man's land.

Thoughtful men who live in the southern states of this country in the presence of a large negro population, and who love their homeland, see in their minds, when they gaze into the future, pictures of lost racial identity which fill them with the gravest apprehension. When these same thinking men, who by research have possession of the facts, raise their voices in warning, they are met with such a degree of lethargy that they at times border on despair. Sometimes this lethargy changes to opposition, ridicule,

and actual persecution by those whose personal interests are involved, by their friends, and by those who profit by cheap negro labor.

When in vision the mind reaches across the ocean in hope that in Northern Europe the white race at its center may at least maintain its purity, the negro is beheld accepted upon equal terms and marrying without hindrance light-haired, blue-eyed Teutons.

The clouds, however, in our homeland are not wholly black but have their golden border. The subject has been studied from all angles and in all lands. The public has in recent years shown an interest in learning the facts, and in considering the means, if possible, of saving the dominant race of America from being submerged in the rising flood of mongrelization.

Earnest Sevier Cox, in his book, "White America," summarizes the result of his researches in all of the continents and amongst all races, and gives his conclusion in one sentence; that, "To solve the problem, the races concerned must be separated or amalgamated." This seems to be the final conclusion to which students of this question are coming. A large branch of the negro race, led by Marcus Garvey, has reached the same conclusion, and is desirous of centralizing the negroes of the western world into a black nation in Africa.

While many have been studying the problem, the State of Virginia took the initiative in actually enacting in 1924 what is known as the "Racial Integrity" law. This law for the first time definitely defines a white person as one with no ascertainable degree of negro blood, and with equal clearness in 1930 states that a colored person is one with any ascertainable degree of negro blood, other non-white races being included in the same class, except that a person with fifteen-sixteenths or more of white blood, the rest American Indian, without negro admixture, may be classed as white. Similar laws were soon adopted by the states of Georgia and Alabama. Other states have been deterred from following, either from lack of leadership in the legislatures, or because of racial complications already existing, and the difficulty of enforcement. These states are still content to rely upon their present inadequate marriage laws, permitting classification as white of persons with one-sixteenth, one-eighth, or one-fourth negro blood, and upon the public abhorrence of mixed marriages. Unfortunately, nineteen northern and western states and the District of Columbia, including the national capital, place no restrictions whatever upon such marriages.

Virginia alone, though in a feeble way, attempted to fix the responsibility of classifying the population of the State by saying in its law that the State Registrar of Vital Statistics *may* register by color those who apply for such registration. This wording, "may," was reduced from the imperative

"shall" during the passage of the bill. The responsibility was assumed by the State Registrar, since it was in accord with work which had already been undertaken by him of properly registering births, deaths, and marriages as to race, as required by the Model Vital Statistics Act of 1912, not only of the Virginia Registrar but likewise, if so desired, without further legal enactment by all state registrars working under the Model Law.

Without realizing just what would happen, the privilege was extended to the people of the State to register by race births which occurred before June 14, 1912, the date when the Model Law became effective, a small fee of twenty-five cents being required to cover the clerical cost. A few white people registered, but no true negroes or dark skinned mixed breeds. With the near-white mixed breeds, this was just the opportunity that they longed for, and in an incredibly short time their applications for white registration began to come in.

The group of "Mongrel Virginians," studied and described by Estabrook and McDougale in their book by that title, in connection with the Carnegie Foundation, were greatly aroused and had a local registrar visit and register them until his supply of cards was exhausted. When these cards reached our office, the trick was at once detected, and all of the fees were returned and the white registration for which they applied refused. The cards, however, giving their parentage were carefully preserved, with regret that the local registrar did not have many more of them.

Our chief difficulty in tracing the pedigree of this group, composed of perhaps one thousand or more in several counties, is their twenty-one per cent of illegitimacy, as the above-mentioned authors found. They are locally known as "Free Issue," from the fact that they are the descendants of freed slaves colonized in one county in the foot-hills of the Blue Ridge Mountains. Estabrook and McDougale accepted their claim that there had been also an admixture of Indian in the group. This gives them the opportunity of proclaiming themselves "Indians," ignoring the negro racial foundation. Now they are maintaining that this "Indian" blood has been so reduced by white illegitimate crossing that they can pass as white. In filling their pedigree forms, they always either claim that their illegitimate fathers were white men or disclaim knowledge as to their identity. Fortunately, however, our Bureau is in possession of fairly complete birth and death records, secured by tax assessors during the period from 1853 to 1896. That was before there was any concerted endeavor to pass as white, and the officers, knowing perfectly their racial standing, registered them as colored. Estabrook checked his work by these records and found them to agree with his conclusions. We have also marriage records from 1853 to

the present. Old tax records in the State Library go further back, always listing them as colored. The older families are also found in Woodson's list of "Free Negro Heads of Families in the United States in 1830," taken from the census report of that year.

By means of these records, we have traced at least one large family back to a slave woman who was freed prior to 1808 in another county and placed on a tract of land with her two mulatto sons. One of these sons intermarried into an old "free issue" family. The other styled himself an "Indian" and mated with a white woman. In the particular line which we traced, a son of this couple from this common-law marriage, or mating, mated similarly with a white woman. Their son married a free issue woman who claims to be white. Other descendants of this slave woman are pretty well mixed with the remaining families of the group, making it easy to show the introduction of the negro strain.

Through the carelessness, to put it mildly, of a census enumerator, 278 of this group were enrolled as Indians and so classified in the preliminary report for 1930. Our office has registered a protest against this classification in the permanent report. In 1920 there were 304, in 1910 there were 7, and in 1900, none classed as Indians. While this parent group was delighted to secure enumeration as Indians through the negligence of an enumerator, an offshoot from it over the ridge in another county actually secured enrollment as white, through the ruling of the census supervisor for the district to so classify them if their children attended white schools. Upon inquiry this was of course claimed, upon the ground, presumably, that the special school provided for them was a white one.

In another county a group of negroes demanded "Indian" registration. A mob of fifteen or twenty of them called upon the enumerator, demanding that he change his classification from colored to Indian. He had already sent his report to the supervisor of his district. What happened after that I do not know, except that the Bureau of the Census published it as received, but the preliminary report gave thirty-nine "Indians" from that county in which none had ever before been heard of. A protest was filed with the Director of the Census, who will add a footnote stating that their classification as Indians has been questioned. The same footnote appears in connection with all of the larger groups.

We have another group living in a county which had no Indians in 1900 but which had 132 in 1930. A portion of the same group in the adjoining county, probably listed by another enumerator, had 1 individual classified as Indian in 1910 but in 1920 had 112, reduced in 1930 to 11. These examples show that the claims of these people to be Indians began after the

1920 census, and have met with success only where they were able to influence the individual enumerators. Several citizens from that county have described their method of initiation into the "Indian" lodge by the "comb test." In some cases some members of a family can pass the test, while the hair of other members is too kinky to allow the comb to pass through in standard manner. It is possible that the actual comb may not be used, but it is true that the texture of the hair receives greater consideration than the family pedigree and greater than color and facial characteristics.

The marriage of a young woman from this group as an Indian to a white man has been recently annulled by the court, after convincing evidence was presented showing that each line of descent is from true negroes and whites. This large family, the offspring of twelve children from the mulatto concubine of a white man, forms a large part of the group, either directly or by admixture with the other families.

Another Virginia-North Carolina group, known in Virginia as negroes and in North Carolina as Croatan Indians, is said by a reliable man past eighty years of age to be descended in part from a white woman by a negro slave, some of the children taking the negro's name and some the mother's. These two names constitute a large part of the Virginia portion of the group. We have had no occasion to work out their genealogical record, as their position as negroes in Virginia is unquestioned.

Another group of negro families, whose pedigrees have been traced by our office, were visited a few years ago by a man from the north, who lived a while with them and wrote a report for The Heye Foundation designating them as a tribe of Indians. This man made no inquiry at the office of the Bureau of Vital Statistics where, if his mind was open to conviction, he could have received ample evidence of the negro origin of his so-called Indians. This group in three counties secured for the first time an Indian classification in the 1930 census. One of these negroes went to a northern state and returned with a white wife.

In the southwestern part of the State are a number of families known locally as "Melungeons," who came from Newman's Ridge, Hancock County, Tennessee, and who are trying to pass as white and send their children to the white schools. Several of them may have married into white families, but they are classed as negroes by the white people amongst whom they live. These families, we believe, are pretty well listed in our office. One of the families moved to a distant part of the State and was reported to us by the school superintendent, who asked for information as to their racial classification. We were able to give him all the information needed. Inquiry was also made by the Superintendent of the Peniten-

tiary, who at different times had two of the family in prison, both claiming the privilege of being placed with the white men.

Another family originated from a Louisiana mulatto who married a white woman soon after the Civil War. The descendants, who were claiming to be full whites, announced that their grandfather came to Virginia from New Orleans. Knowing that New Orleans had birth records reaching back for more than one hundred years, I wrote to the State Registrar and soon received a certificate showing the name in the baptismal records of the negroes in a Roman Catholic church, in 1830 or thereabouts.

In like manner we have traced out other families and groups of families in various parts of the State, and believe that comparatively few have escaped us. We do, however, know of several groups which we have not as yet been able to study. One of these, numbering about one hundred, descendants of a white woman and a negro slave, has hopelessly passed out of our reach into the white race, though their pedigree is known to us; while a second group of similar origin is escaping into the white race because of lack of local interest in the matter, though we have them partly classified, confidentially, without recorded evidence.

We believe that we may safely say that in this, the first attempt to register the population of a state racially, under the most rigid rule possible, without one dollar of special appropriation, relying simply upon demanding correct information on birth, death, and marriage records, we have made a satisfactory beginning.

We have aroused the public to the seriousness of racial amalgamation and convinced the mass of the population that racial intermarriage, and even illegitimate sexual mating, is not only a statutory offense but a crime against both the white and the black races. Young white men do not now look upon the seduction of a colored girl and becoming responsible for her pregnancy, and the starting of a new racial problem, as a joke as was once the attitude toward it. Most important of all, the negro race itself is developing a higher moral tone and greater personal pride, which leads the females to resent approaches from white men, rather than to meekly yield, as in the past. This point is substantiated by physicians and other intelligent people from various localities. Possibly the most outstanding group exception is that studied by Estabrook and McDougle. In conversation with a social worker, supported by a church mission for these people, she says that she is striving with a considerable degree of success to inculcate in the minds of the young females a higher sexual standard, and to lead them to think that it is not an honor to bear children to white men.

While two races have never yet lived together without amalgamation, the

situation as developing in Virginia leads me to believe that that evil day, even by simply maintaining the present improved situation, may be held off some centuries farther into the future than might have been thought possible a few years ago. The weak point is that Virginia is standing alone in this endeavor, and that even the southern states are not showing the interest hoped for by Virginians in abandoning promptly their laws permitting the intermarriage of whites with negroids of from one-sixteenth to one-fourth negro heritage. In the north the situation seems almost hopeless, owing to lack of public sentiment and resulting lack of laws against racial intermarriage. In the south public sentiment is strong and is holding the situation fairly well in hand without rigid laws.

With the great migration of the southern mulattoes to the north, frequently because of the changed social conditions which they find there, I think that I am safe in saying that as time progresses the wave of racial amalgamation will sweep upon Virginia from the north earlier than it will from the south.

THE AMERICAN PEOPLE OF POLISH ORIGIN IN TEXAS

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An investigation of Polish immigrants and their descendants in Texas was undertaken by me in 1929 and 1930. There are two kinds of Polish settlers in Texas: immigrants from Silesia living principally in the environment of St. Antonio and immigrants from southwestern Poland living in the North of Texas. In the environment of St. Antonio I have examined the Polish settlers from Panna Maria, Kosciusko, Hobson, Cestohova, St. Hedwig and Yorktown. In north Texas the Polish settlers from Bremond and Marlin were examined also by me. The whole material embraces 320 families.

This work is based principally on the material from the environment of St. Antonio, where there were subjected to anthropological investigation 425 men and 418 women. According to the results of these studies the two following questions will be answered:

1. To what anthropological types do the immigrants born abroad and their descendants born in Texas belong?
2. What anthropological difference is there between the people born in the old country and the people born in Texas?

The anthropological investigation, the subject of which were the European people, had established among them ten different anthropological components, four of which belong to the fundamental elements and the other six should be considered as secondary types formed by crossing of the fundamental elements.¹ The anthropological elements are: the Nordic, the Laponoid, the Armenoid and the Mediterranean. The secondary types are: the North-Western, the Subnordic, the Preslav, the Alpine, the Dinaric and the Litoral.

The anthropological composition of Polish immigrants in Texas is illustrated in table 1.

As it was stated, we have distinguished among the population of Europe the fundamental elements and the secondary types formed by crossing of the former, namely: the northwestern type is derived of the Nordic and the

¹ Czekanowski, J. Das Typenfrequenzgesetz. Anthr. Anz., 1928, B. V.

TABLE 1
The anthropological composition of immigrants

ANTHROPOLOGICAL TYPE	FROM SILEZIA						FROM SOUTHWESTERN POLAND						TOTAL															
	Born abroad			Born in Texas			Born abroad			Born in Texas			Born abroad			Born in Texas			Born abroad			Born in Texas						
	Men		Women	Men		Women	Men		Women	Men		Women	Men		Women	Men		Women	Men		Women	Men		Women				
	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent	N	Per cent				
Nordic.....	9	15.5	9	17.7	63	17.2	47	12.8	8	21.1	8	22.9	27	27.8	19	23.2	17	17.7	17	19.7	90	19.4	66	14.7	34	18.7	156	17.1
Northwestern.	6	10.3	4	7.8	53	14.4	40	10.9	7	18.4	4	11.4	17	17.5	19	23.2	13	13.5	8	9.3	70	15.1	59	13.1	21	11.5	129	14.1
Subnordic....	14	24.1	18	35.3	124	33.8	134	36.5	17	44.7	9	25.7	37	38.1	13	15.9	31	32.3	27	31.4	161	34.7	147	32.7	58	31.9	308	33.7
Laponoid.....	10	17.2	10	19.6	38	10.4	37	10.1	4	10.5	3	8.6	7	7.2	4	4.9	14	14.6	13	15.1	45	9.7	41	9.1	27	14.8	86	9.4
Preslav.....	11	19.0	5	9.8	31	8.5	37	10.1			8	22.9	2	2.1	7	8.5	11	11.5	13	15.1	33	7.2	44	9.8	24	13.2	77	8.4
Litorale.....	2	3.5	2	3.9	8	2.2	3	0.8			2	5.7	1	1.0	4	4.9	2	2.1	4	4.7	9	1.9	7	1.6	6	3.3	16	1.8
Dinaric.....	4	6.9	2	3.9	37	10.1	31	8.5	1	2.6	1	2.9	3	3.1	10	12.2	5	5.2	3	3.5	40	8.6	41	9.1	8	4.4	81	8.9
Alpine.....	2	3.5	1	2.0	13	3.5	38	10.4	1	2.6			3	3.1	6	7.3	3	3.1	1	1.2	16	3.4	44	9.8	4	2.2	60	6.6
Amount....	58	100.0	51	100.0	367	100.1	367	100.1	38	99.9	35	100.1	97	99.9	82	100.1	96	100.0	86	100.0	464	100.0	449	99.9	182	100.0	913	100.1

Mediterranean elements, the Subnordic of the Laponoid and Nordic elements, the Preslav of the Laponoid and Mediterranean elements, the Alpine of the Armenoid and Laponoid elements, the Dinaric of the Armenoid and Nordic elements, lastly the Litoral of the Mediterranean and Armenoid elements. Considering this fact we must ask the following question: "What proportion of fundamental elements produces the male population and what the female population?" We assume that a population consisting of the following fundamental elements a , l , h , e , which have been intermingled with each other becomes a form of equation:

$$a^2 + l^2 + h^2 + e^2 + 2al + 2ah + 2ae + 2lh + 2le + 2he = 1$$

a^2 , h^2 , l^2 , e^2 , indicate the percentages of fundamental elements and $2al$, $2ah$,

TABLE 2

	IMMIGRANTS FROM SILESIA				IMMIGRANTS FROM SOUTHWESTERN POLAND			
	Men born in		Women born in		Men born in		Women born in	
	Europe	America	Europe	America	Europe	America	Europe	America
Anthropological elements:								
Nordic.....	39.4	41.4	42.0	35.8	45.9	52.8	47.8	48.1
Laponoid.....	41.1	37.0	44.5	40.9	36.0	29.0	36.5	22.1
Armenoid.....	06.6	08.3	04.4	10.3	02.9	03.7	02.9	12.7
Mediterranean.....	13.1	13.4	08.5	12.9	16.2	14.6	12.0	17.2
	100.2	100.1	99.4	99.9	101.0	100.1	99.2	100.1

$2ae$, $2lh$, $2le$, $2he$ —the percentages of secondary types. Then we can define the proportions of fundamental elements in our populations (table 2). An examination of this table shows that the columns with the percentages of particular elements in male and female series indicate a great proportion of Nordic elements, a fact, which does not agree especially with the results based upon the exactly examined population of southwestern Poland. There is reason to think, that the emigrant population, especially men, were selected, and that the emigration affects in the first line the Nordic elements, whereas the Armenoid element shows the least tendency to leave the native country. Thus we answer the first of the stated question.

It is very interesting to observe the respective percentages of the elements of the male and female series born in America as compared with the series of

men and women born in Europe. The descendants born in America shows an increase of Nordic and Armenoid elements and a diminution of the Laponoid one. Only the female offspring of the immigrants of Silesia are an exception to this rule. This exception in the female series from Silesia can be explained by the fact that the anthropological analysis of women is more difficult than the analysis of the men. Especially does it apply to the distinct difference of the Northwestern and Mediterranean types. The Armenoid and the Mediterranean elements are too scarce to enable us to reach any conclusion.

We must suppose that the anthropological difference between the immigrants born abroad and their descendants born in America is due to the unequal natural increase of the particular anthropological types. Table 3 shows the differences between figures for births and deaths of

TABLE 3
The natural increase

TYPE	FATHER	MOTHER
Nordic.....	5.3	6.1
Northwestern.....	3.9	4.9
Subnordic.....	4.8	4.5
Laponoid.....	4.7	4.9
Preslav.....	4.8	4.5
Alpine.....	4.2	3.7
Dinaric.....	4.1	3.2

children, considering the particular anthropological type of father and mother.

It is evident that the father as well as the mother of the Nordic type possess the greatest natural increase of children.

The interesting differences between the figures for births and deaths as compared with the average increase (of 4.7) appear in the marriages of particular types. In order to obtain a stronger marked result we have linked the particular anthropological types according to their affinity in the following groups: the Nordic group (of the Nordic and northwestern types), the Laponoid group (of the Subnordic, the Laponoid and the Preslav types) and the Armenoid group (of the Alpine and Dinaric types). The result is illustrated in table 4.

This table shows that the Nordic marriages indicate the greatest natural increase of children. This result reveals the fact that the descendants born

TABLE 4
The natural increase in the particular marriages

MOTHER	FATHER		
	Nordic	Laponoid	Armenoid
Nordic.....	+1.8	+0.2	+1.3
Laponoid.....	-0.5	+0.3	-0.9
Armenoid.....	-0.9	-1.2	-2.3

TABLE 5
Coefficients of homogamy
The immigrants in Texas

TYPES	MEN						
	Nordic	North-western	Sub-nordic	Laponoid	Preslav	Alpine	Dinaric
Women:							
Nordic.....	+0.069	+0.166	-0.180	+0.033	+0.082		+0.061
Northwestern.....	+0.005	-0.024	-0.150	+0.083	-0.007	+0.273	-0.061
Subnordic.....	+0.062	+0.058	+0.056	-0.088	-0.061	-0.087	-0.000
Laponoid.....	-0.145	-0.101	+0.133	-0.076	+0.096	-0.017	+0.009
Preslav.....	-0.018	-0.110	+0.076	-0.008	-0.027	+0.133	-0.002
Alpine.....	+0.080	-0.116	-0.027	+0.045	+0.035		+0.066
Dinaric.....	-0.054	+0.107	+0.110	+0.009		+0.029	-0.068

The Polish people of Pultusk-country (Poland)

TYPES	MEN				
	Subnordic	Nordic	Alpine	Laponoid	Preslav
Women:					
Subnordic.....	+0.335	-0.036	-0.088	-0.148	-0.161
Nordic.....	-0.180	+0.259	+0.013	+0.010	-0.123
Alpine.....	-0.098	-0.070	+0.124	+0.108	+0.016
Laponoid.....	-0.060	-0.042	+0.046	+0.076	+0.030
Preslav.....	-0.059	-0.131	-0.060	-0.008	+0.241

in America show a greatest percentage of the Nordic type than the immigrants born in the old country.

Our analysis of Polish settlers in Texas had established the following facts:

1. A relatively great percentage of men who emigrate to the United States, as compared with the population of native country belong to the Nordic type.

2. The increase of the Nordic type established in the series of descendants born in Texas is due to the natural increase of this type.

In 1929 I have published a work "Anthropogenetische Auslese" based on an examination of Polish population, in which I have stated the tendency to homogamy in the marriages of particular types. Furthermore I stated that this tendency to the homogamy is not the same in the respective marriages of the particular types. The investigation of people of Texas, on the contrary, has established no homogamy. This fact can be explained as follows. Homogamy appears among the old population, where the anthropological types owing to their different psychical qualities have formed different social strata. It is not the case in Texas, where the oldest immigration exists scarcely for seventy-five years and was drawing on the new settlers in later time.

Table 5 shows us the coefficients of homogamy given by

$$Q = \sin \frac{\pi}{2} Q'$$

where

$$Q' = \frac{ad - bc}{\sqrt{(a+b)(c+d)(a+c)(b+d)}}$$

As a general result of this work we must add that our studies do not approve of Madison Grant's opinion concerning a racial deterioration of American people in the later time. By no means is this opinion quite right, if we regard the American people of Polish origin.

THE EFFECT OF MIGRATION ON THE NATURAL INCREASE OF THE NEGRO

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Ever since the period of emancipation there has been an influx of southern Negroes into the northern states. During the great war the influx swelled to the proportions of an extensive mass movement. To judge from the returns of the 1930 census the migration continued on a fairly extensive scale, although it was less than the trek during the war. Migration is frequently an aid to the increase of a people because the losses in its own territory are quickly made good, while the migrants enable the stock to multiply beyond its former borders. Migration has contributed greatly to the increase of the Anglo-Saxons, Scandinavians, Spanish, Italians, Portuguese, and other European peoples. The compulsory migration of African slaves into various lands has been a potent aid to the numerical increase of the Negro race. What will be the biological effect of the migration of Negroes within the confines of the United States?

I need not dwell upon the great importance of this question in relation to the struggle between whites and blacks for numerical supremacy. One important factor in the issue of this struggle is doubtless climate. In Haiti, Jamaica, Guadeloupe, the Barbadoes and parts of Brazil the Negroes have proven victors over their Indian and white competitors. Parts of our own southern states have followed a somewhat similar course. There are black areas in which over 90 per cent of the inhabitants are Negroes, and for many years Negroes in Mississippi have outnumbered the whites. But notwithstanding the high birth rate of the southern Negroes, the whites in most parts of the south have outbred their Negro rivals. This fact is largely the result of their lower infant and child mortality. Although the birth rate of the Negroes in the Birth Registration Area is in general higher than that of the whites, the relatively high Negro mortality more than overcomes the initial advantage of their higher birth rate. The census of 1930, like that of 1920, shows that the ratio of children under five years of age to women of the child bearing period is greater in the native whites than in the Negroes. This is true for both the north and the south. Unquestionably the whites in the United States are increasing more rapidly

than the Negroes. The more rapid increase of the white population of the United States has been to a large extent due to an extensive foreign immigration which, for a number of years before the great war, added over a million of inhabitants per annum. This immigrant population was more prolific than the native whites, although the native white population of the south has continued to have a high birth rate. The rural south has furnished an extensive breeding ground for white as well as Negro migrants, for there has been a considerable exodus of whites into the north and west. The same economic causes have been responsible for the migratory movements of both races. Negro migrants, however, are more prone to go into the cities than are the southern whites. In most northern states over ninety per cent of the Negro population is urban. The inhabitants of cities have long been characterized by high death rates and low birth rates, but while urban death rates have fallen greatly in recent years urban birth rates have also gone down, so that at present most cities which have a surplus of births over deaths owe their natural increase to the exceptionally favorable age composition of their population.

The birth rate of most of our large cities is not sufficiently high to keep them from decreasing in numbers, if their population were of normal age distribution. Urban life has been relatively even more destructive to Negroes than to whites. Up to 1920 deaths exceeded births in the Negro population of most states and cities of the north. Northward migration had proven a perilous adventure to the Negro race. The migrants, especially in the war period, consisted of people in the adolescent and middle periods of life. The age composition of northern Negroes as shown by the census of 1920 was remarkably different from that of the southern Negroes in having relatively few young children and in having a much larger proportion of individuals in the child bearing age. Nevertheless at this time few northern states showed more births than deaths in their Negro population. I have calculated the stabilized rate of natural increase for 14 northern states in 1920 and found that it falls far below the rate needed to maintain the population without loss.

The growth of our northern Negro population at least up to 1920 has been dependent mainly upon migration. And the effect has been up to that time racially destructive. It has drained off relatively larger and larger numbers of Negroes in the most prolific periods of life and subjected them to the sterilizing influences of the industrial north. The extent to which these losses have been compensated for by an enhanced birth rate in southern Negroes is uncertain. Between 1910 and 1920 some of the southern states, notably Alabama, suffered an actual diminution of their Negro inhabitants.

Temporarily, at least, the trek of Negroes into the north has checked the increase of our Negro population in general. Whether or not it may result later in a further increase, when the effects of the dislocation are outgrown, will depend upon how the Negroes adapt themselves to the environment of the north and west.

The conditions encountered by the northern migrants in their efforts to establish themselves were notoriously bad. The 1920 census following closely the mass migration, found a disorganized, badly housed, and mal-adjusted Negro population. Death rates were high, and the birth rate was relatively low. In the years following 1920 Negro birth rate, according to our birth statistics, have increased in most northern states. For several years births have exceeded deaths among the Negroes in most parts of the north, whereas before 1920 deaths had exceeded births. The Negro death rate has fallen. Infant mortality among northern Negroes has shown a marked decline during the last decade. The Negro population of the north was becoming established on a more satisfactory basis at least up to the period of the recent financial depression, which has borne upon the Negro with a special severity. The steady increase of northern Negroes indicated by our annual reports on birth statistics is doubtless due in part to an under estimate of the Negro population. It is probably due also in part to the better establishment of the Negro migrants. When birth rates are measured by the number of children ever born to mothers who had borne a child during the year, it is a significant fact that this number showed an increase in northern Negro women. At the same time the number of children under five per thousand women of children bearing age in 1930 was insufficient for race maintenance in a stabilized population of northern Negroes. We should, however, be cautious in interpreting the significance of this fact. Recent migrants, even though prolific, could not be expected to have a high proportion of children under five years of age. To do so most of them would have to be in the region for five years in addition to a period required for becoming settled and finding a mate.

Despite a somewhat unfavorable showing at the present time the vital statistics of Northern Negroes are distinctly improving. The American Negro is gradually becoming immunized to tuberculosis which has long been one of his greatest scourges. As a human animal he is probably, on the whole, the physical equal of his white competitors. In some respects the odds are in his favor. He is greatly handicapped in the inter-racial struggle by venereal disease. With an average expectation of life of about 45 years he has still a long way to go before his vital statistics are as favorable as those of the whites. Urban life, which is biologically bad for all races, is rela-

tively more destructive to the Negro than it is to the white man. In the north the Negro seems destined to remain predominately urban for a long time to come. He will, therefore, be subjected to the biological destructive agencies that have acted as such powerful checks to the natural increase of urban populations in the past. The climate is against him, but with proper care he may eventually overcome this handicap. On the other hand, he will probably have, for a considerable time to come, the biological advantages of an inferior social status. By and large, his race will occupy the stratum in our society which is characterized by the highest birth rate. If he competes successfully with the whites in the north it will only be through the maintenance of a birth supply high enough to offset a number of other disadvantages. By maintaining a fairly high birth rate northern Negroes can doubtless survive and increase in numbers in the northern states. Whether a high birth rate will be maintained is open to question. The Negro birth rate has declined greatly since the period of super-fecundity which prevailed in the 70's and 80's. The decline has followed a course similar to that of the whites, and doubtless for much the same reasons. There can be no doubt as to the extensive practise of birth control in our Negro population, especially in the cities. As the birth supply is brought more and more under voluntary control, it is subject to the influence of psychological factors in which it is quite conceivable that racial attitudes might exercise a potent effect. Students of the Polynesian and Melanesian races have not hesitated to attribute to psychological factors a strong influence leading to the gradual disappearance of these races in several islands of the Pacific. Our American Negroes appear to be of a more buoyant and cheerful disposition than many other native peoples and they have borne their portion of adversity with unusual fortitude. Nevertheless Negro literature reflects the impress of the oppression and unjust discrimination to which the Negroes in this country have been subjected. People feeling keenly the injustice and humiliation of their lot in a society dominated by the white man may be loath to bring children into the world, who will have to face the same kind of an unfavorable environment. A recent number of the Birth Control Review devoted to the Negro and containing several articles contributed by Negroes gives voice to the attitude I have mentioned and leads to the suspicion that birth control propaganda may effect a very considerable further reduction of the Negro birth rate.

The greatest influence of birth control propaganda will naturally be among the more intelligent and enterprising members of the race. In all probability the American Negroes are coming into a period of highly dysgenic propagation. The mulatto elements will be gradually bred out and re-

sorbed into the blacks. The more capable and ambitious of the blacks, or browns, who forge ahead and win a measure of success will probably constitute a relatively sterile group. Differential mortality will of course take its greater toll from the more improvident and less enlightened members of the race, but it will probably not compensate for the dysgenic effect of the differential birth rate. There will probably be a continual infusion of white blood into the blacks which might be held to counteract their dysgenic breeding, but this infusion is growing less in amount and probably poorer in quality.

Migration has apparently intensified the dysgenic breeding of our Negro population. Up to at least recent years it has not led to the permanent establishment of Negro communities in the north and west; that is, the Negro communities thus formed have fallen short of self maintenance. Whether the loss from a given section of a certain percentage of its population, which goes into another region where it fails to reproduce itself, really leads to a reduction of the rate of increase of the whole region is not immediately evident. Taking out, say ten per cent of an increasing population, might cause according to a principle enunciated by Malthus, the remaining ninety per cent to reproduce more rapidly so as to produce nearly as many people as before. At the same time the ten percent in the new region might fall somewhat short of reproducing itself. If the region of increasing population suffers a continual loss through migration, the total population might grow more rapidly even though the migrants were not quite self perpetuating.

Possibly our Negro population may be in some such situation. With our present statistical data it is impossible to tell. We do not yet have the data needful for the calculation of stabilized rates of natural increase for the census year 1930. We do know that for some time births have exceeded deaths, but the highly favorable age composition of northern Negroes might bring this condition about, although their stabilized rate of increase was insufficient for maintenance. Hitherto northward migration has been a march toward destruction. How nearly it may have come to be a successful invasion we shall probably soon be able to discover.

ASSORTATIVE MATING FOR COLOR IN THE AMERICAN NEGRO

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The determination of the physical type the American Negro is developing has profound social and economic significance, especially as regards skin color, the main physical characteristic on which race prejudice is based. Is it only a matter of a hundred years or so until the Negro shall disappear as such, leaving as his heritage a slightly darker tinge to the skin color of the other groups composing the American population? Or is the Negro forming a homogeneous physical type as regards color? Obviously one can predict only on the assumption that the present mores governing racial matings continue, or at least are not radically changed. The amount of primary race crossing is probably decreasing, and there is an appreciable but unknown percentage of Negroes, especially men, who pass into the white group.¹ Hence the future physical type of the American Negro depends primarily on the type of inheritance mechanism operative and the type of mating occurring within the Negro group itself.

The pigmentation of approximately 5,659 individuals was measured with the color top by Dr. M. J. Herskovits and his associates in 1924-27.² This sample, consisting of two unselected and one selected series from Harlem and one series from rural West Virginia, is probably representative of the American Negro as a whole. Genealogical data were secured for all individuals and families, and on the basis of statements of the Negroes themselves as to Negro-White composition of their ancestry, the entire population was divided by Herskovits into classes according to the amount of mixture represented.

N, unmixed Negro

NNW, more Negro than White

NW, approximately equal amounts of Negro and White

NWW, more White than Negro

Herskovits showed by a consideration of physical traits that the genealogies given were statistically valid in the sense that, in the majority of traits

¹ Reuter, E. B., *Race Mixture*. New York, 1931, pp. 61-71.

² Herskovits, M. J., *The American Negro*. New York, 1928.

in which the two races differ, the mean and standard deviation of the NNW were more like the Negro, the NW intermediate, and the NWW more white.³

The present writer utilized Herskovits' data for an analysis of the mechanism of pigmentation inheritance, and found that the black pigmentation is not inherited as a blend, nor is it produced by the action of one or two factors which act as Mendelian dominants.⁴ Both total and fraternal variability increase with increasing intermixture with the white race, and with increasing differences between the percentages of N (black) pigmentation of the parents.⁵ If the types of N, NNW, NW, and NWW matings are arranged in order of decreasing amounts of Negro ancestry, from $N \times N$, most Negro, to $NNW \times NWW$ and $NW \times NW$, most racially mixed, to

TABLE 1

Variability of offspring according to genealogical class of father and mother

TYPE OF CROSS	NUMBER OF FAMILIES	VARIABILITY OF OFFSPRING		
		S_f^*	s	σ
$N \times N$	29	3.19	2.14	3.84
$N \times NNW$	41	5.06	6.52	8.25
$N \times NW, NNW \times NNW$	37	5.26	6.36	8.25
$N \times NWW, NNW \times NW$	46	7.34	7.88	10.77
$NNW \times NWW, NW \times NW$	31	6.78	7.13	9.84
$NW \times NWW$	22	6.47	9.57	11.55
$NWW \times NWW$	12	5.91	5.58	8.13

* S_f is the fraternal variability, s the family variability, and σ the standard deviation or total variability.

$NWW \times NWW$, least Negro, the fraternal variability increases from 3.19 for unmixed Negro crosses to 7.34 and 6.78 for crosses representing the most racial intermixture, and then decreases to 5.91 for crosses representing the least Negro and the most White mixture (table 1). That is, any type of crossing which tended to increase the proportion of Negroes having approx-

³ Herskovits, M. J., "Does the Negro know his father?", *Opportunity*, October, 1926.

⁴ Barnes, Irene, "The inheritance of pigmentation in the American Negro," *Human Biology*, September, 1929, pp. 321-381. See also Davenport, C. B., *Heredity of Skin-Color in Negro-White Crosses*, Carnegie Institution of Washington, Publication No. 188, 1913.

⁵ For a discussion of fraternal variability, see Herskovits, M. J., "A further discussion of the variability of family strains in the Negro-White population of New York City," *Journal of the American Statistical Association*, September, 1925, pp. 1-10.

imately equal Negro and White ancestry would tend to increase the variability of the population as a whole, while a type of crossing which tended to increase the proportion of unmixed Negro matings would decrease the variability of the total population.

Herskovits has previously shown that there is a definite curvilinear relationship between the color of husbands and wives. Table 2 gives the average color of wives according to the color of their husbands, and *vice versa*, based on the same families Herskovits used in his study, plus additional families measured in rural West Virginia. The coefficient of regression of wives on husbands is .44; of husbands on wives, .41.⁶ "The darkest women . . . seem to marry men of about their own color or lighter, but

TABLE 2

Average skin color (per cent N) of wives for increasingly dark husbands, and of husbands for increasingly dark wives

PER CENT N, HUSBANDS	NUMBER OF CASES	AVERAGE PER CENT N, WIVES	PER CENT N, WIVES	NUMBER OF CASES	AVERAGE PER CENT N, HUSBANDS
28-33	3	55.92	28-33	5	71.90
34-39	9	54.03	34-39	4	38.00
40-45	13	57.00	40-45	19	61.25
46-51	12	50.02	46-51	30	57.20
52-57	23	58.29	52-57	25	63.18
58-63	25	56.64	58-63	30	65.71
64-69	28	64.06	64-69	30	67.67
70-75	42	63.08	70-75	37	68.91
76-81	51	71.28	76-81	34	75.22
82-87	22	67.79	82-87	14	76.28
Total.	228	62.82	Total.	228	66.43

the lighter women, and those not pronouncedly dark, marry men darker than themselves."⁷

Both husbands and wives were divided into those with less than 45 per cent N (light), 45 to 67 per cent N (medium), and 67 per cent N or more (dark). The coefficient of contingency for the color of husbands and wives,

⁶ The skewness of the distributions makes the validity of the use of correlation coefficients extremely questionable, but within the limits of this objection, the r between the percentage of N pigmentation of husbands (y) and wives (x) is $+.42$, while η_{yz} is $.51$ and η_{yx} is $.52$. The difference between r and η_{yz} is 3.22 times the probable error of \hat{r} .

⁷ Herskovits, M. J., "Social selection in a mixed population," *Proceedings of the National Academy of Sciences*, vol. xii, 1926, pp. 587-593.

using this division, is .34. The coefficient of contingency for the various types of N, NNW, NW, and NWW matings is .37. Thus it appears that Negroes tend on the average to marry Negroes of approximately the same color, but that the relationship is curvilinear, i.e., light wives marry husbands darker than themselves, and dark wives marry husbands lighter than themselves.

What is the significance of this type of mating for the variability of the offspring? Fraternal variability would be increased if mating were entirely random as regards pigmentation, and lessened to the extent that there was selective mating of darks with darks and lights with lights. Table 3 shows for various types of genealogical crosses the actual number of matings of given types, and the number of matings that would have been expected

TABLE 3
Actual and theoretical number of matings according to genealogical class of father and mother

TYPE OF CROSS	NUMBER OF MATINGS		
	Actual	Theoretical	Actual-theoretical
N × N	29	17	+12
N × NNW	41	39	+ 2
N × NW, NNW × NNW	37	50	-13
N × NWW, NNW × NW	46	54	- 8
NW × NW, NNW × NWW	31	35	- 4
NW × NWW	22	17	+ 5
NWW × NWW	12	6	+ 6
Total.....	218	218	0

on the basis of random selection. There is a proportion greater than chance for N × N, N × NNW, NW × NWW, and NWW × NWW matings, and less than chance for the other types of crosses. The fraternal variability of the offspring of these 218 matings was 5.87. If we assume that the actual fraternal variability for each type of cross is the true variability of the universe, and then weight its importance in determining the variability of the 218 crosses according to the theoretical number of crosses of that type there would have been if mating were random, the fraternal variability of the 218 families would have been 6.19.

Similarly, the fraternal variability of the offspring of the 95 families in which the parents were within 6 per cent of the same pigmentation reading was 5.04; the fraternal variability of the 228 families classified according to

light, medium, and dark crosses was 6.06; while the fraternal variability, according to the assumptions made as to random mating in the preceding paragraph, would have been 6.12.

The variability of the offspring appears to be less than it would have been if mating were entirely random, but greater than it would have been if all Negroes had married persons of approximately the same color and genealogical class as themselves. One important consequence of the type of mating that is occurring is that the proportion of unmixed Negroes is much less among the children than among their fathers and mothers, 29 per cent among the latter and 14 per cent among the former (table 4). On the other hand, 54 per cent of the parents and 72 per cent of the offspring belong to the NNW and NW genealogical classes, while 17 per cent of the parents and 14 per cent of the offspring belong to the NWW.

TABLE 4

Percentage distribution of husbands, wives, and children according to genealogical class

CLASS	NUMBER				PER CENT			
	Husband	Wife	Parent	Children	Husband	Wife	Parent	Children
N	76	50	126	105	34.86	22.93	28.90	14.23
NNW	73	63	136	393	33.49	28.90	31.19	53.25
NW	45	54	99	140	20.64	24.77	22.71	18.97
NWW	24	51	75	100	11.01	23.39	17.20	13.55
Total	218	218	436	738	100.0	100.0	100.0	100.0

To the extent to which this sample is typical, it would appear that the American Negro population of the future will be more homogeneous as to ancestry, i.e., there will be a smaller percentage of unmixed Negroes, a larger percentage of persons with half or more Negro ancestry, and probably a smaller percentage who pass as Negroes but have more White than Negro ancestry. The process of social selection apparently operating to give the preference in mating to the lighter Negro woman will mean a less proportion of Negro ancestry in the population as a whole only if it means that an undue proportion of dark girls do not marry.⁸ In any case, if lighter women marry darker men, and *vice versa*, the offspring on the average will be darker than their lighter parent and so more likely to remain within the Negro group. However, the segregation process operative in the inheritance of pigmentation will prevent the development of a population of one uniform hue.

⁸ In Jamaica, there is some indication that the mate selection is the opposite of that in the American Negro population, "black" rather than "white" features being preferred. See Davenport, C. B., and Steggerda, Morris, *Race Crossing in Jamaica*. Carnegie Institution of Washington, Publication No. 395, 1929, pp. 296.

SECTION IV

EDUCATION AND EUGENICS
SOCIETY AND EUGENICS



EUGENICS AND EDUCATION

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The subject eugenics and education may comprise:

1. The principles which eugenics provide for education;
2. The question: how shall we educate the population in eugenics;
3. The results to be expected, and
4. The place eugenics occupies in our views of life and the world.

A few words on all these points.

The principles of education may be deduced from various philosophical and scientific systems. For instance:

For Schopenhauer the Kantian thing in itself is, as we know, *will* (der Wille) and the will therefore is unchangeable, is beyond time and causality. We see the will in the character of the individual. The character is unchangeable.

With Schopenhauer, therefore, education is of very limited importance. His character is decisive for each human being.

Goethe (in his *Italienische Reise*) also says: "Das Leben eines Menschen ist sein Character" ("The life of a man is his character").

To mention another great philosopher: Bergson finds in evolution, the creative evolution, the true reason for the existence of the world. For evolution duration is necessary. The importance of the duration is shown in our life: we are always changing. The duration of life is not of indifference for the value of our life. Our character is made, is formed in regard to our life.

With Bergson, therefore, education occupies a large place in contrast to what we saw with Schopenhauer.

J. J. Rousseau begins his *Emile* with the words: "Tout est bien sortant des mains de l'Auteur des choses" (All has come right from the hands of the Author of things"), and the French revolution premised that all people are born alike.

What principles does eugenics—which thus aims at the betterment of the human race by promoting good births and reducing bad ones—place in the problem of education?

In order to indicate this, we will proceed from Quetelet who applied statistics to human relations.

Quetelet (in the middle of the nineteenth century) was interested in variability, i.e. the phenomena of variation, the small differences in nature. (People, by the way, have continued to study this. It is said that when Leibnitz, in a discourse, spoke about variability, the ladies in the audience went into the park and sought for leaves which were alike and showed them to Leibnitz.)

Quetelet found that if, with regard to some characteristic or other, for instance body length, one has a large number of examples at hand, and if these can be grouped in a certain regular way, one has then to do with material of the same sort.

The curve of Quetelet demonstrates the distribution of the cases over the various length-classes. The greatest number is in the middle of the series of cases: it is the top of the curve. Left and right of the middle are gradually decreasing numbers. The curve gives us in one glance an impression of the distribution of the cases over the length-classes. The body-length of the length-class with the greatest number is designated by Quetelet as the mean length, "*la moyenne*."

The regularity of the curve of the body-length, which is established by the mutual regularity of the numbers of the various dimensions, is for Quetelet the expression of the internal unity of mankind: they belong to one species. And Quetelet ascribes this great significance to the curve, because, according to him, it agrees with the curve, which is demonstrated by the succession of the co-efficients of the binomial formula of Newton. The frequency curve approaches the ideal, i.e., the binomial curve.

It is of great importance to make Quetelet's line of thought clear to us. According to Quetelet the frequency curve shows that mankind is a unity. The differences are unimportant; they arise as a result of the influence of the environment. Quetelet called his average the type. Man forms a type. The average is the important; the masses of the large numbers,—they form the type. They characterize the nation to which they belong.

Many have expressed their opinion about the large number of averages. Nietzsche complains of the "many too many," Schopenhauer says that there must be many millions of ordinary people that one genius may be possible.

To Quetelet the frequency curve is of almost mystical value. The study of the statistics affects him.

Another scholar who loves statistics, is Sir Francis Galton. With Galton we come within the sphere of our subject: eugenics and education. Galton was the originator of eugenics. His definition of this science "as the study of the agencies under social control, which may improve or impair the racial

qualities of future generations, either physically or mentally" still holds good.

Galton devotes his attention to the importance of births, he opines: "that a man's natural abilities are derived by inheritance." Thus for the innate characteristics, inheritance is of great importance. As a result of his statistical and experimental investigations in heredity and also as a result of deduction, Galton forms the ancestral law of inheritance. This implies regression, thus children on an average deviate less from the average of the population than their parents. The law of ancestral inheritance offers the possibility of selection.

Galton investigated as has been said heredity statistically and the results were important. He has come to the opinion that there are natural abilities by heredity, that gifted parents have more chance of having gifted children than non-gifted parents.

This result is of great significance for the problem of education: people, therefore, are not born alike. It takes us back to the curve of Quetelet and its significance.

Every period bears its mental stamp. Philosophy also expresses its time in thoughts. Nobody goes beyond his time. But the onesidedness of a time is also its strength. The power of the physical science period of the end of the nineteenth and the beginning of the twentieth centuries is the induction, the analysis, the critical sense, the experiment.

To the great representatives of this period belongs Mendel, the discoverer of the rules of crossing, who goes beyond his time in his ingeniousness.

Mendel's investigations went considerably further than those of Galton. His crossing experiment laid the basis for the experimental heredity doctrine: Mendelism.

For our subject we have to speak about a second keen investigator, Johannsen.

The application of statistics to scientific problems, as we have seen, had great attraction for such men as Quetelet and Galton.

Johannsen followed the natural scientific method, which is that of induction and analysis and contributed in an important degree to the knowledge of the significance of the curve of Quetelet and determined the development of the doctrine of heredity. Johannsen works on the cultivation method of De Vilmorin and Nillson, just as Hugo de Vries did.

Mendel, with the aid of crossing experiments, investigated how the characteristics then express themselves. He found the rules of dominance in the first bastard generation and of splitting (segregation) in the second. The

independence of the characteristics (better hereditary factors or genes) is accepted,—and this is of supreme importance—in consequence of segregation, we assume then the purity of gametes in crossing.

Whilst Mendel studied heredity by crossing, Johannsen occupied himself with pure lines (*reinen Linien*). According to Johannsen a pure line consists of individuals who descend from one fertilized individual.

Johannsen examined the significance of the curve of Quetelet. He experimented with beans. He grouped the beans into weight-classes. The bean-material thus grouped can best be represented by the curve of Quetelet, and if we compare the average weight of the progeny for the various weight-classes with those of the original material, we see that regression in the sense of Galton is present.

Johannsen asked himself, on what the regression was based and sought the explanation in unequal hereditary value of the variants in each group of the original material.

The proof Johannsen supplied by weighing separately variants of each group, sowing them and collecting them separately.

This he did for the groups with the smallest and with the largest beans. Johannsen found that the average weight of the beans of the progeny of beans of one class was not the same; there were some pronounced deviations. It appeared thus that in one and the same class several hereditary variations were present. In a class of minus variants there are some minus variants which belong to hereditary variations deviating less from the average and the presence in each class of some hereditary variations not belonging to the class brings about the regression.

If this explanation of the regression is correct, it cannot be possible that, by the cultivation from minus-, respectively from plus-variants, belonging to a pure line, a selection can be attained; or what is the same thing, the regression must be total, i.e., the average weight of beans for each class must be equal to the average weight of the whole material.

Johannsen carried out this investigation and the result indeed confirmed this idea. This is an important result. It shows that the regularity of the curve of Quetelet will not say that the material which it represents does not contain any hereditary differences and this finding explains the regression of Galton; this is attributed to the presence of hereditary differences in the material.

This wide-reaching result has led to the sharp discrimination between hereditary and non-hereditary variations. Non-hereditary variations are called, according to E. Baur, also modifications (or fluctuations). All that is attained by external circumstances, thus by influences of environ-

ment, belongs to the domain of modificability, the non-hereditary variability.

It is clear that Johannsen by means of his investigations, has come to the phaenotype and genotype notions.

Johannsen confined his first investigation to the comparison of characteristics of two generations. Afterwards, however, he continued the cultivation of pure lines for many years, in order to see whether it was possible to attain a selection of minus-, respectively plus-variants by means of continued cultivation. The result was negative.

The question whether pure lines are invariable in the sense of once for all unchangeable is something else. This does not need to be absolutely the case: new hereditary variations can arise as mutations. This was also observed by Johannsen on a single occasion.

The work of Johannsen in connection with pure lines has, as already mentioned, the same foundation as that of Mendel. While Mendel studied heredity by crossing, Johannsen did so with pure lines. Both based their investigations on the view of the independence of the hereditary characteristics.

Very important is the analysis of the curve of Quetelet, the experimental proof that material, the variability of which can be expressed by the curve of Quetelet, can be constructed from many hereditary variations, each with its own variability. The unity of material, of which the variability can be represented by the curve of Quetelet is seeming.

The significance of this result, that there are hereditary variations, must be instilled in the consciousness of every paedagogue. Here we see the value of natural ability. Education learns this from eugenics: Much is innate; the innate is largely bestowed by heredity. Education must develop that which is inborn in man. Therefore, at the basis of the problem of education lies the question of the possibility of education.

Education is the result of natural ability and environment. The more extensive the pedigree is known, the more clearly is the significance of heredity.

The fact of heredity might lead to fatalism:

There is, however, also the possibility of modification. The same phaenotype can have a different genotype as basis. We therefore need not assume too quickly that the less gifted cannot, as a result of exertion and guidance, attain the higher.

On the basis of the knowledge of nature, we must guide the development of every individual.

This is of enormous value for the happiness of mankind.

We cannot make of everybody what we should like to make of him, but we can try to help everybody to make the best of that which is born in him in so far as favourable factors are concerned, and by careful guidance, by a good choice of circumstances we can try to prevent unfavourable factors in the nature from manifesting themselves. Therefore, if we are conscious of the relative inadequacy of these efforts, we shall attain most of the value of the ideas of genotype and phaenotype.

Eugenics, pointing to the results of scientific research, rejects the idea that all people are born alike, and that therefore the same is attainable for every one.

On the other hand it also condemns the one-sided placing of hereditary ability in the foreground, thereby promoting too strongly a segregation of pupils and a too strong certainty of the possibility or the impossibility of the attainment of results.

Eugenists as appliers of science must also take into account that every science as a scientific doctrine is one-sided. Galilei said: "A doctrine disappears, science progresses." Neither will Mendelism be the last word in the science of heredity.

The point of view which eugenics adopts, regarding education in consequence of the mendelian principles of heredity, is also therefore for a good part the point of view of common sense. Common sense is, as a matter of fact, also prepared to take the inherited nature into account. Like father like son. Public opinion does not take this idea sufficiently preventatively into account.

With this we have returned to our starting point. Does eugenics choose for Schopenhauer or Bergson? It leans more to Schopenhauer.

In our era of the development of the community we may emphatically point to the significance of heredity, therefore, with respect to education, to the importance of natural ability.

In the second place we have put the question: How shall we educate the population in eugenics?

The answer is: By teaching them to take an interest in hereditary phenomena.

We will advocate that every individual provide himself with a life history book. In that way everybody's interest will be directed to heredity. Also in this way important material will be obtained for the study of heredity.

Another important point: In every country a state institute must be founded for the investigation of heredity in man and eugenics. Several similar institutions already exist. Pioneer-work in this domain is being carried out in the United States of America. During the last year there

have been plans for a similar institute in Holland. There is co-operation on the part of scientific institutions, but the present economic conditions prevent progress being made.

In such an institution scientific investigations are carried out. Lectures can also be organised for future medical men, lawyers, teachers and others who are interested.

Examination before marriage also belongs to education in eugenics.

These brief observations on our second point may suffice.

Finally, points 3 and 4: What are the results to be expected and what place can eugenics occupy in our view of life and the world?

The eugenically educated citizen will feel his responsibility towards posterity. This will express itself in his entering into marriage and having or not having children. Thus will be his attitude with respect to his own conduct.

No less important is the influence of eugenical conviction on his conduct towards others.

Eugenical conviction here must necessarily lead to great tolerance. In judging the behaviour of others we must always realize that not all people are alike, that each one acts according to his nature and environment.

Eugenics, in view of the results of the study of heredity, knows that there is a natural privileging among people.

There is a social privileging, there is also a privilege bestowed by nature. One cannot be thankful enough if one is personally gifted by nature, thus born of a good stock and if one grows up in a good social environment.

This fact must be instilled into the minds of people and must help in deciding their attitude as social beings. It must in our own time lead to tolerance and communal sense. Ability is not a personal merit but a natural privilege.

The eugenical ideal must be that every one develops his gifts to enhance the value of his own person, that every one is tolerant with regard to other people's opinions and conduct and that every one is prepared to exert himself in the interest of the whole.

Finally: What is the range of eugenic conceptions for ourselves for our final attitude towards life? Eugenics does not speak finally for our view of life and the world.

It is true that man is cut out in life for the practical, therefore for prosperity and happiness, but man asks himself questions which reach much farther; perhaps there is a further reaching purpose.

The state will therefore also have to be guarded in respect to eugenics.

Eugenics does its duty if it helps, for its part, to realize all possibilities of developing a people.

THE DOMINANCE OF ECONOMICS OVER EUGENICS

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It is now about fifty years since Francis Galton promulgated the doctrine of Eugenics. It has become a highly popular subject for parlor talk and best sellers. Yet, aside from the sterilization of imbeciles, we are today further than ever from putting eugenic principles into actual operation.

That imbeciles should be sterilized is of course unquestionable, but we should not delude ourselves concerning the importance of the benefits thereof. Following Haldane, we may recall the fact that if (as is commonly claimed) most imbecility is due to the same recessive gene, then the sterilization of all imbeciles in every generation would not reduce their number to half until about ten generations had elapsed, and subsequent elimination would be even slower. And after all, actual imbecility represents only a very small part of the hereditary weaknesses which should be eliminated, and this particular defect is not as onerous as many others, firstly because imbeciles do not suffer from the consciousness of their own defect, and secondly because it is not inhumane to segregate them into institutions. Here they constitute much less of an economic and psychological burden on their fellow men than they would in the community at large, where most lesser defectives must remain.

The attack on imbecility was to have been only a first step, yet eugenicists have in the main stuck at that point. The major task of eugenics is not to get rid of this or that specified and highly conspicuous abnormality, such as total hereditary deafness or blindness, existing in relatively rare individuals who might conceivably be subjected, as a class, to outright sterilization. An individual's total genetic worth is a resultant of manifold characteristics, weighted according to their relative importance, positively or negatively, for society. It is a continuous function of all of these combined, so that there is no hard and fast line between the fit and the unfit, based upon one or a few particular genes. The vital thing, for the population at large, is a relatively low rate of multiplication of those who are, in general, physically and mentally less well endowed, without a decrease in the total size of the population, or, to put the same thing conversely, a relatively high multiplication rate of the genetically sounder germ plasm,

all along the line. Ideally, the rate should be a function of total genetic worth, there being, from this point of view, no ultimate distinction between negative and positive eugenics. However, the better the genes, especially if they be rare, the more important is what happens to them. Since Galton's time, absolutely no headway has been made in realizing this major aim; in fact, it is widely claimed by eugenicists themselves that just the opposite process is increasingly operative, despite their own preachments.

We might as well admit that the forces at work are quite beyond the control of us as eugenicists, in the society in which we live. For they are fundamental economic forces. Galton lived too early to appreciate the principle brought out by Marx that the practices of mankind, in any age, are an expression of the economic system and material technique existing in that age. He thought that they could be moulded willy nilly, from without, into conformity with the abstractions of an idealist intellectual. But the organization of society today is such as to make the primary motive of action, at least among the dominant section, the profit motive. This motive works out in devious ways that are contradictory to the welfare of the race as a whole, despite the fact that some of our modern philosophies, in a defense reaction, try to rationalize the two ends into harmony.

The profit system leaves little place for children. In general, they are not profitable investments: their cost is excessive, but the dividends from them are uncertain, they are like to depreciate in value, are non transferable, and they do not mature soon enough. One child may be necessary for continuance of an estate, but each additional one weakens it. For the great masses, who have no estates, each extra child commonly means more intensified slavery for the parents, and an additional unit of human unhappiness, in itself. And as the status of the middle class sinks, the parents hesitate to rear children with lesser privileges than they.

How much can eugenic considerations weigh in determining the actions of people under these conditions? To what extent will they lead people of greater genetic worth voluntarily to have four, five, or even more children (remembering that at least more than three are on the average necessary to a couple, if there is to be any increase at all)? Is it to be wondered at that a census of eugenicists themselves has disclosed an appalling failure to reproduce themselves, despite the fact that they are maximally steeped in their own doctrines? Under the conditions that exist today, we know very well that it is a rare couple that has four or more children, except as a result of ignorance, superstition, or accident, or unless, because of some unusual circumstances, it has not yet been typically immersed in the full tide of our profit system, but has rested in some back-eddy of provincialism, aristoc-

racy, or artisanship, or has been borne upward through some temporary irregularity of the current. But cases like the latter grow fewer and fewer as our organization of society approaches its climax.

It is true that the universal dissemination of scientific birth control technique would tend to eliminate the production of unwanted children, and to this extent it would bring reproduction under the direction of reason. It is to be welcomed whole-heartedly, as a most important biological invention that increases the potential control of man over natural forces. It will help to fend off a part of the intolerable misery that would otherwise afflict innumerable individual cases, although we must remember that the economic screws will eventually be forced down again as tightly as they can be anyhow, any relaxation of the pressure from beneath being responded to by a compensatory increase of pressure from above. That is, when the burden of family care diminishes, wages will be decreased still more, so that birth control provides no remedy for the faults of our economic system. Moreover, it must be admitted that birth control, by itself, would certainly not suffice to meet the major needs of eugenics. Not only is it illegitimate to assume that those now unenlightened, whose reproduction would be reduced by the spread of birth control technique, are genetically inferior, in respect to the traits most valuable for a well ordered society, but, in technically advanced countries like ours, in which the birth rate as a whole is low, the mere reduction in reproduction rate of any section of the population would be eugenically inadequate. Even more vital, from a biological standpoint, is an actual increase of those having the more valuable genes, and it is the obtaining of this increase that is prevented by economic pressure, and by social pressure having an economic basis.

In addition to the financial load involved in having children, we must consider the direct burden imposed on the mother. Do male eugenists suffer from the illusion that most intelligent women love to be pregnant and to endure not only the physical disabilities but also the shame and humiliation, and the difficulties of maintaining a job, that pregnancy involves in our society. That they love the frightful ordeal of childbirth, so seldom relieved by competent medical treatment? That they love to spend forty or fifty thousand hours washing diapers, getting up in the night, tending colic, meeting in a city flat the little savages' just demands for safe outdoor play and companionship, stewing soups and milks, acting as household drudge and either abstaining from the life of the outer world entirely or else staggering under the double burden of a very inferior position outside and work in the home as well? It would be physically possible through organized social services of various types, accompanied by a revolution in our

attitude towards women, vastly to ameliorate these afflictions of the female sex, to reduce them, in fact, to the point where the compensations were greater than the disadvantages. But there is no particular profit in bettering the lot of a slave. Meanwhile, intelligent and self-respecting women, and those who value their husband's love, will use what means they may have to restrict the size of their family to a very low level indeed. And in this they will be right. The eugenist, from his glass house, cannot criticize them.

Another way in which our economic system acts to foil the true purposes of eugenics is by masking the genetic constitution of individuals and of vast groups through the gross inequalities of material and social environment which it imposes upon them. The investigations of Burks on the resemblance between the intelligence of foster children and their guardians, checked by the calculations of Wright on this material, and Newman's converse findings concerning the considerable differences between the intelligence quotients of genetically identical twins who were reared apart, show clearly the important influence of environment as well as that of heredity upon intelligence as ordinarily measured. In Burks' cases the usual differences in home environment occurring between families of the type she studied (mainly middle class) caused, on the average, a difference of about 6 points in the child's Intelligence Quotient (on a scale in which 100 is the normal I.Q.). This agrees as closely as could be expected with Newman's finding that the differences in rearing between the members of his pairs of identical twins reared apart usually caused as great I.Q. differences as did the differences in heredity of two non-identical brothers reared together, for just about 6 or 8 points difference would be expected from the latter cause also. Now in Newman's cases too the individuals compared (the members of a pair) were reared in what was on the whole the same general social class. Surely, the members of widely different social classes, such as Burks' middle class people on the one hand, and white day laborers or Southern Negroes or Mexicans, on the other hand, differ from one another, on the average, in respect to environmental advantages by at least several times the average difference between two members of the same class. Hence we should expect I.Q. differences due to environmental dissimilarities between the children of the former and the latter classes to average at least 15 or 20 points. And this is what has actually been found.

The results, then, show us that there is no scientific basis for the conclusion that socially lower classes, or technically less advanced races, really have a genetically inferior intellectual equipment, since the differences found between their averages are to be accounted for fully by the known effects

of environment. At the same time, we are brought to realize that, in a society having such glaring inequalities of environment as ours, our tests are of little account in the determination of individual genetic differences in intelligence, except in some cases where these differences are extreme or where essential likeness of both home and outer environment can be proved.

If the above is true of intelligence, it is even more true of temperamental traits, moral qualities, etc., since these are more responsive to conditioning than are purely intellectual characteristics. Thus, certain slum districts of our cities constitute veritable factories for the production of criminality among those who happen to be born in them, whether their parents were of the criminal class or not, and, as Jack Black for instance has shown, an analysis of the lives of various individual criminals reveals to what an extent potentially valuable citizens may be turned to a life of habitual crime through the pressure of our social system. Under these circumstances it is society, not the individual, which is the real criminal, and which stands to be judged.

Naturally, the apologists for the still existing order would have us naïvely accept appearances at their face value. Their justification of the existing order depends upon this acceptance. This is bound to lead to a false genetic valuation of individuals, of classes, and of races, so long as this system lasts. The apologists defend their position with the *a priori* argument that, in the social struggle, the better rise to the top. They neglect to show that success in modern economic competition depends on many other factors, besides innate endowment, and that today we have increasingly operative, instead, the principle of: "to him that hath shall be given." But if we assume that inborn differences do play some rôle, the question is, what rôle? Are the characteristics which now lead men to rise, economically, those which are most desirable, from a social point of view? It could at least as well be maintained that the dominant classes tend to have the genetic equipment which would be least desirable in a well ordered social system, since they have been selected chiefly on the basis of predatory, rather than truly constructive, behavior. A study of the lives of many eminent financiers confirms this. The "respectable" captain of industry, military leader or politician, and the successful gangster are psychologically not so far apart. The high-minded, the scrupulous, the idealistic, the generous, and those who are too intelligent to confine their interests to their personal success, these are apt to be left behind in the present-day battle.

This brings us to consideration of another topic: what should be the eugenic goal? So long as present conditions continue the ideology of the people must in the main be a reflection of that of the now dominant class,

and the standards, the criteria of merit of the latter, will be accepted. Naturally, those in power will idealize their own characteristics, particularly those which brought them to dominance. In so far as they concerned themselves about eugenics, would not most of them believe in the production of bigger and better business men, who could see us through bigger and better depressions? There would also be room for various accessory gentry, such as sportsmen of the type who symbolized the predatory life, slap-stick and slush artists to keep us harmlessly amused, and some safe and sane scientists to invent better poison gas and to harmonize science with useful superstition. And perhaps the most benighted elements could be cajoled or coerced into developing themselves into more callous slaves, who could work longer hours on a cheaper grade of beans. Not that this fantasy would ever be realized, for, as I have shown, eugenics under our social system cannot work. But that would unquestionably be the direction in which the ideology of the dominant class would logically tend to lead eugenics, if it could be made to work. Only the impending revolution in our economic system will bring us into a position where we can properly judge, from a truly social point of view, what characters are most worthy of a man, and what will best serve to carry the species onward to greater power and happiness in a united struggle against nature, and for the mutual betterment of all its members.

Galton could not be expected to have realized that the day was soon coming when there would be fundamental economic and social changes, which would utterly change the complexion of eugenic problems. But in our day the writing on the wall is manifest, and they are fools who blind themselves to it. Let us rather prepare with open eyes to face our new problems. There is no use in arguing about the effects, in a hundred years or more, of the continued differential reproduction of different classes, when the very basis for the existence of these classes as such will soon be swept away, and in place of the economic conditions imposed by the class struggle, entirely new conditions will be substituted. Similarly, the present disputes of eugenists about the fates of races will soon appear vain and beside the point, when the economic and social reasons for the existence of the differential fertility of races, as well as for race prejudices, will have disappeared with the general abolition of exploitation. True eugenics will then first come into its own and our science will no longer stand as a mockery. For then men, working in the spirit of coöperation, will attain the social vision to desire great ends, and to judge of what is worthy. Then first, with opportunities extended as equally as possible to all, will men be able to recognize the best human material for what it is, and garner it from the

great neglected tundras of humanity. Then too, and not before, will the economic basis of society be such as to allow a truly social control over differential fertility.

That imminently impending society, ordering its processes consciously for the common good, assures every one economic plenty, takes away a large part of the burden of the children from the shoulders of the individual couple, and especially from the woman, and so makes it possible for them to decide by considerations of the interests of the future generations, and of the race as a whole, rather than of themselves, how many and what children to have. Along with other débris, the cobwebs of superstition and taboo will be swept clean away from the whole subject of sex and reproduction, so as to make possible more real research, and more thoroughly rational practices in these so important activities of man. The possibilities of the future eugenics under these conditions are unlimited and inspiring. It is up to us, if we want eugenics that functions, to work for it in the only way now practicable, by first turning our hand to help throw over the incubus of the old, outworn society.

THE SOONG FAMILY

AN EXAMPLE OF GREAT ABILITY IN THE COMMON MAN

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A WORD ABOUT METHODOLOGY

The contest between heredity and environment is perennial. At the present time, the theory of "behaviorism" seems to have given the environmentalists a new and stronger weapon for defending environment as the more important element in evolution and the making of man. On the other hand, meetings of eugenists, like this one, staunchly and determinately affirm the supremacy of heredity over and against environment. And so the battle rages without any definite conclusion.

What is the trouble? It is the old scholastic futility of abstract reasoning. A man takes the position that *A* is true, ergo, *B* cannot be true. He argues by means of the syllogism that everything contained in his premise or premises is true, but everything false contained in other premises. This scholastic method of reasoning, inherited from pre-scientific education, still haunts many supposedly well informed men, and works havoc even in scientific circles; and the contention between environmentalists and hereditarians is only one example out of many that might be given.

The scientist must take cognizance of both facts. Heredity does not work in a vacuum but in the specific environment in which it is placed; environment does not affect any heredity except that which is exposed to it. The result is an effect of the meeting and the interaction of the two; and it is impossible to tell which is more important—heredity or environment. The situation is this: Heredity supplies ability; environment furnishes opportunity. The two must meet, if results are to be attained.

We have two striking illustrations of this fact in our history of the Civil War. When U. S. Grant, a descendant of an old New England family and with a good record in the Mexican war, resigned his commission at the age of thirty-two to take up farming and selling of real estate only to make a fizzle of it and had to seek refuge as a clerk in his father's leather shop at the age of thirty-eight, he was looked upon as a broken and disappointed man. The heredity was there, but it had no way of manifesting itself in that dreary

place of Galena, Illinois. The Civil War furnished the opportunity for that great military genius to blossom out and bear excellent fruit. There was, on the other hand, a considerable number of army officers whose chances for distinguishing themselves were much better than those of Grant, but who failed to do so because they lacked the hereditary genius. The opportunity and the genius met in Grant, and the results were splendid.

The situation is similar in the case of Lincoln. His early record contains nothing particularly extraordinary; he met with several failures. The Civil War furnished him the opportunity to manifest his talent or genius. Without that opportunity he might have made a good but not an extraordinary president, perhaps a "Tippecanoe and Tyler too."

These two cases contain another important truth—genius and talent do not necessarily have to be preceded by genius or talent in the ancestral lines. If the ancestors have been of sound stock, nature has a way of producing at least occasionally extraordinary results by the interweaving of two individuals with sound ancestry.

This methodological introduction is necessary for an understanding of that very gifted family of the Soongs, which is playing such an important rôle in the life of China today.

EARLY LIFE OF SOONG

Little is known about the early life of the founder of the family. His Chinese name is given as Soong Yu-Ju; his later name as Charles Jones Soong; a third variant is Charles Han Kiao-Soong. But Soong is not the real patronym of this man. It was *Han*. He is supposed to have changed it either because his family disowned him after he became a Christian, or because a wealthy Chinese minister befriended him and he had hopes of being adopted and inheriting his benefactor's property. Be that as it may, some facts are perfectly clear.

Mr. Soong was born about 1856 on the island of Hainan, south of Canton. His father, a small farmer, died while the boy was still in his teens. After the re-marriage of his young mother, Charles, to give him the name by which he was later known, found himself in a more miserable environment than before, because unfriendliness on the part of his step-father was added to poverty. So the lad made up his mind to leave his home permanently. After some difficulties he finally arrived in Hongkong, where, owing to his unusual intelligence, although uneducated, he was employed by the American captain of an old type trading vessel on the recommendation of one of the pioneer Hainan sailors. His intelligence and industry soon gained for him the favor of Captain Jones who brought the twenty-four year old

Chinese sailor to America. He landed in Wilmington, N. C., in 1880, and had no expectation of becoming the founder of such a magnificent family as happened later. Captain Jones continued to befriend him, and he made a living by selling cord hammocks which he had learned to make aboard ship. After some time he became a Christian and adopted the name of his benefactor, Charles Jones.

Mr. Soong evidently made a good impression on those with whom he associated, especially by his integrity and intelligence. Dr. Julian S. Carr of Durham, N. C., became interested in him to such an extent that he saw him through Trinity College, now Duke University. But the new convert was eager for a theological education, and he managed somehow to go to the seminary of the Southern Methodists at Nashville, Tenn., and received a theological diploma from Vanderbilt University in 1885. And he kept in close touch with these institutions until his death in 1917 or 1918.

On his return to China he settled in Shanghai as a missionary and teacher; he built a church, was a member of the first Y. M. C. A. committee in China, and later built a home of his own and had a printing press established in a small building in the rear of his house for the translation of the Bible and Christian tracts into Chinese. The success he attained in these varied and numerous activities prove that he was a man of exceptional ability and showed competence in whatever he undertook.

This competence guided him in choosing as a wife a Miss Nee (or Ni) Kwei-Tsong—a vigorous and intelligent young woman of eighteen, with a high-school education and interested especially in music and mathematics. She was able in home management and took care of the family whenever her husband was absent from home. She died in 1931 at the age of sixty-three.

More is known about her ancestry than about that of her husband. Her father, named Nee (or Ni) Yin-Shan, was a scholar interested in jurisprudence. Her mother came of a military family, but not of the bandit kind; in fact, Mr. Nee lost his life in defending his local community against bandits. Whether that event turned his wife toward Christianity is not known; but she was an earnest member of the Methodist Church and brought her daughter up in that faith. Mrs. Soong was thus a Christian from childhood while her husband became one at the age of twenty-five or twenty-six.

SOONG'S LATER LIFE

While the life of Mr. Soong thus far is strikingly interesting, it is perhaps of no particular importance; he was shrewd, capable and circumspect in

whatever he undertook but took little part in the life of China except to convert as many people to Christianity as he could; and if China had continued to be controlled by the old Manchu dynasty perhaps little would have been heard of him or his family, because neither he nor his wife belonged to the ruling class. His opportunity came in 1911 after the establishment of the republic. He became acquainted with Dr. Sun Yat-Sen, and this acquaintance soon ripened into an intimate personal and political friendship. Mr. Soong had, among other things, engaged in business and, with his persistence and capacity, made considerable money. He supported the revolution both with his money and services, as treasurer and secretary to Sun Yat-Sen, and had to flee twice to Japan to protect his life. His principal service to the cause of the revolution during the six years before his death consisted in organizing its finances as much as was possible under the trying conditions which he had to face. One of his sons inherited this ability for financial management and has been, as will be presently shown, of great service to China.

THE SOONG CHILDREN

The crowning glory of Charles Jones Soong's life are his six children, three sons and three daughters, each of them possessing great talent, verging in two cases close to genius. When the unknown Chinese sailor landed on the shores of America at the age of twenty-four, he certainly never dreamed that he was to be the founder of such an important family, nicknamed by their enemies the "Soong Dynasty"; for today, and for the past ten years or so, this family has controlled China, not so much by force as by the integrity of its character, its high ideals, and the honesty of its administration.

The oldest son is Soong Tse-Ven, generally referred to as T. V. He was educated at St. John's University, Shanghai; came to America and graduated from the Harvard School of Business Administration in 1915. He came to New York and took courses in the Graduate School of Columbia University while working in different banks. On returning to China he entered various commercial enterprises, organized a department of commerce and the Chinese Central Government Bank under the National Government. He is a member of the Central Committee of the Kuomintang and has been Minister of Finance since 1926.

Mr. George E. Sokolsky in an article in the *New York Times* (November 15, 1931) says of him: "T. V. Soong . . . is generally regarded as the most competent administrative official that China has produced since Marquis Tseng Kuo-Fang, who reorganized the nation for the suppression of the Taiping rebellion." And a writer in *Asia* (October, 1927, p. 814) says:

"T. V. Soong represents an honest and energetic liberalism. As minister of finance, in less than two years, without any important increase in taxation, he multiplied the resources of Kwantung Province by twelve. Although his uncompromising honesty made enemies, he earned the reputation of being the most capable administrator in Chinese life."

T. V. Soong is not a revolutionist, but an honest and capable business man who wants to help China, and he certainly stands out like a tower of strength among the corrupt politicians of his country.

Soong Tse-Liang, the second son, is likewise a graduate of the Harvard School of Business Administration. He has traveled in Europe, was director of the Department of General Affairs in the Ministry of Railways, and is now a managing director of the Whangpoo Conservancy Board (a technical organization), and a rising light among the business men of Shanghai. He has also been Minister of Foreign Affairs.

Soong Tse-An, the youngest brother, has studied both at Vanderbilt University, where his father studied theology, and at Harvard. But he, too, studied business and is a director in the salt administration.

Soong Ah-Ling, the oldest daughter, was educated at Wesleyan College, Macon, Ga., and is married to Mr. Kung Siang-Hsi, a descendant of Confucius and one of the richest men in China, owning a chain-store system of general shops, produce-purchasing agencies, and small banks. He has been Minister of Industry and Commerce under the Nationalist Government. He does not take kindly, though, to politics but prefers to serve his people through the improvement of commerce and public charity. He is the most characteristically Chinese member of the family and his contacts with Chinese life are so numerous, that the saying, "Dr. Kung is everything in China," has become current in his country.

Madame Kung has inherited from her mother a special capacity for hard-headed common sense; she is an excellent hostess and a devoted mother of her two boys and two girls. She is quiet and unassuming but of a superior intellectuality. Owing to these qualities her advice is sought not only by members of the Soong family, but by friends and other relatives. Her influence has not been altogether without guile, for she has used her great ability to promote the interests of the Soongs, but always in a meritorious way.

Soong Mei-Ling is the third daughter; she was, like her sisters, educated at Wesleyan College, Macon, Ga., but spent some time at Wellesley College, Mass. In 1924 she met Chiang Kai-Shek, then a humble officer, in the home of her sister, Madame Sun. A secret romance developed between the beautiful and charming Mei-Ling and the handsome and capable Chiang.

It was opposed by the members of the Soong family, but the courtship ended in the love-match on the first of December, 1927, after the prospective groom had proved his military skill and political strategy by becoming president of the republic. He is a product of Chinese education and had only incidental contacts with modern ideas through a term in a military school in Japan and a year with the Red Army of Russia before his marriage to Mei-Ling. She most willingly availed herself of the privilege of introducing him to Western culture; she reads to him, tells him about American life, plays the piano for him, acts as his interpreter in confidential talks with foreigners, and has recently brought him into the Christian fold. Her charm and versatility are said to have kept several would-be betrayers of China's interests in line with the National Government. But she keeps as much in the background as possible and acts through her husband.

Soong Ching-Ling, the second daughter, has been reserved for the last, because she is easily the most interesting number of the family. She, too, graduated from Wesleyan College, Macon, Ga., and has a sweet, gentle personality which radiates warmth and kindness wherever she happens to be. But behind this gentle appearance is hidden a fiery nature, capable of utter devotion to a cause and willing to make any sacrifices for it.

Her cause is the Chinese Republic, personified in Dr. Sun Yat-Sen. She met him in Yokohama in 1915 on her return from America. He was in exile there at the time with her father and other Chinese patriots, banished by Yuan Shih-Kai. Beautiful, alert, intensely patriotic, she readily attracted Dr. Sun's attention. She became his secretary and was thus initiated into all the intrigues and glories of the still unstable republic. A deep love soon developed between the two, although he was married, fifty years old, and had three grown up children. He was a Christian, opposed to polygamy, and their affection seemed doomed to failure. But his wife, sensing the situation, gave him his freedom and they were married in 1915. From that time on, her life, her energy, and all her ambitions centered in him until his death in 1925. During the nearly ten years of their marriage she was his "right hand," translated his great work "International Development of China" into English, shared his exile and temporary poverty, and always cheered him up when the gloom was thickest.

His death produced a profound change in her. She withdrew from politics until new developments, due to Russian bolshevism, brought her out into the open again. She was against the Kuomintang and Kiang Kai-Shek whose wedding to her sister she refused to attend, because she accused him of having betrayed her husband's principles. She went to Russia, but returned in 1929 to attend the state burial of her husband in the magnificent mausoleum the nation had erected in his honor near Nanking.

She refused every offer of office and emoluments from the new government and went back to her exile in Europe. But the Sino-Japanese troubles brought her home once more.

She threw herself into the thick of the fight for Chinese sovereignty, organized the women for political action and for relief and hospital work in Shanghai. These intense labors brought about a nervous breakdown in the Spring of this year from which she is slowly recuperating. She is the true Oriental widow in her devotion to the memory and the ideals of her husband, and China honors her for it. As the writer in *Asia*, already referred to, says: "As the widow of Sun Yat-Sen, Madam Sun is sacred. The contrast between her own shy delicacy and grace and the tremendous name she bears, is truly dramatic: it makes her a figure of romance."

Revolutions may break down old idols but they soon erect new ones, for the mob cannot live without them. The "Little Father" of Russia is dead, but the memory of Lenin is alive; the "Heaven-Born" of Peking is in exile, but the mausoleum at Nanking still speaks to the crowds.

GENERAL REMARKS

The Soongs are physically a vigorous and well-set-up race; the daughters are beautiful and the sons are handsome, an indication of good structure and functioning. An interesting change in their psychology consists in the fact that while their mode and manner of living is entirely modeled after Western patterns and while the daughters assumed Christian "given" names, they have abandoned these and have returned to their Chinese "given" names. Their Western culture seems to have made them not less but more Chinese in their patriotism and devotion to their people. Madame Sun Yat-Sen, for instance, is the most patriotic of the six Soongs, but she has never mastered Mandarin Chinese and speaks only the Shanghai dialect. In the present crisis with Japan, each member, both in the direct line and by marriage, has manifested the greatest concern about the cultural and territorial integrity of China and has fought the aggressor tooth and nail.

Here is a family unable to trace its pedigree back for ninety-six generations as one of my correspondents informed me he could do with his family, a family whose progenitor most likely changed his patronym for reasons sufficient unto himself; but a family of vigorous physical and mental stock, alert, capable, and above all else honest to the point of a fault in the midst of a welter of political and commercial corruption. Such men are worth thousands of shrewdly calculating acquisitive individuals who always look out for their own advantage. These men will save China, and such men will save America. And the aim of eugenics consists ultimately in producing such families, whether with or without a pedigree.

TYPES OF DATA AVAILABLE FOR EUGENICS RESEARCH IN THE UNITED STATES

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It is necessary at the start to make a distinction between what we may call Individual Eugenics and Social Eugenics. Certain hereditary defects may be extremely painful in their consequences for individual families and yet may not bulk large in public welfare. The development of genetic therapy in dealing with hereditary disorders demands an intimate understanding of the special types of heredity which may be involved in each variation. Such procedure, therefore, waits upon the researches of physicians, physiologists, psychiatrists, and geneticists. On the other hand, there are some very frequent hereditary limitations, notably limitations in capacity for intellectual development, which may not be particularly painful to individuals but may involve serious social consequences. Our attention has been devoted primarily to the study of data bearing on the social aspects of general population trends. We are interested in data which show what is happening with regard to the distribution of hereditary characteristics, especially capacity for intellectual development, in the population of the United States. And we are equally interested in data which throw light on the causes of present trends and the possibilities of social control.

With this approach in mind, comprehensive surveys, census data and vital statistics are necessarily of first importance, in spite of all the inaccuracies and limitations which necessarily infect such materials. In the study of population changes we must deal almost wholly with mass data. In other phases of our problem, however, more intimate and detailed studies are of greater value. For example, in the study of intelligence, a few carefully controlled experimental results with well selected samples are worth more than a mass of data whose meanings are dubious. Of course, large-scale and detailed studies are complementary in this field. The results of extensive surveys such as the Army intelligence tests give some indication of the distribution of degrees of present intellectual development. More detailed studies throw light on how much, or in this case, how little, these results mean as regards hereditary capacity. I should like to call attention to one type of mass data with regard to distribution of intelligence, which has not,

I believe, been adequately exploited. We may assume that deviations toward mental deficiency occur most frequently among families of borderline or low normal intelligence. High incidence of mental deficiency in any group is, therefore, an indication of much inferior intelligence in that group. Army rejections for mental deficiency were intended to meet the exigencies of a particular situation, but perhaps for that reason are all the more reliable for our purpose. Rejections for mental deficiency by local boards at the time of the war are reported by Davenport and Love. A second series of rejections by camp psychiatrists are reported with racial classification by Bailey and others. The latter data were never prorated. When prorated, the two sets of data are complementary, because an unusually severe weeding out by the local boards in certain states left fewer mental defects to be discovered by the camp psychiatrists. The combination of these two sets of data gives, I believe, the most reliable indication available of the distribution of mental deficiency in different sections of the United States.

Another field in which detailed studies are especially needed to supplement mass data is the analysis of factors which influence sizes of families in different situations. This field has been sadly neglected in eugenics research. In the practice of medicine it is usually considered that prescription of remedies should follow the diagnosis of causes. But in eugenics we have launched various proposals for racial betterment without very much study of causes of differential natality, which is, of course, the chief mechanism by which the hereditary characteristics of a population are altered. In the study of factors influencing differential natality, data on variations in birth rates in relation to geographical location, time, and economic and social conditions, may be very illuminating. But such mass data need to be supplemented by intimate case studies of attitudes and motives and, where possible, medical diagnosis of physiological capacities.

In the use of census data and vital statistics to study reproductive trends of different groups, the first consideration must be the elimination of irregularities due to peculiar age and sex distributions. Unless such factors are eliminated, results may be obtained which give an entirely false impression of the vital habits of any group. For example, in the United States in 1919-1920, a vital index calculated on the basis of crude birth and death rates would indicate an excess of births over deaths of 89 per cent, whereas a vital index calculated on a basis of age-specific death rates and maternity rates per thousand women at each childbearing age gives an excess of births over deaths of only 35 per cent. Very different stories are told by an excess of births of 89 per cent and an excess of births of 35 per cent! Incidentally, it may be remarked that the excess of births over deaths in the United States,

computed on an age-specific basis, has probably dropped to zero during the present calendar year, 1932. In other words, the population increases which will still be recorded for several decades must be attributed to peculiar age-distribution conditions which are the hang-over of vital conditions that are no longer operative, and to whatever immigration there may be.

There are three principal types of data which may be used as indices of natality. Birth rates, especially age-specific maternity rates, are probably the most reliable in making a comparison between racial and nativity groups. Birth rates, however, are quite unreliable in making comparisons between different localities, especially between rural and urban areas, because many rural women bear their children in city hospitals.

Ratios of children under 5 years of age per thousand women of childbearing ages, sometimes taken as 20-44 and sometimes as 15-44, give the best basis for comparisons between localities, and may be used for comparisons between whites and Negroes and between different urban districts. Both birth rates and ratios of children to women are subject to inaccuracies due to under-registration of births and under-enumeration of young children. In some sections and with some racial groups such inaccuracies may amount to as much as 25 per cent and in some cases even more. Ratios of children to women give an index of natality which has, in a sense, been automatically adjusted by the elimination of much of the infant mortality.

The third chief index of natality is size of family, or record of numbers of children ever born to the mothers of a given group. Data of this type may be the best or the worst. Confusion frequently exists between numbers of children ever born and numbers of children counted as alive at any time; and unless the data are standardized for age distribution of mothers or limited to records of women at least 40 years of age, or unless age disturbances have been in some other way eliminated, data on size of family is quite worthless for our purposes. Incidentally, it may be hoped that the Census will insert again the question, "Number of children ever born," which was included in 1910 but dropped in 1920 and 1930. Data secured by this question constitutes the basis of the elaborate studies of fertility which have been made in England and some other countries, and recently in this country by the Milbank Memorial Fund. In recent English and American studies of this sort it has been necessary to use 1910 (England, 1911) census data.

In the analysis of survival rates life-table data are fundamental. Life tables give the proportion of survivors to different age periods, the expectation of life at birth, and the numbers of persons of different ages who would be expected to be alive if birth rates remain constant and the effects of migration are neglected. All of these values are derived from age-specific

death rates. From these life-table values we may derive three convenient yardsticks of survival, corresponding to types of natality data already mentioned:

1. The *birth rate* which would tend to yield a stationary population at given mortality conditions. This result is secured simply by dividing the integer (1) by the expectation of life at birth. Stationary birth rates per 1,000 women aged 15-44 can also be determined.

2. The *ratio of children* under 5 per women of specified ages, e.g., 15-44, which would be just sufficient to supply permanent replacement can also be determined from the age distribution of the theoretical stationary population. The ratio of the observed ratio of children to women to the estimated replacement value gives a convenient index of net reproduction per generation.

3. *Numbers of children* per family necessary to supply family replacement can also be worked out from life-table values. Some figures of this sort, estimated in relation to different sets of variables, are presented in the text of a forthcoming study by Frederick Osborn and the speaker, *Dynamics of Population* (to be published by the Macmillan Company, 1934).

It is possible to secure quantitative, albeit imperfect data on distribution of various characteristics, including intelligence, in different groups. It is also possible to secure quantitative indices of reproduction trends. Simply by putting these two sets of data together we may get some indication of what is happening to the distribution of such traits, so far as reproduction is concerned.

We have tried such an experiment, using data on distribution of intelligence quotients in school children in New York State villages, classified according to occupations of fathers (Haggerty and Nash data) combined with reproduction indices of similar occupational classes derived from U. S. Birth Statistics, 1928. The results of this experiment are shown on one of the charts in the exhibit.

Other data are available which show variations in natality in relation to variations in intelligence within occupational classes, and in individual families. There is no large, constant differential between ethnic groups in this country. Immigrant mothers, as we all know, have very large families, but their daughters do not seem to follow their example, to any very great extent. And it is an open question whether whites or Negroes are at present reproducing more rapidly. (The present speaker is inclined, on the basis of new census data, to think that at present the Negroes have a slight advantage.) Moreover, it is difficult, in view of all the environmental complications, to know how much significance to attach to apparent differences in intellectual development between different ethnic groups.

The general rural-urban differential in natality, and other regional variations offer peculiarly interesting research problems at the present time. Psychological surveys show great differences in intelligence in different localities. Sociological studies show a great variety of factors controlling migrations within the nation. The significance of such variations in the study of population change is obvious, since families in some areas may be decreasing quite rapidly, whereas families in other areas may be increasing 30 or 50 per cent or even more per generation. In general, at present, farm families have about 50 per cent more children per family than all other classes combined. This suggests that the character of the farm population is a matter of primary eugenic interest. But we do not know what will happen to these regional differentials in the future. The subject has many interesting angles.

Acute problems are present which demand scientific investigation and thoughtful consideration. There is a wealth of psychological, anthropological, medical, statistical, and sociological data at our disposal which has not as yet been adequately exploited for its eugenic implications.

THE NEED OF A COURSE IN MEDICAL GENETICS IN THE MEDICAL CURRICULUM

A PIVOTAL POINT IN THE EUGENIC PROGRAM

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The whole-hearted coöperation of the genetically trained medical practitioner is an essential to the success of the eugenic program for the following reasons. (1) He is necessary to determine who are physically and mentally qualified to be the parents of the next generation, if the better stock is to be urged to reproduce in greater numbers. (2) He is the authority who must decide as to what persons have inherited diseases. (3) Upon his observations of disease in more than one member of the family, and upon his accurate and systematic recording of these, depend the very material with which the eugenic program deals. Without the physician who furnishes clinical records of inherited disease in man, there would be little proof of the necessity of eugenics. (4) He is a vital part in the education of the public as to the value of and necessity for eugenics. He forms the court of last appeal for the public in matters relating to disease. He is indispensable in the program of sterilization, both as the actual operator, and in large part as the initiator of recommendations for patients to be sterilized. The medical practitioner who is ignorant of the importance of heredity as an etiological factor in producing disease may counteract the best efforts of eugenic organizations.

Have the members of the medical profession been trained so that they are capable of fulfilling these tasks? What has been their education with respect to the fundamental principles of genetics, and with respect to the application of these in the field of medicine?

A survey of the approved leading schools of the United States, Canada and England has elicited the following facts. First, the medical student receives a very brief training in his biology course in genetics; too brief to be adequate for his later needs. Secondly, this lack is seldom compensated for in the medical course, the student hearing of heredity in disease only incidentally, and only as the professor is impressed with the importance of

heredity as an etiological factor. Thirdly, if any definite attempt is made in the medical course to instruct students in the principles of inheritance as illustrated in the heredity of various diseases, this discussion is given in the preclinical courses, before the student has any knowledge of the disease discussed. Hence theory, rather than practical observation, forms a part of the subject.

Inasmuch as the practitioner in his student days has been taught little of inheritance in disease; and has not had his interest aroused as to its significance, he fails most frequently to record his own observations in this field, or if he records them, they may be in such form as to furnish little of useful information to the trained scientist, studying inheritance of disease in man.

Until the medical practitioner is made aware of the importance of heredity as an etiological factor in the production of disease, he will not be apt to have a sympathetic attitude toward public education nor toward any scheme which may be devised to curtail the heavy economic waste of caring for the hereditarily defective. For these reasons, a sound eugenic measure, and one which will bring in large returns in professional and public interest, and which will serve to give far more data on human inheritance than we have at present, is the agitation to have taught in every medical school, not only a more extensive course of the fundamentals of genetics in premedical courses, but the application of this science to problems of human disease. This course should be taught by a medically trained person, familiar with the field of genetics, and it should be taught during the final year of the medical course, when the student has become familiar with the signs and symptoms of disease.

SPECIAL CAPACITIES OF AMERICAN INDIANS

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I

Fortunately it is possible to attempt an appreciation of the contributions of American Indians to present-day civilization without having to combat the notion of racial inferiority.

Indians are not inferior, however. Traditional ideas of the mental superiority or inferiority of races, which had a considerable revival during the early years of American intelligence measurement, have recently been subjected to a more discriminating analysis at the hands of competent psychologists. Garth, whose findings have been used repeatedly by adherents of the theory of mental inferiority of certain races, including Indians, and who himself confesses to an earlier conviction that there was racial inferiority, now says in his 1931 book on Race Psychology:

The author is convinced, after an examination of the literature, that we have never, with all our searching, found indisputable evidence for belief in mental differences which are essentially racial. Differences as found can usually be shown to be due to one of two causes, modification (nurture) or selection, and often these are complicated by the results of careless measuring.¹

Speaking of his own Indian measurements, which have been carried on over a period of many years with thousands of Indian children of various tribes, Garth finds that "education tends to reduce to a minimum, or even nothing, the effect of the presence of Indian blood in the educated mixed-blood individual."

Yoder, reviewing the evidence a year or two prior to Garth's published summary, came to much the same conclusion. He says:

The consensus of competent scientific thought, contemplating the inability of mental testers to define intelligence, the inadequacy of all attempts to take such factors as education, social status, and language into consideration, and the deficiencies of testing con-

¹ Garth, Thomas Russell. Race psychology: A study of racial mental differences. With an introduction by R. S. Woodworth. New York, McGraw-Hill, 1931.

ditions, finds no proof of racial inferiority or superiority and eliminates the usual methods of determining such standing from the field of scientific usefulness.²

The everyday experience of supervisors and teachers in our Government Indian schools tends more and more to confirm these conclusions. "I find young children the same everywhere," says one of the veteran teachers among the Apaches; "they have the same curiosity, the same open minds, the same trustfulness, the same sense of satisfaction in having found out something new." In schools on the Pima reservation in Arizona this year whole classrooms of Indian children measured up to the normal grade for white children or above it. The supervisor for this region reports that half the Pima children (and this is preponderatingly a full-blood area) are not retarded when educational achievement is compared with chronological age—"some are a few months behind, most are a few months ahead."

II

Whatever the answer may be to the more or less academic question of innate intelligence, there can be no doubt of the significance of Indian contributions to civilization. Herbert J. Spinden speaks of "a heritage of utility beyond the dreams of avarice"—referring particularly to the inestimable food plants which Indians brought from the wild to a high state of domestication. He reminds us, however, that the Indian "has prepared a second heritage of *beauty*, a gift of fine arts, illusions, and immaterial creations which rise above mere utilities as the mountains rise above the plain," and it is in this realm of the fine arts that Indians of today have the greatest possibilities. Just as the Welsh look to the Mabinogion and the English find in the Arthurian romance a never-failing inspiration, so, Spinden maintains, "Americans of the future will surely realize an epic grandeur in the song sequences and world stories of the first Americans. The Night Chant of the Navajo and the Hako of the Omaha will take their place in the foreland of our national literature as mysterious and beautiful dramas which somehow prefigure the American ideal." He calls the Indian "a true artist unusually qualified by natural abilities in several provinces of esthetic expression," with dramatic ceremonies that combine music, dancing, and pageantry with the use of words in the form of poetry and imaginative prose. He finds him gifted in applications of color and design, "retaining an ancient but evergrowing skill in the homecrafts of weaving and pottery-making and in the illimitable fields of painting and sculpture."³

² Yoder, Dale. Present status of the question of racial differences. *Journal of educational psychology*, 19: 463-70. October 1928.

³ Spinden, Herbert J. *Fine art and the first Americans*. Exposition of tribal Indian arts, New York, 1931. (Monograph.)

In their recent "Introduction to American Indian Art," published in connection with the Indian Tribal Arts exposition, John Sloan and Oliver LaFarge give similar testimony:

The American Indian race possesses an innate talent in the fine and applied arts. The Indian is a born artist, possessing a capacity for discipline and careful work, and a fine sense of line and rhythm. . . . He has evolved for himself during many thousands of years a form and content peculiarly his own.

Of the recent water colors by Pueblo and Kiowa artists Sloan and LaFarge remark:

In these pictures we see the object combined with the artist's subjective response to it—a union of material and technique both symbolic and intelligible. These young Indians have applied to the painting of their pictures the discipline of line and color developed through many centuries of decorating every imaginable object of daily or sacred use with designs innately suited to the objects decorated and charged with traditional cultural concepts. Simplicity, balance, rhythm, abstraction, and unequalled range of design elements, and virility, characterize the work of the Indian of today.

Tribute has been paid by many observers to the persistent union of the useful and the artistic in Indian life and art. The same qualities will be found in any good examples of Indian basketry; for instance, "from the basketmaker work of four thousand years ago to the present-day Hopi and Jicarilla weaves with their joyous colors." Neil Judd, reviewing remains of earlier Indian life on the American continent, regards it as particularly remarkable that "the inherent artistic genius of these dissimilar tribes should have persisted through four hundred years of alien domination and remained so little modified by exotic ideas and materials." As artists and as craftsmen in stone, wood, and shell, he says, "the prehistoric American Indians are only now winning the appreciation their work has long merited." The California Indians, according to Spinden, though having no agriculture and only the simplest of needs, "made the finest basketry of either hemisphere and set a standard of thorough sincerity and intricate perfection in a universal craft." Navajo jewelry, still safe despite modern commercial violation, has as its keynote "mass, simplicity, smooth surfaces of pure, soft silver, set off by the repetition of quiet and rather inert designs." The marvelous pottery of the Southwest was a wholly native development, Chapman thinks, the knowledge of firing having apparently been acquired by the accidental contact of clay objects with great heat, and with no aid from permanent kilns or the potter's wheel. Yet the Coronado expedition found pottery-making the principal craft in nearly a hundred Indian villages and it is still an important craft in more than a dozen Pueblos, each with a distinctive art.

The claim is made for the art of the various Indian groups that in its philosophic conception of life it is essentially different from modern individualism. "It belongs to a world where expression is subservient to the 'idea,'" asserts Alice Corbin Henderson in her monograph on Modern Indian Painting; "where the forms of art are never collected or hoarded as such, but the idea or image is tenaciously held and preserved through the centuries."

Even though younger Indians have begun to work individually as artists, and to make water-color drawings independent of the ritualistic ceremonies, the old spirit still animates their work and their point of view. Art is not, to them, individualistic self-expression, not subjective, not *precieux*. It is as happily objective as making turquoise beads or weaving a blanket. . . . These artists are a part of this living culture, and their work is a reflection of a philosophy that feels every object magically alive—the deer with its exposed breath-arrow, the basket or bowl with its breathing space, the *hogan* that must be breathed and blest into life, the painting that must be magically created and that will still go on living unless it is ceremonially destroyed.

As for Indian poetry, Mary Austin finds it the key to Indian design and perhaps to all Indian art—fundamentally associated with the processes of living:

There is a song when the newborn child is held up to the light, a song for the corn-planting and one to bring the deer down from the mountain; a song for the building of the house, for the cure of the sick, for the making of the bow, for the soul in departing. Friends of the Indian are often accused of "poetizing" the Indian. But the truth is that this is what he has done for himself, done it so completely that our failure to follow him on the poetic level at which his important processes take place is the chief reason for our failure to understand him. Nothing disconcerted him more than learning that the white man could raise corn without singing over it; nothing has been more difficult of adjustment than realizing that we can like his songs and not share their spiritual content.

A still further Indian contribution to civilization, closely associated with the esthetic and spiritual, is the social organization of the small community. It is not merely that Indian social organization may be interesting historically to students of western democracy; it is rather that in its survivals of community arts, village industry, and wholesome rural life, there may be a way out for American industrialism with its mass production and mass living. Tannenbaum and other students of modern Mexico have laid stress on the deliberate effort there to build on native culture—on what Moises Saenz calls "the cultural integration of the Indian." "The Indian tends toward the corporate life which he lived for many ages in the past," says John Collier. "As a member of a commune or corporation he is, relatively speaking, satisfied, laborious, and ambitious, and his social frictions tend to disappear. His whole nature, not merely his desire for property, adjusts into

a corporate embodiment." There are possibilities in Mexico's effort to build on Indian community living, therefore, that are important not only for Indians in the American Southwest, but for American rural life and civilization generally.

III

Perhaps for us today the most important thing is the way we choose to look at these possible Indian contributions. The real question, whether in terms of races or individuals, is the preservation and strengthening of capacities and achievements. The real task is to encourage and stimulate talent, wherever found, whether in individuals or in groups. The full-blood Indian girl twelve years of age with an I Q of 145 whom Garth found in the Santa Fe Indian School presents an opportunity for the discovery and development of ability. "If superiority is worth conserving in the white race, it is worth conserving in all races," says Garth apropos of this case, and he reminds us that "rarely has a society endeavored to build up the Negro or the Indian. Nor has their education ever been properly undertaken and generously supported." Not even the most ardent hereditarian questions today the profound influence of modification upon native processes. The problem for us is to exert this modification and at the same time accept fully the possibilities of Indian peoples as they are. Jacobson, in his introduction to his portfolio of Kiowa paintings, takes Anglo-Saxons to task for their habit of "smashing the culture of any primitive peoples that gets in their way and then, with loving care, placing the pieces in a museum." In our program of education and adjustment today with the Indian people we must somehow find the way to save and advance the significant contributions they have made and can make to our civilization.

HEREDITY AND ENVIRONMENT—THEIR RELATIVE RÔLES IN THE DEVELOPMENT OF EAST TENNESSEE MOUNTAIN CHILDREN

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The Southern Highlands have presented many interesting romances and legends which have pictured the mountaineer as a unique individual,—self-satisfied, extremely independent, superstitious, and above all, backward. Sociological studies have added to this picture much subjective evidence to strengthen the characterization of the Highlanders, and have endeavored to point out many explanations for their peculiar personalities, habits, speech, songs, feuds, and economic status. During the past three years, by objectively measuring intelligence, physical development, and special abilities, we have endeavored to learn something more about these people who live under the direct influence of isolated mountain environment.

Time will permit neither a complete survey of the literature, nor the presentation of full data. A comprehensive discussion of the study of the intelligence of mountain children is found in the *Journal of Educational Psychology* for May, 1932, and similar discussions on the other two problems are being prepared for publication. We will attempt to give here only a brief summary of our studies of the mountain people.

The Illinois Intelligence Test was given to 845, and the Dearborn Test to 946 mountain children. The results show the IQ rating of the mountain children is higher on the Dearborn Test. The median IQ for the Illinois is $78 \pm .47$, and for the Dearborn $82 \pm .40$. An analysis of the Dearborn Test shows it is less dependent upon schooling than the Illinois, and that various items on this test seem to be materially influenced by environmental factors. Of the seventeen different items, the seven missed most frequently by mountain children are largely dependent upon environment, such as the recognition of stamps, telling the time of day, handling money, etc.

A marked decrease in IQ with an increase in chronological age was shown on both the Illinois and the Dearborn Tests. The median IQ on the Dearborn Test at age six is 95 ± 2.03 and decreases to 74 ± 2.41 at age sixteen. If the average mountain child when he enters school at age six falls within the limits of normality, or only five points below perfect normality, it seems

plausible to speculate that if the children had been measured at an earlier age they might have reached perfect normality. This is, if the intelligence rating of these children decreased as rapidly from age six to sixteen, what did it do before age six? If we assume that the IQ of an unselected group remains fairly constant, this decrease among mountain children might indicate the influence of a poor environment acting upon innate abilities, or that the tests are measuring environmental influences rather than hereditary potentialities. A careful study of the results of Hirsch's investigation of East Kentucky mountain children with the same test indicates a similar trend although Hirsch gives a different interpretation.

In an attempt to measure the special abilities of mountain children, the Seashore Test of Musical Talent was given to 450 children in grades V-VIII. We realize that there are many discrepancies and criticisms of the Seashore Test. No attempt will be made to defend the validity and reliability of the test, but we feel that for our purpose it is the best music test available. Its results at least give us data for comparison in the six phases: pitch, intensity, time, consonance, tonal memory, and rhythm. As to how great a part these six factors play in musical talent we do not know.

When comparing the scores of the mountain children with Larson's revision of Seashore's norms, the reliability of the differences shows the mountain children to be slightly below the norms in time, consonance, rhythm and intensity, and considerably below in pitch and tonal memory. Another comparison was made between mountain children and Larson's fifth grade class in beginning music. Here there is a significant statistical difference in favor of the mountain children in all measures, and a marked difference in time, intensity and consonance. The mountain children appear superior when compared with Larson's figures for an eighth grade group of non-musicians, but lack of reliability measures force us to read this comparison with reservations. In comparing mountain children with full blood Indian children as measured by Garth, the reliability of the differences shows mountain children are superior in practically all measures for grades V-VIII.

We have made several other comparisons between mountain children and other groups which did not have adequate reliability measures. Gray and Bingham report a study on the comparison of music ability of colored and white children. The mountain children are superior to the colored in all measures except time and pitch, and in these two measures the differences appear small. The mountain children are above the white children in consonance and tonal memory, and the differences in the other measures are not marked. Johnson made a study of 3350 negro children. Comparison with this group seems to show that the negroes are superior to mountain children in all meas-

ures for the fifth grade, and in all measures for the eighth grade except for intensity and probably time. These differences are verified by a study of the percent of overlapping. Another comparison was made between mountain children and William Larson's study of public school pupils in instrumental music classes. Mountain children appear superior to Larson's pupils in the beginning music classes and in the junior high school orchestra group. This comparison might indicate that the mountain children with no training are superior to Larson's groups already in music classes. A comparison of mountain children with a study of fifth and eighth grade children in San Jose, California, reported by Farnsworth and Church, shows mountain children are above the fifth and eighth grade in all measures except memory.

We have made three comparisons on the musical ability of mountain children with other groups having adequate reliability measures. The mountain children are above in two of these comparisons and below in one. We have attempted to make four other comparisons without reliability measures. In these the mountain children seem to be above in three of the four comparisons. We are not able to say to what extent the scores of the Seashore Test measure innate music ability, or how much they are influenced by environment, but it seems that the mountain children compare favorably with normal children in musical talent as measured by the Seashore Test.

In order to further study mountain children we have measured the height and weight of 1475 unselected cases from ages six to seventeen. It is generally accepted that these two measures give as fair an index of physical status as any other two traits, although they may not be a true index of nutrition. No attempt was made to select the cases according to race. It is fairly well known that these mountain people approach a relatively pure North European stock. These people are the direct descendants of the early Scotch, Irish, English and German settlers. It is a popular opinion that mountain people are above the average in height, and as a general rule undernourished. No attention is given by the average family towards providing a well balanced diet. The economic status of the mountain people where these data were gathered is very low, and in many cases extreme poverty exists.

We have compared the height and weight of mountain children with Baldwin's final norms for American children. These data seem to show that the mountain children are below Baldwin's standards for height and above in weight, but when we study the number of cases and the size of the mean deviations, the significance of the differences disappears. There seems to be no significant difference between mountain children and Baldwin's final norms.

SOME ASPECTS OF INSTRUCTION IN EUGENICS

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"If to do were as easy as to know what were good to do, chapels had been churches and poor men's cottages, prince's palaces."—SHAKESPEARE.

There have been several ways of providing education in eugenics—public lectures, magazine articles, books, research publications and group discussions. These efforts have convinced large numbers of people that biological knowledge, if properly used, may greatly increase its service to the human race. Such services may be comparable to those which men have accomplished through their careful production of such animals as race and draft horses, or milk and beef cattle, that conform fairly well to the ideals toward which the channels of inheritance have been directed. Men direct their animals and plants by guiding them and by applying such restraints and controls as are necessary. Men who wish to produce a superior race horse or beef animal now plan for it "even to the third and fourth generation" in advance of existing race horses and beef cattle.

For themselves, however, men depend largely upon the controls and guides supplied by each individual. Small groups—part of the feeble-minded, or part of the criminal class—are arbitrarily controlled, those being at the lowest levels of human conduct. Little is done as yet toward selection of human types comparable to the superior animal types men insist upon. Men depend upon guidance resulting from education, and when education is absent or when humans are too poor in quality to profit it, eugenical control is in a bad way.

This paper will deal with public school education and not with valuable work being undertaken by other agencies.

From the point of view of those interested in making public education more effective, the problems of eugenics are not easily separated from related problems in inheritance and in social controls. Most of us, I suppose, agree in large part with Galton's definition that eugenics is "the study of the agencies under social control, which may improve or impair the racial qualities of future generations either physically or mentally." However, this definition does not give emphasis to certain outstanding facts which must be recognized if the education of young persons regarding eugenics is to be effective.

The first of these facts is that the desired eugenical attitudes need to be established at an age which usually is so young that use cannot be made of Galton's hope that eugenics shall "improve the racial qualities of future generations physically and mentally." The second outstanding fact needing to be recognized in an educational program is that young persons may be influenced best by use of teachings which bear close personal relations and contain direct values for those being taught. Galton's definition, from an educational point of view, sounds too much like the older idea that education is almost wholly for the sake of future needs. We now believe that education will serve future needs far better, if its first service is to immediate needs both personal and social. In educational uses of subjects other than eugenics, that is, in history, language, literature, the sciences, etc., it is far more effective to make sure that education is based upon and proceeds from real situations of significant value. The older education was always promising future values, some of them often hard to picture to the learner. Modern education is surely directed toward future needs, but realizes that since future needs cannot be met except through learning to meet present needs, the future is best cared for by caring for the present. Thus, in eugenical education, we shall keep in mind Galton's emphasis upon future society, but in practice we should deal with the problems and with the individuals now concerned with education. We need less preachment about how fine it would be to have a future society determined by eugenics, and shall need to face the far more difficult task of trying to incorporate sound principles of eugenics into the possessions of the young people who are now in the process of becoming this so-called future society whose destiny is the ultimate aim of eugenics. The biological and social facts and their meaning in relation to young people constitute the proper foundation for eugenical instruction. Constant admonitions about a hopeful philosophy for future use serves a good purpose, but needs to be based upon specific biological knowledge.

Another reason for a change in certain recommended types of eugenical instruction and for its more careful presentation at an earlier age than is common relates to the influence exerted by personal and social attitudes. The facts derived through scientific studies in eugenics are indispensable. Many more such studies are greatly needed. Indeed, we seem almost at the beginning of accumulation of exact data, all of which when organized will compose the science of eugenics. Much of these data must be used in any worthy program of instruction in eugenics. Nevertheless, mere knowledge about endless accurate data about eugenics will be of little assistance in meeting individual's problems or in building the desired future society. For most, perhaps almost all people, the attitudes that are acquired in different

ways are the chief guides in determining action. The long-hoped-for scientific control of action is still too largely in the realm of hope. Knowledge, alone, cannot be depended upon to guide conduct. It must be so fully assimilated into personal experience, that it results in a guiding attitude, strong enough to hold when a strong adverse pull is applied.

It is possible to change pupil attitudes and to develop new ones. A small amount of experimental teaching has recently been done in an effort to provide the factual correction for superstitions and other unfounded beliefs regarding inheritance. Scientific persons now know that haemophilia and color blindness are inherited in certain definite ways; that some organic and nerve cell structures are inherited and serve to predispose their possessors toward certain types of conduct. The experimental teaching referred to proved that specific instruction on specific matters may produce desired changes both in knowledge and attitude so far as these specific points are concerned. While only a few of the points used in this experiment related to eugenics, the few that did, experienced a desired change as did the other beliefs used in the experiment. Such a procedure is recommended for further use in problems of education in eugenics. Much such experimental teaching about eugenics is needed. It is only upon the results of such experiments that safe progress may be made.

The biology course in secondary schools seems the logical opportunity for a factual foundation for instruction in eugenics. The study cannot be adequately made of plants and animals unless their reproduction is included. The structures and processes of reproduction from simplest to most complex forms is essential to an elementary understanding of plant and animal life. If properly presented, these are full of interest to high school pupils. The pupils' questions are direct and pertinent, and may be answered directly and frankly, provided no wrong-minded adult injects such harmful attitudes as the taboos, and "You are not old enough to know." If biology is properly taught, high school pupils acquire in a wholesome way, the foundational knowledge requisite for later eugenical interpretation. Furthermore, if biological knowledge is developed slowly and actually, the learners build their own scientific basis for later eugenical applications, and thus may develop their guiding attitudes based upon biological facts and not wholly upon social admonitions.

The course in biology, in its latter part, includes problems in cell division, cell union, and chromosome structure and behavior. These provide a knowledge basis of the biological mechanisms of inheritance. An elementary study of Mendelism and the later contributions to knowledge of transmission of inherited characters is a never-failing stimulant to discussions about our-

selves and our ancestors, and usually about our descendants. With the frankness of modern youth, these questions may be discussed upon a factual basis, and interpretations made that may possibly produce highly important attitudes. My observation has been that pupils under guidance of a wise and factually-minded biology teacher, may be led to useful discussions of the needed applications of eugenical knowledge. An evasive, self conscious or wrongly-minded teacher, or a fault-finding and misunderstanding parent may make it quite unwise for eugenical applications to be attempted, until the obstacles have been removed. The biology course might well close with a clear presentation of the fact that each of us has secured through inheritance some good and some bad qualities; that we may select and change our environment and our controls so that our best qualities may be enhanced, and our worst qualities restricted or suppressed; that we are the individuals through whom the qualities of future peoples are determined, and that what is done about these qualities in the succeeding generations is of supreme concern to the future of mankind.

Personally, it seems to me, that biology, as a subject of general public education, has a service to perform scarcely visioned as yet by those responsible for the administration of public education, possibly not by very many leading biologists. Real biology may become a factual guide for social philosophy.

Too often our public lectures on eugenics have been associated with ideas of prevention of any kind of inheritance. Data published in the past week indicate that the East Harlem region and not the Riverside region of New York is concerned about the future of New York's human race. During 1931, the number of East Harlem births was 23.65 per 1,000 population. The Riverside region had 11.01 births per 1,000 population. The Williams Bridge region of the Bronx had 18.71 births per 1,000 population, and the Red Hook region of Brooklyn had 18.60 births per 1,000 population. These data and many others of similar nature raise a very fundamental question about so-called eugenical instruction of certain kinds. College graduates from certain colleges where much instruction about eugenics is known to be given, instead of using selective care and discrimination to insure a fair number of improved offspring, have used their education as a means of preventing offspring to a point showing failure of some of these groups to maintain themselves. Proper instruction in eugenics is designed to establish an improved human race, not to define a scholarly ideal about a future human race but make little contribution to its realization.

THE INADEQUACY OF CENSUS DATA FOR CERTAIN EUGENIC INVESTIGATIONS

CHARLES C. GROVE

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This brief paper or note is to suggest a form and a procedure for securing further, more intimate information than that obtained from ordinary census data towards answering such questions as follow:

What has been the number of births in families from generation to generation? What percentum of the children reached years of economic productivity? How many years of such economic productive life were lived in each succeeding generation? Has this number had the same trend as the birth rate or, although the number of births per family has decreased, has the economic value of the lives increased? What causes curtailed life in the several generations? What causes took away those from one to eighteen years of age?—those from 18 to 45?—from 45 to 65?—above 65?

The answers to these questions, if secured faithfully from all sections of the country in sufficient number, will enable us to get down very closely to operating causes and also to the study of variations geographically, in groups as to racial ancestry, as to occupation, as to educational development and outlook. The data can be transferred to tabulation punch cards so as to yield the several classifications expeditiously.

The family histories required can be secured only by persons in the sympathetic confidence of the family. The Pastor and the Physician are the most likely ones to secure such information. These must be shown the value of the study and their interest must be aroused. The pastor may be led to appreciate that coöperation furnishes him a rare opportunity both to impress the Christian duty of keeping physically fit, and to stimulate a conscious aim to pursue good health and right living just as we pursue pleasure, wealth, and a livelihood. And to what real pastor would not these aims furnish the highest incentive! The physician will readily appreciate the value of such a study if sufficient information can be got from wide-spread sections.

The inquiries of physicians are to furnish check on the faithfulness of the answers given by others relative to causes. No names will be found on these sheets, and only the geographic origin of the report will be learned from the post-mark on the return envelope.

FROM TOWN		STATE		PASTOR		LOCAL NO								
SERIAL NO	DATE OF BIRTH	NATION-ALITY	OCCUPA-TION	EXTENT OF EDUCATION			DATE OF MARRI-AGE	NUMBER OF CHILDREN						AGE AT AND CAUSES OF DEATH
				GRADE	H. S.	COL.		MALE			FEMALE			
								INFANTS	UNDER 5	5-12	13-18	SINGLES	MARRIED	DEAD
HUSBAND								M						
WIFE								F						
HUSB'S FATHER								M						
HUSB'S MOTHER								F						
WIFE'S FATHER								M						
WIFE'S MOTHER								F						
FATHER'S HUSB'S								M						
FATHER'S MOTHER'S								F						
FATHER'S HUSB'S								M						
FATHER'S MOTHER'S								F						
FATHER'S HUSB'S								M						
FATHER'S MOTHER'S								F						
FATHER'S HUSB'S								M						
FATHER'S MOTHER'S								F						

WHY, IN YOUR OPINION, ARE THERE FEWER BIRTHS NOW?
 USE NUMERICAL IN ORDER OF IMPORTANCE, AS 1, 2, 3, ETC.
 ECONOMIC CONDITIONS () HEALTH () FEAR OF CHILD BIRTH () PHYSICAL INABILITY () MARRIAGE LATER IN LIFE ()
 INTERFERENCE WITH PERSONAL ASPIRATIONS () FEAR OF HEREDITARY DISEASE () LOWERED IDEALS ON SEX RELATIONS ()
 FURTHER REASONS AND REMARKS: _____

NOTE:— STATE NUMERICAL GRADE OR YEAR IN COLUMN ON EDUCATION.

DATES OF BIRTHS IN ORDER OF ALL CHILDREN LIVING AND DEAD IN THE SEVERAL GENERATIONS	
FOR LIVING GIVE:— SEX (S—D), BIRTH DATE, EXTENT OF EDUCATION (DATE), SINGLE OR MARRIED (DATE), OCCUPATION, NUMBER OF CHILDREN.	
FOR DEAD GIVE:— SEX (S—D), BIRTH DATE, DIED (DATE), CAUSE OF DEATH, EXTENT OF EDUCATION, OCCUPATION AT DEATH, NUMBER OF CHILDREN.	
PRESENT FAMILY	1 S FEB 9 1885 LIVING COLLEGE AB 1905 MARRIED 1906 SUPT OF SCHOOLS 3 CHILDREN
	2 D JUNE 15 1887 DIED OCT 18 1899 INFLUENZA IN 8TH GRADE AT SCHOOL
	3 S DEC 14 1889 LIVING COLLEGE B S 1909 PH.D. 1913 MARRIED 1914 CHEMIST 4 CHILDREN
	4
	5
	6
	7
	8
HUSBAND'S FAMILY	1
	2
	3
	4
	5
	6
	7
	8
WIFE'S FAMILY	1
	2
	3
	4
	5
	6
	7
	8
PREVIOUS GENERATIONS	1
	2
	3
	4
	5
	6
	7
	8

IF SPACE IS NOT SUFFICIENT, PLEASE USE 8 1/2 X 11 PAPER AND ENCLOSE WITH CARD

The pastor's name and location alone are to appear with a local number, which the pastor will record opposite the family's name and keep in his files in order to permit the head of the investigation to make further inquiries if replies have been unsatisfactory. It is to be recalled that even the pastor need not know the replies that are made unless the one filling out the form permits him to see them, for the answers may be sealed in an envelope by the head of the family reporting. This arrangement assures all desired secrecy and yet permits further inquiry if that should become necessary.

Herewith are presented the inquiry forms and the accompanying letters.

Two further points remain: Who shall head such inquiry? What detail plans have been devised to save time, labor, and expense in securing the data and making it available for the studies to be made?

First, since this is an International Congress, the suggestions as to who shall head the investigation are apt to be legion. The government itself through its Census Bureau might be responsible for it, or one of the endowed foundations, or scholarly societies or associations, or even an individual. At any rate, the head must have at least moral authority and the respect and confidence of the lieutenants, and these in turn must have the same from the heads of families who report.

The inquiry forms and accompanying letters follow:

Dear Pastor,

There is a valuable piece of research that cannot be completed without the co-operation of you and other pastors. The United States Public Health Service is being helped by several endowed agencies in getting at controlling factors in public health. Census data informs us of what has happened *en masse*. But your help is needed to secure more intimate information without giving any names of the families whose history is reported.

Your co-operation is solicited in helping us see what happens in the single family and the descendant families from generation to generation in the various parts of the country, amongst groups as to racial ancestry, as to occupation, as to educational development and outlook.

Enclosed please find a return post card, ready to be put into the mail after you have noted thereon simply how many of the data cards, like the enclosed, you will endeavor to have filled out at your suggestion and with your assistance if necessary. We will then mail all that you can profitably use, together with an envelope for each, so that the data need not be seen by the pastor even, but it may be enclosed and sealed by the parent who fills in the data. Please return the post card in any case—if many, few, or no cards can be used.

Please remember, (1) No names of persons are to be given. (2) An envelope will be provided in which to seal each report. (3) The Pastor will be put to no expense to return the cards.

Knowing that you will appreciate the opportunity that this work may furnish both to impress the Christian duty of keeping physically fit, and to stimulate the conscious aim to pursue good health and right living just as we pursue pleasure, wealth, and a livelihood, I would remain, awaiting your reply,

Very sincerely yours,

Dear Doctor:

Since a certain piece of desirable research cannot be done without your co-operation together with that of a limited number of thoughtful, scholarly workers in the field, may we not ask your prompt consideration of the schedule given below, basing your judgments on your () years of professional practice, involving () cases.

We do not ask your name, only—

- (1) Fill in the two blanks above.
- (2) Check the spaces on the left, indicating a cause.
- (3) Give the approximate percentage of cases on the right.
- (4) Add any further information and remarks on the reverse side.
- (5) Return by early mail in enclosed stamped envelope.

I. *Why are there* fewer births per family than a generation or two ago? Because

- | | |
|--|--------|
| () There are not fewer in percentum of cases | ()% |
| () Of economic conditions | ()% |
| () Of more concern for advantages to be given the child | ()% |
| () Of better understanding by women of what is involved | ()% |
| () Of physical inability on either side; <i>then</i> ()%, <i>now</i> | ()% |
| () Marriage later in life (fewer, less favorable years of exposure) | ()% |
| () Interference with personal aspirations or pleasures | ()% |
| () Fear of hereditary disease | ()% |
| () Fear of childbirth | ()% |
| () Lowered ideals of sex relations | ()% |

II. How the number of children is limited

- | | |
|---|--------|
| () By continence | ()% |
| () By fewer and less favorable years of married life | ()% |
| () By better understanding by women of their right to choose | ()% |
| () By fuller knowledge of contraceptive measures | ()% |

Very respectfully yours,

Finally, minute details to cut down expense have been planned. For example, stamped window envelopes with return address will be sent, into which the post card for the pastor's reply will be so placed as to show his name and address. On the same side he will place his request for some number of the forms. The return address on the reverse side will bring the card back. The same card, showing the pastor's name and address will be pasted on the package containing the number of forms requested right there on the face of the card. These addresses will be printed on the cards by the addressograph departments of the various denominational headquarters at very reasonable rates. These cards can be bought in sheets and printed together, saving press work, and then cut and sent to the addressograph departments. The doctors will use the inquiry sheet for their replies and return them in the accompanying self-addressed stamped envelope. These and other details will insure the economical and expeditious handling of the inquiry.

RACE AND FAMILY IN THE HISTORY OF AMERICAN INSTITUTIONS

WILHELMINE E. KEY

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A basic problem in Eugenics is the attempt to discover a relation between the history of a nation and the salient traits and tendencies of its people. Needless to say this problem is beset with difficulties. These lie largely in the impossibility of measuring accurately human traits either in their "innate" condition or as they have been influenced by the cultural milieu in which they are immersed. Yet however difficult such evaluation may be, and however inadequate our knowledge of the great variety of factors entering into the problem, such inquiry should be highly rewarding.

Nothing is more elusive than human nature, yet nothing is more obvious than fundamental differences in human nature. We may set out from the general proposition that the native equipment of salient traits differs from individual to individual. If individuals differ, then groups of individuals may be conceded to vary or differ from one another, both as they constitute those blood networks we know as families and those larger groups of remoter derivation from a common stock known as races. It is essential that we seize on the differences which remain relatively independent of the environment or which influence the environment in contradistinction to such as are to a greater degree the product of the environment.

So in the study of the historical process, in particular that pertaining to the social and political organization conditioning national progress, we have on the one hand, over-emphasis on the cultural factors to the neglect of the heritable factors, and on the other hand, over-emphasis on the latter to the neglect of the cultural factors. The same confusion exists in accounting for leaders, whether technological, intellectual, political. We talk of educating for leadership. But what made the leaders in the past? No school is responsible for Edison, Lincoln, Hamilton. Rather are they and their kind remarkable for their lack of formal schooling.

Edison was notoriously at odds with his teachers; he had access to the common store of scientific knowledge of today. Yet only he, in virtue of his peculiar gifts was able to realize on that common knowledge in his inventions. Lincoln led this nation in a period of civil strife. He shared with all

and notably with his advisers the political heritage of his time. Yet only he was able to cope successfully with the manifold dangers and vicissitudes of that time. Hamilton framed a financial policy, far-reaching if not satisfactory to his opponents. His materials were at the command of many another of the able founders of our government. Yet it was Hamilton who, through his temperament and mental gifts, conceived and put into execution the many-sided features of that policy. Examples of this sort could be multiplied indefinitely.

The search for "laws" governing national evolution has led to many hypotheses regarding its primary factors, and successively, geographic location, soil, climate, numerical increase have been stressed as foremost in determining trend. Only lately have the factors, racial and personal been given any considerable place in these deliberations. To be convinced of the simple logic of this new attitude, one needs only to ask, "What kind of a civilization would a lot of morons build? Or once achieved, how would they manage to maintain it?" But perhaps we shall some day have a painful answer to these questions.

We may conceive then of national evolution as depending in large measure on the biological and psychological constitution of man. According to this view, the status of a people is an index of their abilities, these, of course taken in relation to the virgin resources of the territory they occupy, and the types of culture with which they have contact and which they are fitted to adapt to their peculiar purposes.

We may illustrate this view by brief allusion to the early colonization of this country. Spain, France, Holland and England all made extensive explorations and ambitious attempts at settlement. They found here many tribes still in the hunting stage of development as well as others, such as the Incas and the Mayas, who had achieved a considerable culture. The mode of life of the former had persisted for hundreds of years in the midst of a continent abounding in means of promoting a high state of civilization. Granting the power of endurance and self-control, the high standards of morality of these tribes, the fact remains that under natural conditions highly favorable to the growth of a material culture, they left those resources practically untouched. It has been pointed out that lacking any tool but a stone hatchet, the clearing of the virgin forest was impossible; without beasts of burden, ploughing was out of the question. It must also be remembered that through contact with the white man and access to his means and methods the Indian of these sections was no more inclined to the exploiting of our natural resources than he was in the Pre-Columbian period. Yet here, a few handfuls of immigrants so secured themselves in a few decades that

they became the builders of one of the richest civilizations, known to all time, going on from conquest to conquest over the forces of nature, and laying at least a foundation for world dominion that out-matches the dreams of any former era.

Again, why did the four nations that earliest gained a foothold here have such unequal shares in this development? Why was the major part of this conquest borne by the British, with such intrusive colonial ingredients as the Dutch, the Germans and the French Huguenots? We cannot follow these nations in any detailed history, but let us glance briefly at the primary urges that animated their activities on the new continent.

The Spaniards came seeking gold. They were aroused to their greatest efforts by the spectacle of the wealth of the Aztecs. But while they despoiled the Indians and reduced them to a state of dependence, they taught them many crafts and brought them the offices of their religion,—eternal salvation as they understood it. The French too were inspired by missionary zeal, though this seems to have been more than equalled by love of adventure and desire for barter. They were even more impatient than the Spaniards of the hard plodding work necessary to wresting a livelihood from the soil. The English had also heard reports of fabulous wealth. If some of the earliest comers were chiefly lured by the hope of easeful plenty, the dominating motive for the majority was far different. That this brought in its train colonists possessing combinations of traits fitted to cope successfully with the adverse conditions of pioneer existence is made plain by ensuing chapters of our colonial history.

Human history abounds in instances similar to the one just cited where stocks and races made little or nothing out of fine natural advantages. When through migration these are supplanted by stocks having other types of capacity, there occurs a new efflorescence of culture, to be accounted for only on the ground of the superior ability of the new stocks. This superiority may be in no sense of the word absolute. The abilities are superior in the sense that they are fitted to take fuller advantage of the environmental conditions. In our period of colonization and the westward trek across the continent, the dynamic power behind that phenomenal movement lay in the interaction of certain types of personality with new combinations of environmental condition. These conditions constituting the natural resources of the land together with new demands on the individual such as adverse climate, vast distances to be traversed, savage enemies, have acted to bring to the fore trait-complexes best fitted to the successful exploitation of those resources. The stage which offered free play for such trait-complexes, furnished at the same time, through the social selection of those types for marriage, conditions highly favorable to their perpetuation.

That this study has for us more than a mere academic interest appears from the following considerations: Whatever the present crises, social and economic, may compass by bringing latent potentialities to the fore, through stress of untoward conditions, we may not look to them to change materially the basic fabric of our society. That was fixed long ago in the germinal constitution of the peoples that were drawn to our shores. How the traits arising from that constitution may be eliminated, conserved, combined and recombined must be the task of the social policies of the future.

From this point onward, our inquiry takes two principal directions. First, into the human ground substance from which proceeded our distinctive development,—industrially, socially, politically. Second, the nature and origin of those regnant personalities which led in this development. We deal here with the essence of the process of Americanization. This essence lies in the ever greater approximation on the part of our constituent peoples to the standards and ideals conceived by our leaders. Its success depends not only on the compelling power of those leaders, but also on the native bent of the lesser families, attracted hither by all that the name America for good or ill, has come to stand for, who have with more or less success worked out the pattern set for them by those leaders.

It was not then just any collection of humans who embarked here on the conquest of a continent, penetrated it first by painful hazard, then banded it with lines of steel and with all those means of easy communication we now enjoy; nor is it conceivable that our social and political institutions could have been what they are without such families as the Adamses, the Randolphs, the Edwardses, the Lees, and that without them we should have had such personalities as John and Samuel Adams, George Washington, Thomas Jefferson and John Marshall, with all that their leadership entailed in war and statecraft.

Selective processes reaching far back in European history were at work to give character to the stocks that came to our shores. In affirming this we do not reduce national progress to any simple formula. Selection in the first place implies variability and variability springs from a wide range of conditions. Some of these factors reside in the crossing of races and strains. Mutations, at present entirely mysterious in origin, also play a rôle, and the isolation furnished by geographical barriers and racial antipathy. We may only attempt to disentangle a few of the most potent elements from the texture of the whole and single out certain fruitful lines of future speculation and investigation.

There is quite general agreement that crossing, whether of race or strain within the race, widens variability; it also increases mental and physical

vigor, depending on the nature of the race and strain. Havelock Ellis maintains that East Anglia has been particularly fecund in superior Englishmen and has been a portion of the British Isles particularly open to invasion by such diverse peoples as the Vikings, the Dutch, the Romans, Normans and Angles. "East Anglia is productive of great statesmen and great ecclesiastics; it is also a land of great scholars." Since it is the land whence were drawn so many of the colonists of the Atlantic Seaboard, we find here that organic basis favorable to the growth of our American culture and the carrying out of those experiments, governmental, religious and otherwise for which America has come to stand.

Among the early freebooters who crossed the ocean were such Englishmen as Sir Francis Drake and Martin Frobisher who sought to enrich their Queen with metals that proved spurious. Soon, however, these adventurers gave place to middle-class traders whose object was still overseas traffic. Along with this change came the operation of numerous factors which selected the types of intending colonists and gave to them a high advantage in planting their settlements in the new country.

We could with profit review these factors, but we can only instance the most important. First among them was the rise of the middle classes to wealth and positions of political power. This made possible the financing of companies to promote settlement. Then for the actual work of colonization there were two landed classes from which came capable leaders in this enterprise. These were the substantial landed proprietors who combined the management of their estates with the functions of government. Such were the Winthrops, the Endicotts, the Eatons, the Wolcotts who with their spiritual advisers made the beginnings of self-governing commonwealths in New England. The second were the yeomanry, free owners of small farms and noted for industry and independence. They furnished chiefly managers to direct and if need be, take an actual hand in the practical undertakings in the colonies.

The emergence of women as economic factors outside the home was also of high importance. In any event pioneer life would have necessitated sharing the hardships and hazards of the new venture. What is doubtless of equal consequence, the selection of such as partners in marriage, furnished the all-important germinal basis for the segregation of valuable traits. Indeed, the dominance of certain colonial families can, in many instances, be directly traced to the coming together of worthy strains, the chief determining factors being the ability of the women chosen in marriage. Last, but not least potent was the strong urge toward religious and political liberty, which united rich and poor in a common bond, but which, through

its peculiar quality in the various sects gave a definite stamp to the groups that made their way to various points on the Atlantic Seaboard.

So the Virginians differed from the Quakers of Pennsylvania, the Pilgrims at Plymouth from the Bay Colony Puritans and these again from the first comers to Connecticut. This indicates only the crude outlines of the picture, for the South was, no more than New England a homogeneous unit, and all these differences gave to the various sections differences in character, in political development, industrial, social and educational trends. Then all of these colonies included families, many of which became differentiated in course of time with respect to certain characters. These families were as notable for the lack of certain trait-complexes as they were for the possession of others. We have but to dwell on such names as Adams, Lowell, Edwards, Randolph, Roosevelt, Lee to appreciate this diversity of "stamp."

It has been well said that "the ability of a hundred of its most gifted representatives often accounts far more for a nation's or a race's welfare than the ability of a million of its mediocrities." Thus the frequency of superior individualities born within the groups constituting the colonies became of highest significance for those colonies. They became the leaders, assuming definite rôles in the origination of new policies, or persuading and compelling the lesser individuals to their way of thinking, or setting the wide variety of patterns through which they worked out some small share of the whole.

The personalities which thus gave us our distinctive development in industry, science and forms of government, have through study of their family history been found to arise from the fortunate crossing of able lines. This resulted in an accentuation of potentialities, and may be likened to the process we know today under the term emergent evolution. In every case, environmental conditions directed the form of manifestation of these potentialities and furnished the stage for the appropriate play of abilities. Such crossing produced the inventiveness of the Fairbanks, Whitney and Lake families. So the Dwight-Edwards-Woolsey network produced conspicuous examples of scholarship and administrative ability as we find them in Jonathan Edwards, Presidents Dwight and Woolsey of Yale. As this network ramified through other able families it gave rise to hundreds of eminent men and women. So the families of Lee, Fitzhugh and Randolph in Virginia flowered in a galaxy of ability to meet the great exigencies of our history and give peculiar direction to the growth of National policies. Jefferson had as a Randolph heritage his capacity for political strategy and his marvelous faculty of expression. In the union of yeoman and courtier which went into his makeup, we find a unique instance of strict democratic ideals furthered by the gifts conferred by an aristocratic lineage. John

Marshall also had as a Randolph heritage wide mental grasp and a supreme power of persuasion, though his father, who was a "planter of the forest" was also noted for his clear-headedness and decision. Pioneering in the unbroken ground of the construction of the Federal Constitution, he rendered opinions on widely divergent cases which he was able to harmonize into an orderly and consistent whole. This he did by his keen analysis of the general principles involved and his power to win the allegiance of his associates. "He was listened to with the ears of affection."

Time permitting, it would be possible to show in greater detail how families have influenced sectional and state history, this influence becoming incorporated in our various institutions. Studies along this line have been made by myself in Pennsylvania, Michigan, Wisconsin and the Far West; just recently, an inquiry along similar lines is proving fruitful for the lower Connecticut Valley. Depending on a wide range of historical and biographical material, I have tried here to avoid the "possession of that devil of an idea" to which even scientists fall victim.

This latest study is showing how the first families which made that venture from the Bay Colony to the first frontier of this Continent had abilities which of necessity enabled them to make their peculiar and outstanding contributions to the development of this section. How terrific were the hazards of the venture, we know from the opinion of Cotton Mather who remonstrated with the "worthy, learned and genteel persons who were going to bury themselves alive on the banks of the Connecticut." Not only did these settlers establish a town system in their domain, which has proved a model for others, but their experience with their government proved, in the Constitutional Convention of 1787, highly useful in determining the form of our Federal organization. The Dwight-Woolsey network flourished here, and the Ward-Beecher-Foote family, while the Wolcotts, Morgans, Treats and Willys', in their very name, speak eloquently of a nationwide activity in the upbuilding of systems, monetary, economic, educational and governmental. Even the traditional wooden nutmeg and basswood ham have significance for a mechanical ingenuity, rooted in the germ plasm, which lies at the base of a varied and powerful manufacturing interest. Cousin marriages have been frequent, carrying at times the stigmata of an hereditary aristocracy, but on the whole, making for leadership along many worthy lines.

The present crisis cries aloud for effective leadership. Its failure to appear here, in the measure of a century and a half ago, is, shall we say concomitant with the dying out and migration of these families, and the low fecundity of others, which would, if larger, have a safer chance of producing able individuals.

We hope that our law-makers and statesmen will some day concern themselves more intelligently with the dynamics of national evolution. When we are able to see in clearer detail the operation of the factors which I have here given in large outline, we shall be in position to frame more effective policies of national conservation.

CONTRIBUTORY FACTORS IN EUGENICS IN A RURAL STATE

H. F. PERKINS

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Some of us up in Vermont are finding that we started something when we conceived and organized the Commission on Country Life as a background for Eugenics. The publication a year ago of the results of this undertaking appear now to have been only the beginning. Having found out what to do to improve the setting for future generations of Vermonters it now appears that the two hundred Vermonters who studied themselves and their surroundings for three years must proceed to put their own advice into practice. The title of the book is "Rural Vermont: A Program for the Future, by 200 Vermonters." What bearing does it have upon Eugenics?

The Eugenics Survey was responsible for the begetting of this child which soon put its parent in the background in size and vociferousness. It was planned as a means of clearing up some of the complications of conserving the good old Vermont stock in the rural parts, and now that the material has been gathered it proves to have accomplished its purpose to a notable degree. Studying pedigrees of harmful or of helpful families, the problems of racial groups or occupational classifications, or whatever questions of eugenical import, is now, because of this background material, a far less haphazard and complex undertaking.

The more intelligent and socially minded people of all walks of life in all parts of Vermont were gathered in committees according to their various interests and abilities. There was a surprising amount of enthusiastic support and hard, continuous thinking and working on the part of these thirty committees and subcommittees.

- I. Committee on the Human Factor
 - 1. Eugenics Survey
 - 2. Population Changes
- II. Topography and Climate
- III. Soils
- IV. Agriculture—With six subcommittees on Apples, Potatoes, Dairy Problems, etc.
- V. Forestry and Woodworking Industries
- VI. Summer Residents and Tourists
- VII. Fish and Game

VIII. Home and Community Life

IX. Recreation

X. Medical Facilities

XI. Educational Facilities—Subcommittees on

1. Elementary Education in Rural Schools
2. Colleges and Normal Schools
3. Libraries
4. Social Agencies Affecting Education
5. The Service of Secondary Schools
6. Adult Education
7. Financing Education

XII. Care of the Handicapped. Blind and Deaf, Crippled, Tubercular, Feeble Minded, Insane, Paupers

XIII. The Vermont Foundation

XIV. Rural Government

XV. Citizenship—The use of the suffrage—citizenship training—education

XVI. Religious Forces—Making the churches more potent instruments for raising the tone of rural communities spiritually, morally and socially.

XVII. Traditions and Ideals. With divisions on Vermont Biography, Poetry, Prose Writing, Songs and Ballads.

The strictly industrial topics such as manufacturing, taxation and transportation, were left out because they were being covered by commissions or other organizations.

The range of these subjects is ambitious. The researches were carefully planned and extended back in time through the years to the early history of the state. The plans of the towns and of groups within them were looked over as well as the established practices and institutions, with an eye to their prospect of achievement in line with the raising of the levels of human living. The work done and the plans for future work of the state departments and of the private statewide organizations were evaluated.

In spite of the smallness of Vermont, a good deal of narrow provincialism exists and the excellent methods operating in one community in agriculture, schools, or recreation were not known even to their nearest neighbors. Local pride has been responsible for inefficient and feeble efforts as well as for much wholesome progress. Clubs, granges, and libraries are the most important agencies of adult education but local pride hampers the coöperation of adjacent communities which alone would enable many sections of the state to operate really good libraries and to hold regular, interesting meetings with enough people present to supply mutual inspiration.

Right here let me give evidence of the baselessness of the prediction that this was "just another survey" and that the printed report would end all practical value for the enterprise. Let us take the village library as an example of the opposite condition. The library situation is being attacked

with skill and energy by the Committee on Rural Libraries. Funds have been secured for a two year experiment and a woman of superior training, experience and charm of personality is now taking her book truck from village to village, aiding librarians and studying their special problems. In good time she and her committee will have some practical ideas to put where they will do the most good. Some of the struggling back-room-in-a-private-house-libraries will be persuaded to combine for greater service and modern books will be put on the shelves and circulated. Some of them will be about *Eugenics* and its background.

Another group which refused to disband is the one on Adult Education and that also helps the spread of Eugenical knowledge. The original committee has been augmented and reorganized with a council and now determines to make its service irresistably attractive to all sorts of existing clubs and to groups of people young or old who want, or can be persuaded to get together for something more lastingly stimulating to the mind than bridge. These groups will be in the market for speakers, and, judging from the demands of recent years, eugenics is not likely to be neglected in the choice of topics.

These are samples of the direct and immediate results of the work of the Country Life Commission. The indirect results are far more numerous and perhaps more significant.

In order to study heredity, we all recognize that full account must be taken of environment. Just how far each of these two factors enters into the molding of an individual will perhaps never be ascertained, but the better one understands and appreciates the environmental helps and hindrances surrounding the subjects of his study, the better can one evaluate the influences of hereditary trends in their development and fate. In the studies of low-grade families, early in the work of the Vermont Survey, the staff were continually running against the question, "If these folks had had any sort of a chance in childhood, might they not have pulled out of the deplorable state in which a lot of them lived?" Organized charity, law enforcement leagues, supervised dances and such urban stimuli to good behavior and social welfare are scarce articles in the hamlets and open country. There is more chance of certain sorts of depravity going unchallenged in a rural section than in a populous one. At least many cases of deficiency, defectiveness and delinquency seemed to be more persistent through a succession of generations if the people were rural than if they were urban. Prejudices die harder out in the country than they do in towns—prejudices against hospitals and institutions. Out there the people are more individualistic. The man of subnormal mind sends his nine children to the rural

school and refuses to allow their transfer to the state school for feeble-minded, and the school commissioners know the parents so well and so shrink from a row that they let the school teacher and the normal children suffer rather than force a commitment. It is quite possible to be too well acquainted with your neighbors for their good or yours, especially if you are not only town clerk but also owner of the general store. You stand to lose your job and your customers if you offend the few inhabitants.

So lack of backing for law enforcement, local pride, individualism and over developed intimacy all render the problems of social welfare peculiarly difficult in rural communities.

The studies of migrations that were made for the Country Life Commission by the Eugenics Survey, operating as one of the 30 divisions of the Commission, were centered upon three carefully selected towns among which conditions varied as widely as in any selection of rural towns in the state. Population trends have been especially detrimental to the size of rural towns in Vermont. If it had not been for the growth of a few of the cities and largest villages there would have been in every census since 1850 a decline in the total population of the state. A great deal of alarm has been felt and is still felt amongst the more thoughtful Vermonters because of this decline in population which they feel is also a sign of deterioration in quality. They use the expression "skimming the cream" in describing this emigration from rural sections to nearby cities or to more promising homes outside of Vermont. More and more towns are in each census reduced to the class having fewer than 1,000 individuals and if this reduction actually deprived the smallest places of the best young people as is generally believed to be the case, we should have in Vermont a backwash, a sedimentary population without sufficient ambition, energy or ability to get out or to accomplish anything where they are.

The studies that have been made over a period of three years by the Survey give a very much more hopeful prospect for the future not only of Vermont but of other parts of the country to which Vermont contributes some of its best blood. If none but the sediment of the population continued to live in Vermont and raise children there would be no longer any high grade young people to contribute to the life of our cities. But for every individual of high mental ability and physical stamina who leaves the state a dozen, a score, perhaps a hundred others who move from Vermont can carry with them only a meager endowment and their contributions can therefore amount to little or nothing. Furthermore, this is not a new condition. There is ample evidence that a similar proportion of inferior individuals from relatively inferior stock has been leaving the state for decades, and

many men and women of the highest quality remained. Judging from material evidences such as taxes and the ownership of the comforts and luxuries of life, the average Vermont farmer today is in no wise inferior to his ancestors in the ability to make a living from the soil. A study of those factors and conditions that have *held* high grade people is as important as a study of the causes of migration.

No better eugenical program for any section of the country occurs to me than this: The improvement of living conditions, the encouragement of social and intellectual opportunities that will enrich the lives of the people, making them aware of the trends of this modern age, including the trend of Eugenics, and affording a richer environment in which to rear their children. A fine old pioneer stock deserves an environment commensurate with its quality and only in such an environment can the innate qualities of the people come to any worthy fruition. If their home surroundings are poor and life nothing better than a perpetual fight for the merest necessities, their native ambition may be so dampened as to make them indifferent to their future and that of their children. Or, if the ambition is not entirely quelled it can have no suitable outlet in these poor surroundings. No wonder then that many of the young men and women from the poor back hill farms refuse to subject themselves to the hardships, privations and rigors of the ancestral homestead.

A comparison of the occupations chosen by those who have migrated from the three towns with the occupations of those who remained behind shows very clearly how much wider a range of opportunities are opened up in the larger towns and cities than are afforded in the country. While it takes ability of a very high order to make a success of farming under even the most favorable conditions, a different kind of ability, even though it may *rate* higher than that of the successful farmer, may be quite inadequate to cope with the agricultural problems. In this day of specialization as for generations past the successful statesman, scientist or industrial leader who was born in a little country village might have made no success at all as a farmer. He has a certain right to those opportunities, wherever he can find them, that will give him a chance to develop his talents and his natural bent. We have, then, come to the conclusion that in rural Vermont migration is a sign not of decadence but of adjustment. The depletion of some of the smaller towns should be regarded as a healthy sign. Abandoned farms and unused overgrown hill roads are not gravestones but signboards pointing to a better adjustment to changing conditions of living.

This brings me to a word about land utilization. Reforestation, either natural or artificial, is one of the best uses to which the less fertile farms

and fields should be put, and the use of land for vacation grounds offers excellent opportunity for the non-resident owner to make good use of soil and terrain too difficult for agriculture. The whole matter was thoroughly gone over by the Committee on Land Utilization of our Vermont Commission and, in conjunction with the migration studies made by the Eugenics Survey, it is plainly indicated that a program of land utilization is definitely called for in Vermont, and the same is undoubtedly as true elsewhere.

I would remind you of the long list of special committees which were set up to carry on the factfinding investigations of the Country Life Commission. It has been possible to touch upon the activities of only a few. The wealth of material gathered by these earnest, intelligent, capably guided and expertly assisted groups bears upon every phase of living conditions, physical, mental, social, spiritual, in the outposts as well as in the populous parts of Vermont. We not only have as background material for future work in Eugenics, for further studies of family trends and racial differentials, the results of this three years' research, but we have the prospect of utilizing in most practical ways the recommendations of all of these groups of workers. A small army of publicity agents has sprung up and they are putting this information into the hands of the people of the state and pointing out ways in which the state and the communities can draw upon it for their own betterment.

I am not painting a picture of Elysian fields up there in northern New England. We have no illusions in regard to the inertia that characterizes the Vermonter as well as others. We are well aware that people do not like to be disturbed out of the comfortable ruts in which they have become accustomed to move even though it may be at a snail's pace. But there are plenty of Vermonters, born or naturalized, who are ready and eager for improvement. Our committeemen, and during the past year our volunteer spokesmen, have discovered them in every section of the state—people who are willing and glad to promote promising measures of betterment for themselves, their families and their neighbors.

The quixotic dream of five years ago has already been realized in considerable part and a splendid beginning has been made towards the speeding up of the best sort of progress built upon the fine traditions of the old state.

Eugenics in Vermont, then, has already accomplished something and this accomplishment opens the way for further gains, first by giving a clearer conception of those elements in the environment of Vermont which may hinder or help human betterment and second by setting in motion the means of improving the good elements and lessening the bad.

All this may conceivably eventuate in bringing about in Vermonters an

attitude of greater respect for the finest traditions of the state and for the best qualities of her native stock, a greater determination based upon more clearly thought out objectives to "raise the standards of civilization" in the country places and, in this better setting, to rear a finer race, with fewer defectives and reasonably large families of children, sturdy in body and healthy in mind.

Is this hopelessly Eutopian? I maintain that it is based on sound fundamental principles and I submit that if Eugenics is to get anywhere and do anything it must be forward looking and, in the face of accusations of impracticality, must have infinite courage. Especially must Eugenics take due account of the multitudinous elements of the environment in which it proposes to have its superior children born and reared. Such was the purpose and aim of these Background Studies in Eugenics in Vermont.

SECTION V

POSITIVE AND NEGATIVE
EUGENICS

IS THE ABNORMAL TO BECOME NORMAL?

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The various dysgenic classes which are so rapidly increasing in the United States constitute our vast "aristocracy of the unfit." They are an undesirable group of citizens which the more thrifty, intelligent, and superior stocks willingly tax themselves to support and perpetuate. This increasing horde will ultimately overrun and destroy the diminishing posterity of the better classes unless a practical program of restrictive eugenics is adopted and effectively executed.

This paper is presented in the hope that representatives of the Illinois Federation of Women's Clubs will recognize that civilization is doomed if we continue to drift down the stream of a few more generations on the defenseless raft of mistaken brotherly love and blinded sentimentalism.

We desire to hold before you a racial mirror in which you (representatives of the better racial strains living in these United States of America) are invited to gaze while we briefly present the real situation of Uncle Sam's family of one hundred and twenty-three millions.

We are supporting in public institutions an idle population of defectives amounting to more than 1 per cent of the total population, including children, at an estimated annual expense of more than five hundred million dollars.

The names of these insane, idiots, criminals, and paupers are registered in state hospitals, asylums, and prisons, together with some facts respecting their pedigrees. And we are told that the institutional registration is but a small per cent of the total number of defectives.

Who are these undesirables that are so tenderly provided for by the taxes of the thrifty? The American Foundation for the Blind estimates that there are more than one hundred thousand (114,000) blind persons in the United States, an increase of 17,000 in ten years, nearly five thousand of them were born blind, have blind relatives, and will no doubt produce blind children.

Twelve thousand of the hundred thousand deaf people in the United States were born deaf, and 32 per cent have deaf relatives and may produce deaf mutes.

Every day in the year more insane patients occupy hospital beds than do

those suffering from all other diseases combined, including tuberculosis, cancer, childbirth, etc., and they are increasing at the rate of 72 per day.

In 1928 nearly sixty thousand people entered State mental hospitals for the first time, and in addition, fourteen thousand were admitted who were suffering from a recurrence of mental diseases for which they had received earlier hospital treatment. This is an increase of nearly ten thousand over the previous year.

In New York State, one person in ten who reaches adulthood will enter a mental hospital before he dies. It is estimated that four out of every one hundred children who enter school in the United States and Canada will some time be admitted to a mental hospital—a larger number than will graduate from college.

Eighteen per cent of all the people in the world are dull normals. They never have gone, and never will go, farther than the fourth grade in school. Two per cent of all human beings are feeble-minded. It is estimated that there are 650,000 feeble-minded at large, outside of institutions. The number of epileptics in the United States, now nearly two hundred thousand, is increasing year by year, and of them a large per cent are feeble-minded.

There are one hundred thousand paupers in almshouses. They are a rapidly shifting group, drifting into, and out of, these county institutions, which suggests that they are inefficient and of low grade mentality.

In 1929 there were more than a hundred thousand (116,000) inmates in prisons, penitentiaries, reformatories, and institutions of detention in the United States, an increase of nearly ten thousand in a single year.

Let us look for a moment at the money thrifty citizens annually pay in taxes to care for this vast army of defectives and delinquents in the penal institutions, state hospitals, almshouses, etc., of the United States. For the fiscal year 1928 there was expended for the deaf, blind, and mute over thirteen million dollars (\$13,075,666); for the mentally diseased, over one hundred million (\$103,239,249). If the rate per cent charged for institutional depreciation and the per capita cost for legislation, courts, etc., be added, the annual sum expended in this field by tax payers amounts to almost one hundred fifty million (\$143,353,933). If we add to this a fair estimate of the loss of future net earnings of the average first admissions to hospitals for mental disease, the total is nearly seven hundred million dollars a year (\$686,603,410). The annual cost of the care of the inmates in our penal institutions and houses of correction is over fifty-five millions (\$55,824,887). Putting all these figures together, but omitting court costs and legislative and institutional depreciation, we are annually taxed for the care of the mentally diseased, the defective, and the delinquent, 35 per cent of the total expenditure by all the states for public school education.

In our own Illinois the latest figures of the state statistician show that in 1928 the thrifty people of this state were taxed for these undesirables confined in institutions, as follows: for the care of defectives, nearly seven hundred thousand dollars (\$683,452.38); for the feeble-minded, over one million (\$1,031,189.44); for epileptics, over one hundred thousand (\$120,000); for the deaf, over three hundred thousand (\$332,615); for the blind, over two hundred thousand (\$219,621.38); for the insane, over six million (\$6,104,077.35); for new institutions and for improvements in those already existing, over five million (\$5,267,155.44). An additional million a year is spent by the state in directions other than institutional—a grand total of over twenty-two million dollars, the tax of the thrifty for the great army of defectives and criminals in this one state alone. We spend only five times this amount on our public schools. Think of it: one-fifth as much money spent on defectives and delinquents as for the support of the public educational institutions!

The tragedy of it all is not that we are spending these enormous sums this year, or even that we shall continue to do so during the lives of these undesirables who today are incarcerated or who are otherwise wards of the community, but rather that we and our children's children must continue to do this for untold generations, unless something is done about it; for mental defectiveness, which is at the bottom of it all, *is directly inherited*. As long as these individuals are allowed to propagate their kind without let or hindrance, the demand for the expenditure of these vast sums will not only continue at the present rate, but will increase from year to year in alarming proportions.

There is a startling relationship between vice, crime, and drunkenness, and poverty and feeble-mindedness. Recent psychic studies show that criminality as such is not hereditary; that which *is* inherited and which *is* associated with crime is mental disorder. Eighty-five per cent of the youth brought into the Boys' Court of Chicago are mentally disordered, and over 50 per cent of all criminals everywhere are mentally sick.

In Illinois alone, if our criminals increase each year at the present rate, we shall have an additional 10,000 inmates of penal institutions to deal with in just seven years. The prison population of Illinois for seventy years has shown a tragic growth; the last ten years has witnessed an increase greater than that of the previous sixty, and 1931 exceeded that of any previous ten-year period. The feeble-minded at Lincoln and Dixon increased 5 per cent over 1930.

The modern civilized races are proud of their ability to control nature. What an insult to our intelligence to intimate that we cannot control human reproduction so as to deliver society from the burden and disgrace of having

to support helpless defectives and dangerous degenerates at a cost of far more than five hundred million dollars a year!

Suppose, my clubwomen friends, a new disease plague should descend upon us which would strike down 2 to 3 per cent of the population, not merely rendering them inefficient but actually throwing all these smitten individuals on the community for their entire support at a cost of over five hundred million dollars a year. What would we think? What would we do?

We are today face to face with a much more serious problem—one of gigantic proportions—for the menace of feeble-mindedness, insanity, and delinquency is a rising tide, constantly growing in volume, because these enemies of society pass on their faulty mental and moral taints to their rapidly increasing progeny. Must we sit supinely by and let all this go on? No! a thousand times, no!

Here we are coddling, feeding, training, and protecting this viper of degeneracy in our midst, all the while laying the flattering unction to our souls that we are a *philanthropic*, charitable, and thoroughly Christianized people. We presume to protect the weak and lavish charity with a free hand upon these defectives, all the while seemingly ignorant and unmindful of the fact that ultimately this monster will grow to such hideous proportions that it will strike us down, that the future descendants of the army of the unfit will increase to such numbers that they will overwhelm the posterity of superior humans and eventually wipe out the civilization we bequeath our descendants; and all this will certainly come to pass if we do not heed the handwriting on the wall and do something effectively to stay the march of racial degeneracy, for it is said that even now three-fourths of the next generation are being produced by the inferior one-fourth of this one.

Public lethargy and general indifference to this subject is due to the fact that we have become more or less accustomed to these conditions. Davenport says, "We have become so used to crime, disease, and degeneracy that we take them for necessary evils. That they *were*, in the world's ignorance, is granted. That they must remain so, is denied." The great horde of defectives in the world today have the right to live and enjoy as best they may whatever freedom is compatible with the lives and freedom of the normal and thrifty; but society has the undeniable right, yes, and is bound by the duty, to protect itself, by whatever methods it may deem wise, against repetitions of hereditary blunders. If my profession continues to try to save every weak child that is born into the world; if we continue to serve the unfit baby in our welfare stations, dispensaries and clinics, and if this coddled, protected weakling grows to adolescence and shows that it cannot get out of the fourth grade at school, that it is manifestly defective and degenerate,

and if we know that it is likely to produce only unfit individuals; then, we maintain that society owes it to the medical profession on the one hand and to itself on the other, to say—in substance—to this child: “We will continue to do the very best for you; you shall be educated or trained to your fullest capacity—and then you shall be either segregated or sterilized—we will do our full duty by you, but there must be no more like you.”

One of the most terrible blunders connected with our present management of these classes is that we keep some of them incarcerated in custodial institutions until they grow up, become sexually mature, and then, when because of the training we have given them, they have become partially or wholly self-supporting, they are forthwith turned loose upon the public to begin their calamitous career of freely reproducing themselves only to curse the next generation. Segregation, to be effective in cutting off defective germ plasm, must be strictly according to sex. In segregating the female, the attendants immediately in contact with these unfortunate individuals should be of the same sex, for we should remember that each year there are born over one thousand illegitimate children to feeble-minded mothers on our county farms.

The chief objection urged against segregation is that of expense; this is not a valid objection in view of the enormous amount of money spent in conducting the courts, and for the maintenance of hundreds of institutions of correction and detention which at present do not care for one-tenth of our defective and antisocial population.

The expense would normally decrease with each decade and would be enormously diminished in a single generation. The details of the program of segregation are too large a subject for this paper, but we merely say in passing that these undesirables could be located on state farms and their labor so utilized as to make them largely self-supporting. A large per cent of the feeble-minded would be able to do enough work to provide for their own care. The group which could not contribute to its own support, such as the insane, the highly criminal type, the epileptic, etc., the state would continue to care for as at present. The point we want to emphasize is that if they are *all* incarcerated for one lifetime so that they cannot reproduce their kind at all, our problem will largely solve itself in two generations.

And now concerning sterilization as a means of stopping reproduction on the part of the defective classes: It is agreed by all that sterilization should never be advocated in doubtful cases or in the milder and more questionable forms of defectiveness, but it would seem to be admirably suited to cases of undoubted feeble-mindedness, whether the defect were manifested as criminality, imbecility, or some form of hereditary sexual perversion.

Let it be clearly understood that sterilization in no wise interferes with the normal biologic feelings and impulses of the individual. The self-supporting types of sterilized individuals could marry and live out their natural lives, while at the same time society could breathe more freely, knowing that no feeble-minded offspring would result from such marriages between the hereditarily defective.

There is no question that a sterilization law, enforced throughout the United States, would result, in less than one hundred years, in eliminating at least 90 per cent of crime, insanity, feeble-mindedness, moronism, and abnormal sexuality, not to mention many other forms of defectiveness and degeneracy. Thus within a century, our asylums, prisons, and state hospitals would be largely emptied of their present victims of human woe and misery. The indigent and aged paupers, and the unfortunate degenerates of various types would disappear as a troublesome factor in civilized society.

In man's early history, primitive life was for the swift and the strong. The puberty rites which sent the youth far from the clan into the wilds for twenty-eight days were sorters of men. Natural selection's death rate of the jungle helped to purify the primitive race by destroying the weak and permitting only the strong to live and reproduce.

Eugenicists hope to arrive at the same result by the selective birth rate. If antisocial individuals are kept humanely segregated during their lifetime instead of being turned out after a few years of institutional life and allowed to marry, they will leave no descendants, and the number of congenital defectives in the community will be notably diminished. If the same policy is followed through succeeding generations, the number of those incapable of taking a useful part in society will steadily decrease.

If, while these reforms are being accomplished, the present definite tendency among the well-to-do and the more thrifty groups of the working classes toward race suicide can be successfully combated; if these superior men and women can be imbued with the conviction that they owe a duty to the race, to the generations of the future, to leave behind them families of substantial size as guarantees that the noble legacies of mind and morals received from *their* ancestors shall be vouchsafed to their children's children down through the centuries—then there is assurance that this problem will be solved.

If America is to escape the doom of the nations of old, we must breed good Americans. The fall of every nation in history has been due to many causes, but always chief among them has been the decline of the national stock. Nations must change, but they need not of necessity die out. A quickened eugenic consciousness is one of the prerequisites to the working out of a successful racial program. Better babies must become the watchword.

Our religious and our moral codes must include the conscientious conviction that the race must be purified. Eugenics must be taught throughout our national educational system.

No civilization can endure in the presence of a continuous over supply of inferior stocks, and its decline and overthrow become doubly sure and certain if, at the same time, there is an undersupply of the superior stocks—those stocks which carry the germ plasm of leadership, talent, and ability. Some nations have risen rapidly in culture and efficiency and subsequently fallen with equal rapidity. Is the United States to be one of these?

In times of war, when our national safety is seriously threatened, we have not hesitated to conscript the able-bodied and clear-headed manhood of the nation—our very best stock—for an army of defense for the protection of our civilization and institutions. Would it not be equally fitting, since it is within our power, to conscript—literally to draft—this great horde of defective individuals who are not only a curse to the society of today, but who are also the carriers of degeneracy to future generations? Why not conscript these undesirables for the common weal, and then, after they are examined, studied, and classified, take such action as will not only be for their best good, but which will also be in the interests of the welfare of society as a whole, both today and for all time to come?

If we should thus conscript our degenerates, sanely classify and properly employ, incarcerate, or sterilize them, within a very few years, most of our charities, which are dealing largely with problems resulting from feeble-mindedness, would go out of business; most of our jails and brothels would be empty; our courts would languish for want of cases; and fully three-fourths of our philanthropic and reformatory work having to do with poverty, vice, intemperance, delinquency, and crime would stop for want of the feeble-minded grist which today keeps these mills of charity grinding.

American conditions call for thoughtful consideration—for serious study. The problems of the hour challenge our immediate consideration. Our national life needs to be studied in the light of the rise and fall of other nations. We are but a young people, and now is the time, in our adolescence as it were, carefully to take stock, earnestly to inquire into and recognize our fundamental defects, and then with patriotic courage and stalwart bravery to consecrate our hands to the task and dedicate our minds to the cause of turning away the swelling tide of moral decadence and mental defectiveness before this dire threat of degeneracy shall have time to assume more serious proportions, and before the racial deterioration which now looms in the not far distant future shall have, to further degree, undermined the stability and intellectual greatness of America and Americans.

The call now to the citizenship of our country is for the reading, thinking half to become students of the great problems of race betterment; to formulate their ideas, revise their opinions, reach sound conclusions, and then, in turn, to become teachers of the other, the unthinking and the careless half which are driving on heedlessly toward racial decadence and national ruin.

The hour has come to sound the rallying cry for that part of our citizenship which is willing to look the facts in the face and then with intelligence and determination to lay the axe of prevention to the root of the tree of tainted heredity, which is responsible for this increasing harvest of human unfitness, defectiveness, and degeneracy.

SELECTIVE STERILIZATION FOR RACE CULTURE

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It is a well known fact that scientists will argue endlessly over the question of whether heredity or environment (nature or nurture) plays the greatest rôle in the normal development of the average individual, but it is not necessary to quibble over the question of which one of these influences plays the greatest rôle—it is enough to realize that *both* play an important rôle. But when we consider the mentally deficient (feeble-minded) person it is an entirely different matter. All the researches that have been made in this sphere so far point to the following facts: (1) the greatest single cause of mental deficiency (50 to 65 per cent) is poor heredity of a specific nature—namely, mental deficiency in one or both parents, and vice versa; (2) the greater proportion of mentally deficient persons who bear children procreate mentally deficient offspring. Detailed case reports of many generations of hereditary defectives can be found in the extensive researches made by Goddard on “The Kallikak Family” and by Dugdale on “The Jukes Family” (“A Study in Crime, Pauperism, Disease, and Heredity”).

By selective sterilization we mean the sterilization of defective individuals in order to prevent them from procreating their kind. Thus it becomes clear how the sterilization selectively of mentally deficient persons improves our racial culture. By preventing the birth of mental defectives, we raise the general average level of intelligence throughout the population—since the preponderance of births in the average and superior group is relatively increased. According to the statistics that were secured during the World War upon the members of the United States Army which drew its members from every walk of life, about between 1 and 2 per cent of the general population is believed to be mentally deficient to the extent of feeble-mindedness. This would include from 1,000,000 to 2,000,000 persons in the United States. Another 13 per cent are mentally deficient in sufficient degree to classify below the accepted standard for average intelligence, this latter group comprising over 14,000,000 persons in the United States. If all those who classify as feeble minded were sterilized we would stamp out the greater proportion of the group which prevents racial and social progress. We would at the same time decrease the size of this other group of intellectually

inferior individuals, because many of these are the result of unions between an average person and a feeble minded person, which usually results in feeble minded or borderline progeny.

A large proportion of illegitimate children are born by mentally deficient mothers, and it may also be stated that a relatively large proportion of fathers of illegitimate children would be found to be inferior individuals if reliable data could be secured on this question. We would therefore decrease in great measure the extent of this problem of illegitimacy if all feeble minded persons were sterilized and thereby prevented from procreating. It follows quite naturally that the problem of prostitution would be considerably decreased, since a greater proportion of prostitutes are mentally inferior and many are definitely feeble minded—so that by decreasing the whole number of mentally deficient persons we would naturally decrease this problem of prostitution proportionately.

It is believed that the need for selectively sterilizing the entire group of hereditary mental defectives will be readily conceded by all students of race culture. But quite apart from this group which includes 50 to 65 per cent of feeble minded, it would also be conducive to racial improvement to sterilize even those feeble minded who do not necessarily fall in the hereditary group. Ample justification for this is found in the fact that regardless of our theories of heredity, *mental defectives tend to maintain inferior homes in inferior environments, and they quite generally rear their children in an inferior manner.* This is readily understandable, for they do not possess the requisite knowledge necessary to train children along normal lines. The rearing of children into normal adults is a much neglected art, and able parenthood is the most important profession on earth, requiring a store of knowledge which is possessed by few parents of even average intelligence, and certainly we can never expect feeble minded persons to acquire sufficient knowledge to carry out child rearing properly. In this sphere it must be remembered that the faultily reared children of each generation make up the greater proportion of the insane, criminals, prostitutes, paupers, and social misfits of the next generation. An authority on this subject, a superintendent of one of the many larger state institutions for mental defectives, stated the matter very well when he said, "I have yet to see the mentally defective girl or boy for whom parenthood can be recommended."

Any single medico-physiological measure which possesses a sufficient appeal to induce over 50 per cent of the states of the union to adopt statutes permitting its use, must be a valuable asset to humanity. If not, it would appear that the legislatures of over half our states do not have sufficient judgment to care for the common welfare, for *laws permitting selective sterilization are available in 27 states* at the present time.

What about the opinions of the social scientists in this matter? In 1930 all the members of American Association for the Study of the Feeble-minded (317) were consulted by questionnaire as to whether they approved or disapproved of sterilization of mental defectives. 243 replies to the question were received, and 227 of this number approved the principle of sterilization. Ninety-four per cent of the members of this scientifically minded organization thus expressed their evident approval. The very interesting fact was also learned through this questionnaire that not one of the members living in states that now have sterilization laws wished their present law abandoned. In a number of confidential discussions of this question which I have had with superintendents of state institutions for the feeble minded I have encountered none who would not sanction the principle of selective sterilization, though many believe that the electorate is in some states not sufficiently advanced in social science to fully comprehend the far reaching value of permissive sterilization of defectives.

The actual fact is that in the State of California, where they have the most complete and reliable data on which to base opinions in the matter, we find the most enthusiastic supporters of this measure. Even those persons who have been sterilized are among the group who are enthusiastically friendly to the measure. Their relatives and friends are, in general, equally well satisfied.

In cases where sterilized feeble minded persons have married, since there are no children, both husband and wife can work out so that, even if neither one is very efficient economically, the joint earnings of the two support them comfortably. Probably neither one could have carried successfully the responsibility of a family and children.

From another state, Delaware, where a considerable number of sterilizations have been performed, comes this comment: "The sterilization law, passed at the instance of this Board in 1923 (State Board of Charities) is producing remarkable results . . . This Board is still of the opinion that *the sterilization law is one of the most important laws on our statute books.*"

Many of my own cases seen in mental hygiene clinics conducted throughout New York and New Jersey show most convincingly the need for the use of sterilization of mental defectives. A family of six children, two of whom reached the fourth grade, three only the third, and the patient who is a thirteen-year-old moron showing no school progress—all are apparently defectives. The father is a drunkard and uneducated, the mother definitely defective mentally. She eloped with a negro after adding this defective brood to the nation's population—who in their turn (if not sterilized) will breed more defectives. Would it not have been far better if she had been sterilized before propagating these six defectives—and what of the future?

She is likely to breed defective mulattos indefinitely. Will we improve social conditions by allowing conditions such as this to continue unabated? In another family, the father (46) refused to work despite repeated jail sentences for non-support. He is alcoholic and a mental defective of low moron grade, and said to be the father of a number of illegitimate children, three of whom are defective mentally, a fourth is nearly so, and the other two are unknown to the writer, though probably inferior children. One of these children contracted gonorrhoea at eight and a half years as a result of a supposed rape by a man of fifty-two. (She had been set an example for such a relationship by frequently witnessing her parents in the marital embrace.) Considering her low mental capacity it is more than probable that she made little effort to prevent this assault. Would it not have been far better to have sterilized the parents of these two families rather than to have this sordid story to relate now?

I have the records of another family in which there were 9 children *all* of whom are *retarded mentally* and most of whom are definitely mental defectives; another family in which 16 children were born *all of whom* were of moron intelligence or lower, the father being an illiterate mental defective, and the mother mentally retarded as well as epileptic. A study of another family tree shows the following: From 8 matings there were born 49 offspring, two of whom are dead. Out of this group of 47 individuals there were 20 mental defectives and 10 more who were described as defectives. The other 17 are unknown quantities because of lack of information, but some of these were undoubtedly defectives. One of the couples in this group propagated 13 children, *all* of whom were of *defective* or *borderline* intelligence. Other couples propagated 7, 8, 9 and 10 children respectively. The detailed records of the members of this clan if obtainable would doubtless show a trail of pauperism, illegitimacy, prostitution, and crime similar to that found in the classical study of the Jukes family. These family studies show the positive necessity for sterilizing defectives if we hope to cut down the extent of these social sores. Hundreds of similar degenerate family trees can be found in the archives of any State Mental Hygiene Bureau.

It is not an infrequent occurrence in medical practice to encounter families in which 10, 12, or 15 or more children have been born. Does anyone believe that such large families are desirable? Does any woman ever have that many children from choice? I am convinced that she does *not* if she is honest with herself or her physician. It has been shown that the rate of infant mortality increases definitely as the size of the family increases. The newspapers some time ago carried a story of a woman who had just had her 25th baby—thirteen of the brood, however, had luckily died. Otherwise

how could this family have been supported—unless the man was a bank president (and bank presidents it may be noted, do not have large families. Why?—Because they are able to procure contraceptive information).

But from the mental hygienic viewpoint there is a still more pressing need for the proper prescribing of contraceptive information. There are thousands of couples living abnormal lives because of the lack of such information. I personally know professionally a very considerable number of women who because of the constant fear of pregnancy, have been unable to allow themselves to enjoy normally the satisfying physiological act which is the main spring of a happy marriage. Every physician will encounter in his practice similar cases, if he investigates the biological history of his patients. It is well known to physicians that a proper consummation of this act is just as necessary for the woman as for the man—yet we find everywhere women who have not experienced this most necessary fruition in their married lives, or others who, because of fear, are able to experience it only at infrequent intervals. The extreme nervous tension brought about in the woman by this frequent repetition of sexual frustration is in many cases the cause of a nervous breakdown. In the case of the man on the other hand, the many types of physiologically improper substitutes for the normal sexual relationship that are resorted to as means of preventing pregnancy, bring about in him the same feeling of sexual frustration, which if repeated indefinitely may also result in a nervous breakdown. Many cases could be cited in support of this contention. *The establishment of complete mutuality or reciprocal emotional fruition is absolutely necessary if a marriage is to prove a successful and socially constructive one.*

But after all why should we get so excited over this question of an immediate need for initiating steps that will further racial culture? The mental defective portion of the population is placed at the seemingly insignificant figure of only 2 per cent (or less) of the population—so why should we worry ourselves about the matter? Let us consider the question carefully and with a view to the type of population we will have, ten, twenty, or fifty years hence. It is a well known fact that birth control knowledge (even though it is in many cases of unsatisfactory type) is at the present time widely disseminated throughout the general population. That this is fact and not myth is shown by statistics to the effect that the birth rate was 20 per cent less in 1930 than it was in 1920. Undoubtedly with the wider dissemination of such knowledge this rate will decline still further. This means that as time goes on we will come nearer and nearer to a stable population quantitatively.

But what of the ultimate *quality* of this population? Careful study of

the situation should convince anyone that if we go on propagating according to the rules in force at present, there must result a decrease in the quality of our racial stock. The reason for this lies in the fact that the lowered birth rate centers around the more intelligent portion of the population, while the inferior and mentally defective portions of the population are continuing to propagate at the same rapid rate as formerly. In fact studies have shown only too graphically that the super-intellectual group per se is not propagating fast enough to maintain itself, while the former is multiplying itself almost threefold. It is recognized that the use of contraceptive methods by the intelligent portion of the population is improving the physical and mental caliber of the individuals born into this group because of the better physique of the mother who undergoes pregnancy less frequently than was the case in previous generations. But it is also recognized that it is this intelligent portion of the population that is having fewer children than in previous generations. Because of the fact that the *un*intelligent portion of the population are continuing to propagate at the same rapid rate as formerly (which means they will increase in proportion to the population at large) and since they cannot be brought to use contraceptive methods because of ignorance and disinterest, it becomes evident that we need sterilization (of defectives) as a measure for protecting and perpetuating the human betterment brought about through the improvement wrought in the intelligent portion.

In England studies show that the average number of offspring in defective families is twice as great (7.4 per family) as the number of offspring in families of average intelligence (3.7 per family). One student has calculated that with our present rate of increase, in three generations the average and superior intellectual portion of the population will not be maintaining itself (that is: 1,000 average or superior individuals now living will then be replaced by only 687 others), while the feeble minded and degenerate type will have multiplied itself *over three and one half times* (that is: 1,000 defectives now living will then be replaced by 3,600 others).

In our own country a study made of the marital history of graduates of the leading colleges made by Mr. Henry R. Carey brings to light some very interesting but most alarming facts. Statistics show that of all the women in the nation over 15 years of age, 72.5 per cent were married (1920). But of the graduates of leading women's colleges this percentage was much lower ranging from 55 per cent down to 41 per cent (Vassar 55.5 per cent—1928; Smith 50.1 per cent—1926; Bryn Mawr 48.1 per cent—1928; Barnard 41.8 per cent—1925). In another table we find that out of a group of exceptionally distinguished women alumnae (average age 53) only 20 per cent were

married, while out of a group of exceptionally distinguished Yale alumnae (average age 54) 95 per cent were married. It was also found that the number of Harvard graduates married was 10 to 24 per cent higher than the number of married graduates of Smith, Wellesley, Bryn Mawr, Barnard, and Mt. Holyoke. *Thus it appears that the influence of the women's colleges is towards the wholesale suppression of marriage among the selected best of the nation, resulting in the annihilation (or sterilization) of the fittest of the race.* In corroboration of this a study of the graduates of one woman's college (Mt. Holyoke) showed that 50 years ago 85 per cent of the graduates married but only 50 per cent married at the end of this 50 year period—showing a gradual decrease from one decade to another.

These figures do not completely show the seriousness of the situation, however, for *in addition to the fact that fewer of our female intelligentsia are marrying, the smaller proportion who do marry are having only one third as many children as are the women of the nation at large.* Thus again we see that we are figuratively sterilizing the fittest. What could be more fitting than the words of Dr. Raymond Pearl, of Johns Hopkins who has recently said, "The wrong kind of people have too many children and the right kind too few."

We have always devoted much effort to the controlled breeding of animals. Witness the pedigreed dogs, horses, etc. that are displayed at various shows. Yet we have heretofore taken it for granted (quite unwarrantedly) that some Divine power would see to it that only desirable humans would be propagated. What more fallacious position would it be possible to assume considering the fact that man possesses the greatest possibilities of all the animals, so far as fertility is concerned (because of the lack of seasonal or other oestral cycles in the human species)—and knowing the extent of human thoughtlessness so far as posterity is concerned. We allow the most important group inhabiting the earth, the human species, to propagate blindly and without limit—while we control with the most scientific care the breeding of the lower animals.

There are probably in this group very few who have not read the description of the trail of crime, murder, pauperism, prostitution, illegitimacy and incest which is found in the history of the famous Jukes and Kallikak families. It was demonstrated that the main factor in these ignoble family histories was mental deficiency. It would have cost but \$150.00 to have sterilized the original couples, to cut off the seemingly endless social sores resulting wherever members of these families have settled. Yet the actual cost in relief alone of only one of these families was estimated at over \$2,000,-

000.00 in 1916, as there were at that time 2,000 members of that socially unworthy clan. We have no idea what the cost may have risen to now and there are many such clans in our civilized society.

It should be kept in mind on the other hand that there are those who believe that our population has already attained a greater number than is necessary for efficient functioning of the race as a whole. Certainly our present picture of millions of unemployed would point to the belief that this suggestion is a reasonable one. It would undoubtedly be found, if such a research was possible, that a major portion of this vast army of unemployed are social inadequates, and in many cases mental defectives, who might have been spared the misery they are now facing if they had never been born. It would certainly be understandable how many of them would prefer not to have been born, if they could have known what was in store for them on this earth where the struggle for existence and the urge toward the survival of the fittest makes it necessary for all those who would survive to possess a native endowment of at least average intelligence.

Could there be any more fitting words, through which to visualize our goal in race culture, than those of President Hoover, who stated when he wrote "A Child's Bill of Rights:" "There should be no child in America that has not the complete birthright of a sound mind in a sound body, and that has not been born under proper conditions."

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MARRIAGE COUNSELLING

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Family counselling has doubtless been done in one way or another by everyone who was given an opportunity to do so since the beginning of history. The Catholic priesthood among others has been trained for centuries to aid its parishioners in this way. But the change that has occurred during the last decade, which has led to what is rapidly becoming a recognized movement, results from accumulating scientific knowledge, especially concerning heredity and eugenics; and from a better understanding of the motivation of human behavior. It has been particularly accelerated by the increasing breakdown of family life in every civilized country, due to a large variety of social and economic causes.

The advice and information given may be either preventive or remedial, dependent largely on whether it is given before or after marriage. The European marriage advice bureaus (Eheberatungsstellen), particularly those established by authority of the Prussian government, have attempted to reach people before marriage, sometimes definitely limiting their services to the unmarried. And since prevention is better than cure, any agency in this field will naturally prefer to reach its clients before they are in difficulties, rather than afterward.

If people can be advised effectively before marriage, such an agency naturally has an eugenic value, in promoting wise marriages and discouraging unwise ones. From this point of view, the movement has been hailed by many as a most important factor in eugenic progress.

Analysis, and still more experience, indicate that the eugenic value of marriage advice is likely to be exaggerated. Most couples are seen only when they have already planned to marry. In Los Angeles they come to us anywhere from a week to a month before the wedding day. It is neither feasible nor desirable to break up such a proposed marriage in most cases. If people are to be influenced eugenically in their choice of mates, this influence must usually be exerted through education of public opinion, not later than the high school period.

Once in a while, of course, it is possible to advise people who are about

to marry, as to whether they should or should not have children. But again such advice would usually be too late, and at best only a few couples could be affected in this way. While any gain is useful, it is futile to hope that the problem of eugenics can be affected materially by such trivial procedures. It will be solved only by mass-measures, so to speak, dealing with the five great factors that make or break a nation: war, immigration, contraception, higher education, and charity.

If young people can be educated to seek advice before they fall in love, some good can be done in a few cases. We get such inquiries, but we classify them not as "premarital" (since they are not definitely planning to marry any definite person) but as problems of heredity. Most of these inquirers seek light on the probable consequences to offspring of a situation in their kinship—for instance, an uncle with dementia praecox, or a sister with epilepsy.

In counselling such persons, it is necessary to balance the probabilities. Our advice, when called for, is based on a consideration of whether the individual has anything of great value to transmit to posterity, to offset the handicap mentioned. If his children probably have $\frac{1}{2}$ chance to be well-endowed physically and mentally and to make a real contribution to civilization, it might be considered to offset $\frac{1}{10}$ chance of developing dementia praecox. If the chance of dementia praecox, on the other hand, is $\frac{1}{2}$, and that of good endowment otherwise only $\frac{1}{10}$, the person may well be urged at least to undergo sterilization before marriage.

On the negative side, then, I think the value of marriage advice is usually overestimated. On the positive side a good deal can be done to promote successful marriage. This will, in general, result in more children than will unsuccessful marriage,—indeed, a recent statistician has calculated that the couple with one child has nine times as great a likelihood of avoiding divorce, as does the childless couple; and that each additional child reduces by one-half the remaining chance of a break-up.

To prepare young people for successful marriage is therefore a real contribution, eugenically. The counsellor is greatly aided here by the fact that those who come for premarital conference are far above the average of the population in intelligence and altruism, and therefore likely to use successfully any information given them. After a study of the personal and family history, our client is given a list of books, all of which are available for him in the Los Angeles Public Library, and which present the subject from different points of view, through the eyes of a number of different authors. There are many useful books in this field, and a selection from them repre-

sents to some extent mere personal preference; those which the Institute of Family Relations is using just now for this purpose are the following:

- Exner, M. J.: *The Sexual Side of Marriage.*
- Galloway, T. W.: *Love and Marriage.*
- Groves, E. R.: *Wholesome Marriage.*
- Groves, E. R., and Groves, Gladys H.: *Sex in Marriage.*
- Johns, Jane: *The Girls Men Marry.*
- Jordan, W. G.: *Little Problems of Married Life.*
- Parker, Cornelia S.: *An American Idyll.*
- Popenoe, Paul: *Modern Marriage: A Handbook.*
- Popenoe, Paul: *Problems of Human Reproduction.*
- Sanger, Margaret: *Happiness in Marriage.*
- Wright, Helena: *The Sex Factor in Marriage.*

Probably no one person reads all of these books, but each is urged to read as many of them as time permits, in order to get the benefit of different approaches to the central subject. He is then sent to a medical consultant for physical examination. The physician also gives contraceptive information to those who desire it. Under the organization of the Institute, instruction on this subject is considered to be a function of the medical profession, and this division of labor has proved satisfactory.

The opportunity to get any general questions answered is afforded by the physician, in whose own office the examination takes place. This means a great saving of time for the medical consultants, and provides much better work, since in their own offices they have every facility, including proper help. The client then returns to the office of the Institute, and any questions remaining in his mind can be cleared up. To avoid all possible misunderstanding, he is finally given a mimeographed pamphlet which deals with all the causes of sexual adjustment that have been found in our experience to be common or serious, in as specific a way as our knowledge of the English language permits.

These consultations give the staff a chance to emphasize the three factors that we have found present in every unhappy marriage (sexual maladjustment, bad home-making, and failure to use leisure time constructively) and to see that the young people have information on them. Opportunity is also taken to warn against the danger of postponing child-bearing too long. Finally, the findings of the study of personal and family history and physical examination are reviewed, in order that any points which might affect the future happiness of the couple, or their children, may be given due weight.

The premarital conference represents the most constructive, preventive work of the Institute's Department of Personal Service, and therefore the

one that gives us the most satisfaction. But so far, this Department has been called on much more frequently by couples already married, who face difficulties that they can not solve and want help in dealing with them.

Each case requires analysis to determine the causes of friction; then the couple must be aided to remove these one at a time, and to substitute new attitudes and new knowledge to prevent the recurrence of such causes of friction. Obviously it is necessary to have the intelligent coöperation of both husband and wife. The trouble must be as simple as it is rare, which can be dealt with if only one partner is seen.

To recognize the causes of friction when they are seen, is important; to know where to look for them is, in practice, more important. They may be grouped under five heads, with full recognition of overlapping and complicated relationships between them.

(1) PHYSICAL CONDITION

Such obvious difficulty as may result from a diet inadequate in amount, or ill-balanced, or from lack of necessary exercise or muscular relaxation, is usually well known to the client, and he merely needs encouragement to apply an appropriate remedy. If there is anything really the matter with him, he usually knows that likewise, so far as our experience goes, and if he is not taking proper medical treatment, it is usually because of lack of funds or lack of faith in the medical profession. The most serious difficulty under this heading is the simple one (though the difficulty of dealing with it tactfully is great), of personal hygiene. Lack of cleanliness, presence of bodily odor, failure to attend to the hygiene of the teeth, and the like, are among the common and really serious annoyances of conjugal life, as presented by those who come for assistance in straightening out their personal difficulties. In such cases the remedy is obvious.

(2) ECONOMIC CONDITIONS

These are involved in virtually every case of maladjustment that has come to our attention. The problem of the woman who lacks or feels that she lacks proper clothes to appear in the society to which she has been accustomed, is as serious as it is common. The rating scale devised by J. E. Morgan for measurement of family welfare is an exceedingly simple one which we have found useful in giving clients a picture of their own situation and a standard toward which to work in improving it. The most universal factor under this heading, however, relates to budgeting and the management of expenditures. These offer a real difficulty in many cases, and if husband and wife are antagonistic for other reasons, then the daily problems

of family expense simply represent that many more opportunities for friction. Services of a consultant in home economics are often invaluable, not merely in aiding a couple to manage the household more intelligently, but in providing them with some objective standards as by a well planned budget and thereby taking away from them the opportunity, which so many of them use to the full extent, of squabbling over the proportion of the income that shall be spent from week to week for various current purposes.

(3) MENTAL HYGIENE

This covers many different problems that loom large in every family maladjustment. Monotony and deadly routine are factors in the disintegration of many a home, and to avoid them calls for a definite plan and definite effort, made all the more difficult when lack of funds deprives people of the commercial recreations which, for many, are the only ones known in city life. Many a woman suffers from lack of any creative outlet for her energies, or perhaps more frequently from inability to realize that she has plenty of creative outlets available if she only knew how to utilize them. Spread of a more intelligent attitude toward parenthood has been useful in enabling women to find less dissatisfaction and more real pleasure and a feeling of creation in the bearing and rearing of children. This has had an unfortunate consequence, however, when in most communities the education of women along these lines has proceeded more rapidly than that of men with a resulting conflict which will be mentioned under the next heading.

Freedom from fears is of highest importance, and these fears are frequently a fundamental part of the difficulty. (Those relating to sexual adjustment will be dealt with under heading No. 5.) Fear of desertion is a paralyzing factor in many cases, particularly among women with children, although by no means unknown among men. Fear of pregnancy on the part of women has often been represented, during recent years, as a chief cause of family disharmony. Doubtless it is such in many instances, but few of them have been found among our clients. This may be due to a more general dissemination among them of instruction on this point, for Los Angeles county possesses one-fourth of all the birth control clinics in the United States. Once in a while a case appears in which fear of pregnancy is a serious factor, but it is easily dealt with, either by referring the patient to a mother's clinic or, when necessary, by recommending surgical sterilization.

Definite plans for aiding the family to get sufficient recreation—inexpensive, wholesome, and mutual—form an important part of our treatment, and one that requires a survey of community facilities to know what is available for people of different kinds. It will doubtless be the universal experi-

ence that no city has anything like sufficient facilities of this sort. Further development of facilities and education of young people along these lines represent important constructive measures for the prevention of family maladjustment in the future.

(4) COÖPERATION

While failure on the part of married people to coöperate with each other is, in general, a symptom rather than a cause of difficulty, it is yet a heading that involves much of the practical treatment of a case. It is often useful to ask the client to make a list of the ten most important points which he or she has to complain about, arranging them in order of importance. It is surprising to find in how many cases the individual runs out of ideas after listing three or four. To draw out a more systematic picture of the problem, as seen by the partner who is being interviewed, we have found the marital rating scale of Jessie Bernard helpful. This is effectively supplemented in our practice by the use of the Bernreuter Personality adjustment scale which enables the individual to give a picture of himself that is easily scored, in relation to others of his own sex, age, and educational level.

There must be in the first place sufficient intelligence to coöperate, and this sometimes requires the use of the Binet test before one can proceed with confidence. Temperamental difficulties such as jealousy, nagging, and lack of punctuality are difficult to eradicate and may have to be circumvented by the development of changed attitudes toward them in the partner. It goes without saying that no treatment is likely to make over altogether an individual's personality; but if two married people have no serious basis for antagonism and have a real desire to coöperate, they can in most cases adjust themselves to the presence of trivial sources of annoyance. Serious temperamental and emotional defects verging on mental disease may be more recognizable, and in some cases even necessary ground for divorce.

Where there are children, the failure of parents to agree in the management of these is one of the most widespread sources of conflict in our experience. In many cases the mother has attended child-study groups and done some reading of modern literature so that she has definite ideas as to how the children should be handled. The father has not had such opportunities, or has not taken advantage of them. He is therefore inclined to despise these "new-fangled ideas" and to point to the way he himself was brought up as the most successful instance of child rearing known to him, with the assertion that if his own children are reared in the same way, nothing more can be desired. Education of the father is frequently necessary before this source of difficulty, with its inevitable damage to the children as well as to

the family harmony, can be removed. Of course, there are plenty of other cases in which the father is mainly responsible for keeping the children in line, and has to work against the inefficiency of an untrained and irresponsible mother.

(5) SEXUAL DIFFICULTIES

The sexual difficulties which, in general experience, underlie every family maladjustment, go back largely to two sources which themselves are inter-related. Either they are due to distorted emotional attitudes toward sex, carried over from before marriage, or to mere ignorance of the differences between the sexes, physiologically and psychologically, which any boy or girl of fourteen should have learned in high school.

The treatment of the emotional attitudes has been worked out pretty fully during the last twenty years by mental hygienists; but unfortunately this does not mean that it is successful in one hundred per cent of the cases. Until more sound education for marriage and parenthood is given to all young people, there will continue to be wrecks from this cause.

An understanding of the physiology of reproduction and the psychology of the two sexes can be given without much difficulty. It should be learned before marriage. In case the schools have failed in their duty in this respect, the time of marriage is an excellent time to make up the deficiency. A more general insistence on the necessity of proper education before marriage, together with routine adoption of a physical examination, would remove a large part of the difficulty in later married life. Unfortunately, the trend of education during the last generation has been unfavorable because the dominance of a doctrinary feminist point of view has led to a depreciation of the difference between the sexes and frequently to ignoring them or denying them altogether.

There are now available sufficient good books and pamphlets to make education of adults in this field fairly easy. The only limitation on it is that its lack may have continued for so many years that the damage is irreparable.

Several studies on presumably normal groups agree in suggesting that, at least in the educated part of the population, a serious sexual maladjustment exists in 25 per cent or more of all marriages at any one time. Some of these are solved by the persons affected; some are unsolved but simply tolerated indefinitely; others lead sooner or later to antagonisms and conflicts which, involving many other aspects of the common life, break up the home. Obviously success in preventing such an outcome depends markedly on the

length of time the maladjustment has existed. A difficulty that can be removed easily a few months after marriage may have become hopelessly involved after ten years.

Not every sexual maladjustment leads to a broken home; but so far as our experience indicates, almost every broken home is preceded by a sexual maladjustment. The question is often raised: are the conflicts of personality an effect, or a cause, of the sexual maladjustment? It is not easy to answer the question dogmatically. On anything above an animal level, the whole personality must enter into a sexual relationship. But innumerable cases in which the straightening out of a sexual maladjustment has removed antagonisms of conduct and resulted in harmonious personalities, bear witness that useful results may be expected from education on this subject.

In addition to this education on psychology and physiology of sex, there is need of a more widespread education on the social basis of family life, with study of successful instances of marriage on the part of other people. Radical and destructive criticism of marriage and the family, virtually lacking in real scientific basis, has confused many people during the last generation. Popularization of controversies and marital conflict, in fiction, on the stage, at the movies, and through the columns of the newspapers, has built up patterns of failure in the public mind, and patterns of success are rather hard to find. There is a real need of further material of this sort, not merely for education before marriage, but for treatment of difficulties afterward. Often an understanding of the social background of family life is more useful than any other knowledge in dealing with sexual problems and conflicts.

These two lines of activity—premarital conferences and marital adjustments—make up much of the work of our Department of Personal Service, but by no means all of it. In addition to the questions about heredity, already mentioned, there is a continual stream of inquirers about sex problems. Problems of child welfare have also come to make up a large and unexpected part of our work. It was unexpected because we had supposed that we would refer all such applications to Los Angeles' Child Guidance Clinic. It transpired, however, that there were many problems out of line with the type for which the Child Guidance Clinic is intended; or not accepted by that clinic because the child was over their age or lived outside of their territory. In addition, many of these cases are sent to us by other agencies in the city, and involve illegitimacy, adoption, custody after divorce, and the like. The European clinics seem pretty generally to have had the same experience that we have had, that is, that one can scarcely

draw any hard and fast lines excluding certain types of client, but that one must be prepared to take any problem that comes, and either give help or refer the applicant to some other source of help.

While the work of the Department of Personal Service is most interesting, much larger numbers are reached by the Department of Public Education which, therefore, we hope, has a more important function eugenically and socially than any other aspect of the Institute's work. (The third Department, that of Research, awaits funds to function fully.)

Many of those who apply to the Department of Personal Service want, or pretend to want, merely educational material for impersonal use,—in fact, these make up the largest single group in the following tabulation of the first 3000 clients:

Educational material.	1397
Family maladjustments.	427
Child welfare problems.	363
Sex problems.	333
Miscellaneous.	204
Premarital conferences.	172
Problems of heredity.	80
Legal problems.	24
	<hr/> 3000

Many of the students, teachers, club women, and officials who come ostensibly seeking material for educational use, also have problems of their own, for which they later return to us. However, they are given only the one classification.

The Department of Public Education, on the other hand, is not dealing with such individuals, but is in the first place using every effort to get public and private educational machinery adapted to meet the needs of education for marriage and family life, and is in the second place presenting the matter on its own account through series of lectures,—usually at least six. This plan provides for some continuity, gives more comprehensive presentation of the subject, familiarizes the auditors with the different approaches to it, and gives them a better opportunity to bring out their own problems and clear up their own minds, through the discussions and personal conferences that follow each lecture.

Such courses are always given under the auspices of some other organization which assumes responsibility for promotion. These have included universities; churches, either singly or in coöperation; Y. M. C. A. and Y. W. C. A., either singly or united; women's clubs; and Parent-Teacher organizations. The course offered is a flexible one, modified to meet the

interests and needs of the audience. A typical series for young people might cover the following ground:

1. The personal, social, and eugenic values of marriage and the family.
2. The biological basis of marriage,—difference between the sexes and the importance of understanding this physical, mental, and emotional differentiation, for the promotion of successful mating.
3. The choice of a mate.
4. Concerning relations and attitudes within the family in general; and in particular, those relating to division of labor and division of authority; family finances, the use of leisure time, and parent-child relationships.
5. Supposed substitutes for marriage, as compared with normal family life; and the psychological problems involved in the relationships of the two sexes before marriage.
6. Causes of family difficulties and how they may be avoided.

Such a series, developing contact with a group of intelligent and serious-minded young people for six weeks, gives an opportunity to stress some of the practical problems of the eugenics program: the necessity for wider and better acquaintance between the two sexes in the adolescent period, as a prerequisite to the wise choice of a mate at the proper time, for instance. The Institute's staff always attempts to find community machinery to further the various aspects of the eugenics program, and in this way provide for a continuing effort to better local conditions.

Beyond this, much of the time and energy of the Institute are occupied in providing material for teachers all over the United States, particularly in high schools. The need felt for this sort of thing, and the lack of general knowledge as to where help can be obtained, have led to a surprisingly large correspondence. Such contacts are included under the heading "educational" in the tabular statement above.

Special effort has naturally been made to aid the high schools in Los Angeles county, which have already set a high standard in undertaking to prepare their students for marriage and parenthood. Home economics courses are appearing in transparent disguise as Social Arts,—thus encouraging the registration of boys who might think that home economics sounded too much like a course for girls! The Institute is often called on to furnish speakers in these courses, when the teacher feels that there are some aspects of the subject which she is not well qualified to handle. Fortunately, the number of married teachers (about one-half the women teaching in the Los Angeles city schools are married) assures better help for the pupils than could be given in some cities.

While this educational work might well be done elsewhere under other

auspices, there are many advantages in tying it up with what might be called the clinical work of the Institute.

In conclusion, let me turn to the question, what agencies in the United States are undertaking this work of family counselling? Churches, family welfare associations, social hygiene associations, social case workers, physicians (especially gynecologists and psychiatrists), sociologists, Y. M. C. A. and Y. W. C. A. secretaries, eugenists, domestic relations courts, college officials, lawyers, psychologists (especially psychoanalysts), all have from time to time, and in different places, undertaken to specialize in this field.

If my analysis, above, of common sources of friction is correct, it will be evident that no one counsellor is likely to be competent to deal with every possible phase, and that a coöperation among counsellors, or a pooling of interests by those specializing in the field, would be desirable.

From a social point of view, again, it is evident that some cases of family maladjustment may be theoretically quite remediable, but demanding an amount of work which can not be given. The welfare agency may carry through a piece of family case work for two or three years, at a cost of hundreds of dollars to the community. The psychoanalyst may carry through the treatment of a case for a hundred hours of consultation, at \$20 or \$30 per hour. The solution in either event may be quite ideal. But it is wholly impracticable for most families, if they themselves must meet the cost; and for most communities, if they themselves must extend such a service to a considerable proportion of their inhabitants.

If the sexual maladjustments in marriage alone represent one-fourth of the whole married population, as noted above, and if there are numerous other problems, both before and after marriage, that fall properly within the sphere of the family counsellor, it is clear that only an educational program on a large scale is likely to be of any real significance, socially.

It seems worth while to consider, therefore, whether a social agency could not be built up on a new basis, with the object of getting the maximum amount of result for the minimum amount of expense. Such an agency would frankly recognize that some cases, beyond its own scope, might be dealt with successfully by others if expense were no consideration. It would proceed on the assumption that education adapted as well as possible to individual needs could be offered to large numbers of people without large cost; and that while this education would not be sufficient to meet the requirement of every applicant, it would benefit a majority. If the minority could find help elsewhere they would be at liberty to do so.

Such a policy was in the minds of the incorporators of the Institute of Family Relations in Los Angeles, when they began to work out their plans

five years ago. It opened its doors on February 3, 1930, as a non-profit undertaking which attempted to bring together in one place, and give to the public, the existing information that would make for success in marriage and parenthood. It helped 595 clients in its first year, 2275 in its second.

As has been indicated above, the Institute is organized on a professional basis, not on a case work basis; that is, it does not in most cases attempt to follow up clients and persuade them to action if they are unwilling to act for themselves, any more than a physician sends his nurse into a patient's home three times a day to see that the pills he prescribed are duly taken. The Institute's client, in general, is given such information as is appropriate; and if he is not enough interested in his own welfare to coöperate, he will have to seek elsewhere for the help he needs. Since clients come voluntarily because they want help, they are usually in a frame of mind to make use of the assistance given them.

It is easy to see how the same results might be gained in various other ways, with different types of staff, of budget, of affiliation (the Institute has no affiliations, but is wholly independent).

There is naturally a tendency for existing agencies of many different sorts to say, in effect, "This job belongs to us. We are the ones to do it. All we need is more money."

It is highly desirable to encourage as many existing agencies (and individuals) as possible to strengthen their facilities for work along the lines of family conservation. But our experience justifies the belief with which we started, that none of these, alone, is likely to cover the field adequately, and that there is a real place for an institution which will be neither a magnified family welfare organization, nor a glorified mental hygiene clinic, nor a modified home economics class, but a thing apart,—a clearing house and educational center for as much as possible of the existing scientific information that will make for success in marriage and parenthood.

So long as prevention is better than cure, the improvement of education for marriage and parenthood will be the main concern of those interested in this phase of racial welfare. So long as education is inadequate, there will be a need for palliative and remedial work, by individuals or organized agencies. The need will long be so much greater than any possible facilities for meeting it, that there is no occasion to spend much time debating whether it can best be done by this one or that one. Everyone who can possibly contribute toward providing young people with the necessary help to make a success of marriage and family life should be encouraged to do so in every possible way. Meanwhile, the incorporators of the Institute of Family Relations derive a good deal of satisfaction from the very favorable reception which their efforts have met.

HEALTH DECLARATION BEFORE MARRIAGE

JON ALFRED MJØEN

Chairman of the Consultative Eugenics Commission of Norway, Oslo

The first time the new population-politic called race hygiene was officially discussed by politicians in Norway was at a meeting of the Democratic Party 1915. The chairman, the then Prime Minister, was to begin with, not very much inclined to allow eugenics to take up such a broad place at a political congress, but the delegates voted therefore owing especially to the support which Mowinckel, President of the Storting, and Haakon Løken, County Governor for Oslo gave the matter. After the lecture¹ and the very lively discussion that followed the Prime Minister proposed that the lecture and the records of the proceeding should be printed and distributed to all the local organisations in the country. The proposal met with an exceptional support all over the country. The result was that "The Prevention of Racial and National Diseases as a Function of the State" being adopted as an item of the political program. Hereby the question of race-hygiene for the first time came into active politics and the consequences were soon seen.

On the one hand, the representatives elected to the Storting were bound by their party's program to get the question of racial diseases and their causes and prevention taken up for discussion in the fullest extent. On the other hand, the opponents realised that this meant actuality and a real advance for the new doctrine, and the attack on the eugenic movement in general and the Vinderen Laboratory especially before and after this meeting was one of the severest in our Social-political history.

In the meantime a bill for a new alcohol-legislation based on eugenic principles, a proposal for maternity insurance and an amendment to the marriage law was prepared at Vinderen Laboratory and submitted to the Storting.

The amendment to the new marriage law intended to introduce a personal health declaration before marriage (obligatory). This declaration, solemnly affirmed before a medical doctor authorised and paid by the

¹ The lecture was held by Dr. Mjøen, Vinderen Laboratorium who in 1908 had sent out the first Eugenic Program later known as the Norwegian Program f. Race-hygiene adopted in principle at the Eugenics Meeting in Paris, 1913.

State, intended to guarantee that neither of the parties were suffering from a disease or affection that might be injurious to the life and health of the other party or to the possible offspring.

It was pointed out that we in our Society of today and in our state administration are in need of:

1. An institution to search for the sources of social evils.
2. A biological and psychological registration of the whole nation.
3. A training in the higher school which would make the young girls more fit for motherhood.
4. An institution for diffusion of knowledge respecting the renewal, the nourishment and the health of the population.
5. A biological control of immigration.
6. A judicial system founded upon biological principles: we shall not treat the crime but the criminal.
7. An educational system that will form characters and develop mental powers, instead of cramming for examination.
8. A public health system based principally on prophylactic work: prevention not only cure of the great national diseases, especially venereal diseases, free stations for treatment. (Health declaration before marriage, maternity insurance.)

In short, a state administration based upon biological principles.

In support of the amendment to the marriage law it was pointed out by the petitioner, "that there are diseases and tendencies to disease, as well as mental and physical defects, which experience has shown are either congenital or inherited. Children who are subject to defects of this nature, unless they die in infancy, are the source of great trouble to their parents and a burden to the public. If they subsequently marry, the evil will be carried further, often through generations, affecting an everwidening circle of individuals."

The chief object of a health declaration before marriage is to discover whether, in either of the contracting parties, or their families, there are diseases or tendencies to diseases such as alcoholism, tuberculosis, insanity, criminal tendencies (as a result of inherited defective mental development) or venereal diseases. Especially the latter are of greater significance than most other illnesses (plagues).

It was further pointed out in the bill that manual examination would be attended by certain disadvantages which are of such a nature as to render the introduction of an obligatory medical examination before marriage inadvisable. The disease from which society would especially endeavour to protect itself through such legislation, namely, syphilis, frequently cannot

be detected in its latent state, even by the most observant and skilled physician; and it would also seem to be a mistake to introduce the obligatory medical examination of young women at a time when the examination of prostitutes for venereal disease is almost everywhere being allowed to fall into disuse. Obligatory medical examination should therefore not be introduced until bio-chemical methods of research have been so improved, that the presence or absence of such diseases as must be considered in relation to marriage can be ascertained without the necessity of a physical manual examination. In doubtful cases—and there are many such—the medical certificate would, nevertheless, have to be issued; and it would certainly have an effect contrary to its purpose and bring both the law and the physician into discredit. And if obligatory medical examination became statutory and especially in case they were to lead to the prohibition of the union of those considered unfit to marry, they would bring the physician into conflict with his duty of professional secrecy, and easily drive the patient into illegitimate sexual relations.

On the other hand, a *personal* health declaration, made on one's honour before a physician authorised by the state, would have the great advantage of being actually of greater validity than the obligatory certificate on the basis of a medical examination and much less rigorous in form.

False declarations would hardly ever be made, or, at the worst, their number would be exceedingly small. The circumstance that the declaration must be made before a physician would also tend to deter many who might otherwise be tempted to make a false statement in the hope of being able to shift the responsibility to the examining physician himself and his 'medical certificate.'

Among the many advantages that would result from a personal health declaration made before a physician and submitted to parents or guardians for their consideration may be included the awakening of the sense of individual moral responsibility, in fact the awakening of the conscience of the whole nation in regard to marriage and the health of future generations. No one of either sex should marry without first having to ask himself the question, whether or not he is physically fitted for marriage. The result would be that a large number of ineffective individuals, especially such as those whose offspring are now supported by the community, would renounce the idea of founding a family.

And when once the Eugenic Program from 1908 has been brought into operation, we are allowed to expect that the burdens born by the public in the form of poor law rates, prosecutions, prisons, inebriate homes, schools for the feeble-minded, and the like, would be lightened, and there would

be a not inconsiderable improvement in the genetic qualities of the race, bringing with it strength and more national happiness. There would be a direct stimulus to the promotion of good health, and encouragement to keep one's body clean and inviolable; and the authorities would be given an admirable opportunity for watching over the physical welfare of the nation. A legal health-declaration before marriage especially would signify the first step towards a practical system of national hygiene.

The largest Norwegian association of women, "The Norwegian Women's National Council," took up the matter and at their congress in Stavanger, after lectures by Dr. Martha Persen and Dorothea Wiik, unanimously resolved to demand that a declaration of health should be made compulsory by law. The secretary to the association, Cläre Mjøen, maintained that such a declaration ought not merely to state whether one or the other of the parties *is* suffering from any of the diseases mentioned but also whether he or she *has previously* suffered from such disease. Since one of these diseases—gonorrhea—may cause sterility and another—syphilis—is a disease of which the permanent cure is not certain, one of the parties will be deceived if full and complete information is not given. Half the truth might here easily be more disastrous than no information at all.

The dispute about the words "is suffering or has suffered" aroused a violent commotion over the whole land and became the subject of vigorous discussion in the press. Doctors stood against doctors, women against women. It seemed as if the old easy-going system of muddle was once again about to mobilise all its forces, both the experts and the non-experts.

Cläre Mjøen's proposal was later on adopted by the congress of the Norwegian Women's National Council, with a great majority.

During the dispute about the health declaration Ellen Key sent a letter to Cläre Mjøen in which she said: "Not until after many generations of development will it become an instinct for women, an irresistibly imperative instinct, not to make a physically or psychically degenerate or broken down man the father of her children. It may be imagined that morality will subsequently become so developed that further legislation can be avoided, because mankind voluntarily abstain from the worst of all forms of liberty—the liberty to bestow life upon incompetent offspring."

Independent of eugenic initiative a Scandinavian commission on family law was appointed, which amongst other reforms (mostly concerning rights of property) also dealt with the question of health declaration.

In this commission and in the subsequent discussion in the parliaments the biological standpoints were in the first treatment disregarded, whereas by a later treatment (1918) Norway as well as Sweden have adopted a

health declaration in the marriage legislation. These marriage laws now in operation in Norway and Sweden forbid the marriage of any person mentally affected or suffering from syphilis in its contagious stage. Further they authorize the marriage of persons suffering from other kinds of contagious venereal disease, from epilepsy or from leprosy, only if both parties have been informed by a doctor of the danger incurred both as regards themselves and their descendants. These marriage laws might be considered rather rigorous but it must be noted that only a personal certificate is demanded and not examination. Personally I am of the opinion that a pre-nuptial examination is powerless to reveal the existence of syphilis in its latent stage and that it is embarrassing for women to submit to an examination from which, in certain countries, prostitutes are exempt. Not advocating obligatory medical examination, yet desiring to safeguard married people and their children we demand the registration by a doctor of the declaration made by the contracting parties as to their state of health. Given under oath, these declarations have the effect of awakening the conscience as to sex responsibilities. Moreover, such declarations may in special cases, afford definite data for the institution of legal proceedings against persons who are knowingly guilty of spreading infection. Another important fact must be noted: Scandinavian legislation frees the doctor from professional secrecy in cases specified by the law.

Both before and after the bill had passed the Parliaments in Sweden and Norway and entered legislation, it was commented upon by biologists and medical authorities from all parts of the world.

Commentaries to the Norwegian Health Declaration Before Marriage

LEONARD DARWIN: Voluntary health declarations before marriage by the parties concerned would be of some value, whilst great benefits might accrue from a registration system which enabled serious ancestral defects to be readily ascertained.

G. DELAPOUGE: Le certificat d'absence de tares contagieuses ou héréditaires pour le mariage met paraît indispensable, sous la garantie de la responsabilité du médecin qui le délivre, de manière à éviter tout complaisance de sa part.

E. APERT: Le certificat de bonne santé doit être exigé en vue du mariage.

ANNA VAN HERWERDEN: Allgemeine Personenregistrierung und die Resultate der Familienforschungen, wie sie in jedem Kulturstaat unternommen werden müssen, können in der Zukunft durch ärztliches Urteil und ärztlichen Rat in Heiratsgelegenheiten erleichtert werden und eventuelle gesetzliche Massregeln bestimmen helfen.

IRVING FISHER: Laws relating to marriage and divorce, for instance, infertility on either side, or any other seriously dysgenic inheritable defect, should be made honourable ground for divorce.

OTTO KROHNE: Schon vor einigen Jahren ist ein Reichsgesetz ergangen, wonach die Standesbeamten verpflichtet sind, vor jeder Eheschliessung dem betreffenden Paar ein sogenanntes Aufgebotsmerkblatt auszuhändigen, in dem auf die Beachtung der Grundsätze der Vererbung und der wichtigsten Gesichtspunkte für Erzielung einer gesunden Nachkommenschaft hingewiesen wird.

LUCIEN MARCH: La déclaration sanitaire avant le mariage est une mesure de loyauté qui n'offre que des avantages si elle s'allie à des examens médicaux surs et prudents, et si elle ne se joint pas à une crainte excessive des maladies.

G. SCHREIBER: Eine Gesundheitsbescheinigung vor Eingehen der Ehe wäre wünschenswert; die Ärzte könnten beim Ausstellen solcher Bescheinigung gleichzeitig aufklärend wirken.

CHARLES B. DAVENPORT: I think a health declaration is less important than a physical examination before marriage; still more important is some mutual knowledge of family history on the part of those who are proposing to marry.

L. ASCHOFF: Bei der Ausstellung von Gesundheitsscheinen muss sorgfältig zwischen vererbaren und nicht vererbaren Schäden unterschieden werden unter letzteren wieder zwischen übertragbaren und ansteckenden Schäden (Gonorrhoe, Syphilis) und nicht oder nur schwer übertragbaren Schäden (wie z.B. alte Tuberkulose). Bei dem Endurteil sind die geistigen Faktoren neben den körperlichen nicht zu vernachlässigen.

S. J. HOLMES: Mental defectives should be segregated or sterilised unless they may be otherwise kept so that they are in no danger of reproducing their kind. In many cases they should be encouraged to marry after they had become sterilised.

CORRADO GINI: Dans les mesures d'Eugénie générale rentrent l'éducation eugénique, les informations sur les caractères des époux et de leurs ascendants (certificat de mariage, visite prématrimoniale, connaissance des arbres généalogiques) ainsi que les règles à suivre concernant l'endogamie, les croisements entre les races fort différentes, l'âge du mariage, l'intervalle entre les accouchements successifs, la lutte contre l'alcoolisme et la syphilis, contre les poisons industriels et contre certaines maladies et malformations héréditaires.

H. VIRCHOW: Eine ärztliche Bescheinigung über Freisein von Geschlechtskrankheiten musste jeder Mann, der sich zu verheiraten wünscht, beibringen. Diese Bescheinigung musste der Behörde (Standesamt) oder dem Vater oder dem Vormund oder sonstigen Vertreter der Frau (des Mädchens) auf Verlangen eingereicht werden, auch schon, wenn es gewünscht wird, bei der Verlobung. Diese Bestimmung hat ihre Ergänzung dadurch zu finden dass Ärzte, deren Bescheinigung sich als unzuverlässig, erweisen, bestraft werden.

L. VERVAECK: Le certificat médical devrait toujours être réclamé avant le mariage.

D. ZINSSER: Gesundheitsatteste vor der Verheiratung zu verlangen, halte ich für wertvoll. Ich bin aber nicht der Ansicht dass sie gesetzlich vorgeschrieben werden sollen, sondern dass man die Menschen allmählich dazu erziehen sollte, von sich aus der Frage der Gesundheit des zukünftigen Gatten mehr Aufmerksamkeit zu widmen.

G. H. KNIBBS: Health Declaration. A formal declaration of health should be obtained before marriage is permitted.

FRITZ LENZ: (Aus dem deutschen Program f. Rassenhygiene (1922). "Pflichtmässige Untersuchungen aller Ehebewerber ohne Eheverbot sind schon jetzt durchführbar, auf ihre gesetzliche Einführung ist sofort hinzuwirken."

In support of the program from Vinderen Laboratorium the Norwegian philosopher Herman Harris Aall finished his article with the words: "The sexual relations have hitherto been judged chiefly from the standpoint of the love felt by two persons for each other,—they must be raised to a higher level and be judged with a view to the coming generations. We must learn that the responsibility for giving life to a human being may weigh just as heavy as the responsibility for causing the death of a human being."

In Germany, a ministerial decree of February 19, 1926 advocates the establishment of pre-nuptial consultative centres and such institutions are already active at Dresden, Berlin, and Magdeburg. The Medical Society of Berlin pronounced itself on March 24, 1926, in favour of making a pre-nuptial medical examination obligatory for both sexes, with free choice of doctor but it considered that professional secrecy should be strictly observed, and that the final decision should rest with the contracting parties.

In France, a pre-nuptial medical examination, advocated for the past twenty-five years by the "Société française de prophylaxie sanitaire et moral," is also strongly recommended by the Société Française d'Eugénique.

In Austria, a pre-nuptial consultative institution has been in existence in Vienna since 1922, and similar centres are to be found in Belgium (Antwerp and Brussels) and in Italy (Milan).

In the Netherlands, a society has been formed to further the cause of pre-nuptial medical examinations. Dr. Rene Sand, Secretary General of the League of Red Cross Societies and President of the Société d'Eugénique has furnished some data on marriage legislation also in U. S. A., from which it appears that after a pre-nuptial medical certificate was made obligatory in 1919, the law was revoked by the state of Washington, but was adopted with amendments by seven other States, in the majority of which the law only applies to men, the certificate merely stating that there is no sign of venereal disease. In North Carolina the examining doctor must make a declaration to the effect that the contracting party is not suffering from any contagious tuberculous disease and that he cannot be classed as an idiot, an imbecile or a lunatic. In North Dakota the declaration must further state that the subject is neither an epileptic nor a confirmed inebriate. In these two States women must also present certificates but in their case the

declaration need only state that they do not suffer from any contagious tuberculous disease or mental weakness.

Georges Schreiber adds that according to his opinion the Scandinavian system seems to provide the most efficacious, the most equitable and the simplest safeguard. Were it to be adopted in France, certain modifications would have to be made, contagious tuberculosis, for instance, would have to be included among the diseases capable of delaying the marriage ceremony.

THE NORWEGIAN PROGRAM FOR RACEHYGIENE

[Abbreviated form]

The program reprinted below—was presented to the public in a paper read 1908 before the Medical Association—*Medicinerforeningen*—Oslo. (The present Medical Secretary of the Norwegian Medical Association Dr. Jørgen Berner in the chair.) It was adopted in principle at the Eugenics Meeting, Paris 1913 (Leonard Darwin in the chair), and shortly afterwards adopted at a political meeting in Oslo. (The Prime Minister of Norway in the chair.) At the Norwegian meeting the Program was passed in the following form: "Prevention of Race- and National-diseases as a Function of the State." Some of the reform bills have already entered legislation, others are in preparation.

Negative Racehygiene

(Reducing the number of inferior race elements)

* Segregation of Criminals in working colonies.

* Sterilisation of Inferior Race elements. (Not compulsory.)

Positive Racehygiene

(Increasing the number of valuable racial elements)

* Selective Inner Colonization. Preventing Evacuation of the Country. Agricultural Organization independent of City centers. Progressive Wage System and regressive tax-system for family-supporters.

* Maternity Insurance and other positive measures.

Human Biology in school and university. Reform of the present masculine education of women. Young girls more fit for motherhood.

* Clearing House for concentration and diffusion of knowledge respecting the renewal, the nourishment, the health and the movement of population. Centre for Eugenic Science—national and international—with a Consultative Committee which should be heard in all questions concerning population problems.

* A book on Racehygiene has been published from the Laboratory explaining the above program in details. The book and the author was severely attacked by medical men in and outside the University, Oslo. (See "Den Nordiske Race," 1927.) But thanks to the support of the three succeeding ministers for social affairs, Lars Abrahamsen, Johan Castberg, Friis Petersen, several of the reform-bills suggested in the program have already become law in Norway or are in preparation by official initiation (marked*).

Prophylactic Racehygiene

(Protection of the unborn child)

- * Combating racial poisons: pathological poisons especially syphilis, narcotic poisons, especially alcohol. More positive, less negative alcohol systems: Classification and Taxing etc. According to Strength.
- * Prevention of Racial and National Diseases as a function of the state.
- * Health Declaration before Marriage.
Crossing with "distant" (inferior) races should be disadvised or prevented.
- * Biological Registration of the whole nation, with records giving data of valuable transmissible qualities. (Such data should be published from time to time and should partly replace the present degrees and honors. * Identity book * "Kjennbok.")
- * Biological Control with Immigration and Deporting Office.

What is wanted in our state administration?

- A new System of Law: "We shall not treat the crime but the criminal."
- A new System of Health: Fifty per cent "preventive" instead of as now one per cent "preventive" and ninety-nine per cent "curative."
- A new System for Education: Mental culture (character) and body culture. "Lifetest" instead of examination test.
- A new System for Poor Relief: "Help to Self help" (working colonies).

REPORT OF THE COMMITTEE FOR THE STUDY OF THE EUGENIC AND DYSGENIC EFFECTS OF WAR

CORRADO GINI

Rome, Italy

A general detailed report on the previous work of the committee was presented at the meeting held by the Federation at Farnham, in September, 1930. It appeared later in the "Report of the Ninth Conference of the International Federation of Eugenic Organizations, Farnham, Dorset," pages 64 to 69. This report set forth the situation as of the summer of 1930. On January 19, 1931 I notified each of the committee members of the president's (Dr. Davenport's) request that at the Third Congress of Eugenics to be held at New York in August, 1932, I open, with a report, a discussion on the eugenic and dysgenic effects of war. On that occasion I also asked each one of them to forward to me, within the month of February, a statement as to the state of his researches on the subject. Some members reported, but only Dr. Szel, representing the commission for Hungary, added new contributions to the subject. He sent me, in fact, a 32 page report which I submit as an annex to mine. Three of our committee members, however, Dr. Burgdörfer (Germany), Dr. Briand (France), and Prof. Hersch (Switzerland), sent in papers which had previously been presented at the International Congress of Population held in Rome in September 1931. The respective titles of these papers are: "Eugenik und Krieg;" "Le Coefficient de masculinité en France pendant et après la guerre, 1914-1918," and "Des Principaux Effets Démographiques des Guerres Modernes."

As a matter of fact, the subject of the effects of war on the race had been placed on the program of that Congress and, besides being treated by the three papers submitted by our above-mentioned colleagues, was treated also by two other memoirs, one by Prof. Eugene Würzburger of Leipzig, entitled "L'influence de la Guerre Mondiale sur le Mouvement de la Population," and the other by Dr. Edouard Rosset, director of the Statistical Bureau of the City of Lodz, concerning "Les Maladies Vénériennes et la Guerre."

It is also to be remembered that at the Tokio session (1930) of the International Institute of Statistics Messrs. Sakamoto and Koren Ko presented a short paper entitled "Etudes statistiques sur les effets eugéniques de la guerre" explaining the results of some researches concerning Japan which

Count Yanagisawa, a member of our Committee had had them undertake at my request.

Meanwhile Prof. Hunt has published in the series of monographs of the Eugenics Research Association an extended memoir entitled "Some Biological Aspects of War" and Dr. L'Eltore's "Contributi allo studio degli effetti selettivi sulle persone dal punto di vista dell'eugenica," dealing with the selective influence exerted by war among the students of the Universities and other institutions of higher learning of Rome, Genoa, and Pisa, has appeared in the review "Genesis," official organ of the Italian Federation of Eugenics. At the Italian Ministry of War a special bureau has been charged with the compilation of statistical results concerning the characteristics of service-men who died in the war many of which characteristics may be of interest from a eugenic standpoint. At the present time, the work has been completed as regards the regions of Abbruzzi, Basilicata, Campania, Emilia, Latium, Liguria, and, partly, Lombardy.

President Davenport's efforts to secure a more substantial financial backing for the work of the Committee having been unsuccessful, the committee can only count upon the \$1000 offered by Prof. Irving Fisher, of which \$50 has already been expended for the preparation of a bibliography. The whole amount, of course, is quite insufficient to cover even a portion of the expenses entailed by the necessary researches. Consequently, it has been set aside to pay for the cost of printing, and the committee members have been asked to do their work gratuitously. Under these conditions, some of our colleagues have declared themselves unable to conduct their researches, while others, apparently owing to the same reason, have been obliged to discontinue theirs. Furthermore, it is known that in several countries the researches undertaken by the ministries of war have been discontinued, while in other countries they have been suspended, or at least postponed on account of the present economic crisis. The ever decreasing number of replies which I have received from members of the Committee shows clearly that it is not profitable to prolong further the period of preparation, and that the Committee ought to conclude its work on the basis of the data gathered and already at its disposal. Inspired with this aim, it is my intention to ask the members of the Committee to be so good as to submit at a given time (for example, July, 1935), all the material they have gathered and can further gather on the subject, in order that we may proceed to submit a final report. To this report, a bibliography should be appended, which should bring up to date and complete the one already prepared.

Meanwhile, I have the honor of giving a résumé of the results contained in the memoirs submitted either directly to the Committee (by Dr. Szel), to

the International Congress of Population (by Messrs. Briand, Burgdörfer, Hersch, Rosset, and Würzburger) and to the Tokio session of the International Institute of Statistics, as well as in works published by Prof. Hunt and Col. Love, in America, and by me, my pupils, or colleagues (Messrs. Boldrini, Crosara, D'Addario, L'Eltore, Livì, Savorgnan and Pieraccini), in Italy.¹

GENERAL CONSIDERATION ON THE PROGRAMME AND POSSIBLE RESULTS OF RESEARCHES ON THE EUGENIC AND DYSGENIC EFFECTS OF WAR

Before proceeding with the résumé of the results so far obtained in their researches by the members of the committee for the study of the eugenic or dysgenic effects of the war, or by other scholars who studied the matter at my request, I deem it opportune to dwell upon some considerations aiming to give a just valuation of the importance that such results may assume for science and practical life.

First of all we must take into account the fact that the eugenic or dysgenic aspect of war, although important, will always constitute a secondary point of view in the determination of wars. Whatever the effects of war on the race may be, be they favorable or unfavorable, it is little likely that a consideration of them will ever dissuade from war those nations that incline toward it, or, vice versa, induce others to war that are not war-minded. As a matter of fact, the consideration of prestige and economic advantages and, above all, the emotions and the sentiments represent factors which are preponderant, if not altogether irresistible, in determining a war.

Another fundamental point is that it is not proper to speak of the eugenic or dysgenic effects of "war" on "the race" but rather of "a war" on "a

¹ Cfr. C. GINI: Sulla mortalità infantile durante la guerra—"Atti della Società Italiana di ostetricia e ginecologia," Vol. XIX, 1919 (also in: Problemi Sociologici della guerra—Bologna, Zanichelli, 1921); C. GINI: La coscrizione militare dal punto di vista eugenico—"Metron," Vol. I, n. 1, 1920; F. SAVORGNAN: La natimortalità negli anni di guerra—"Metron," vol. I, n. 2, 1920; C. GINI: La guerra dal punto di vista dell'Eugenica—"Metron," vol. I, n. 4, 1921; M. BOLDRINI and A. CROSARA: Sull'azione selettiva della guerra tra gli studenti universitari italiani—"Metron," vol. II, n. 3, 1923; C. GINI and L. LIVI: Alcuni aspetti delle perdite dell'esercito italiano in base a dati degli Uffici Notizie—"Metron," vol. IV, n. 2, 1924; C. GINI: I morti dell'esercito italiano dal 24 maggio 1915 al 31 dicembre 1918—Provveditorato Generale dello Stato, Roma, 1926; R. D'ADDARIO: L'azione selettiva della guerra in un gruppo di studenti universitari italiani—"Archivio Scientifico del R. Istituto Superiore di Scienze Economiche e Commerciali di Bari," 1926-27 and 1927-28; H. R. HUNT: Some biological aspects of war—Eugenics Research Association," Monograph Series, New York, 1930; G. P. L'ELTORE: Contributo allo studio degli effetti selettivi della guerra dal punto di vista dell'eugenica—"Genesis," n.1-2, 1932.

race," or better still, on "a population." Indeed, a consideration of the results so far obtained shows that the effects of the various wars have been essentially different. This is true not only of the direct effects but likewise of the indirect; and not only of the actual war but also of its preparation, which entails the organization of armies in time of peace.

According to whether the system of recruiting be general or special, and, in the latter case, according as to whether it be voluntary or compulsory, and still further, according to the classes of the population which supply the men, according to the more or less severe criteria of selection, according to the longer or shorter period of service,—the results may be radically different. They may also differ according to the diffusion of diseases, and particularly of the venereal diseases, varies in the military and civil populations, and according to the remedies applied in both to check the diseases. They may be different according to the greater or lesser prestige the soldier enjoys with the population and according to the preference which women accord to those who have served in the army.

As regards the war proper, the data we have at our disposal show that the relative proportions of the soldiers who died of wounds and those who died of illness, the mortality among officers and soldiers, the losses suffered by the various social classes may vary greatly from war to war, and, for the same war, from belligerent nation to belligerent nation, according to the nature of the war, to its duration, and to the particular circumstances arising during its development; finally, they vary according to the system of recruiting, to the evolution of the means of offense and defense, and to the progress of sanitation. The mortality suffered by the fighting military population, by the territorial force, and by the civil population may also vary greatly from war to war.

Identical war losses, furthermore, may have different results for populations which are in different stages of demographic evolution. Easily replaceable and, in the last analysis, insignificant for a nation demographically exuberant, these losses may stop forever the progress of another nation which has passed beyond the time most favorable for its growth, and they may also determine its ultimate ruin if it is already in a condition of unstable equilibrium.

Aside from these considerations of a general nature, there are special circumstances which may cause certain war effects to assume a particular aspect for some nations. Generally, war determines a scarcity of adult men. In countries having a strong emigration it may however have the opposite effect, by stopping the emigratory currents and causing the repatriation of the men abroad. The diminution of males of the most productive age deter-

mines usually the scarcity of labor supply, but if the diminution of births has been very pronounced and prolonged, it may happen that the diminution of the unproductive population may compensate or even more than compensate for such scarcity. It is well known that outstanding economists have maintained that one of the factors of the present crisis caused by overproduction is due to the post-war diminution of the unproductive portion of the population. The lack of sexual equilibrium in the adults determined by the war may, on the other hand, have the opposite effects in a population in which the males abound and in one in which they are normally scarce.

The influences of war on the populations are so varied and multiple and are often exerted so indirectly that, in order to give a comprehensive valuation, it is first necessary to have a synthetic idea of them, an idea which can be formed only by means of statistical data. On the other hand, we must avoid the illusion of having thoroughly exhausted the subject by means of these data, since statistics enables us to measure only some particularly salient and generally immediate manifestations of such influences, while it is harder for us to point out the less immediate or altogether remote consequences. Therefore, after having finished the quantitative researches offered by statistical data, it behooves us to verify the conclusions suggested by them in the light of history, asking ourselves whether the differences found between the peoples that have waged many wars and those that have waged none are really such as our conclusions would have led us to expect, and if not, how the divergence can be accounted for.

Furthermore, it is obvious that the eugenic and dysgenic effects of war must be considered not only from the intranational point of view but also from the international point of view, the direct or inverse selection which war determines within the elements of a population being susceptible of being strengthened or, vice versa, corrected, or even outdone by a selection which works along the same or opposite lines among the various nations.

In comparison with such a vast program, the results so far obtained represent very little, I should say almost nothing. This fact should be a strong urging to all scientists to make further researches.

I shall tell of my findings following the order of topics as shown by the program distributed to the members of the committee for the study of the eugenic and dysgenic effects of war.

THE EFFECTS OF THE MILITARY ORGANIZATION IN TIME OF PEACE

Until now direct researches have been carried on only in Italy, where for a certain period of time it has been possible to examine the percentage of married men, and the number of their children, among the conscripts de-

clared fit to serve, distinguishing two classes: those who actually served, and those who were exempted. It has been found that those who serve their time in the army marry later than those who, although fit, are wholly or partly exempted. The former, however, marry more frequently, as if to have served in the army constituted grounds for preference in the matrimonial selection. Up to a certain age, which, according to the results of the various researches, varies from twenty-five to forty years, the average number of living children is, for those who have served, inferior to that of the children of the exempted conscripts, which may be accounted for by the shorter duration of the formers' marriages. Once past forty years of age, instead, if not before, those who have served in the army have an average number of living children superior to that of those fit for service but exempted. Although they married later, those who served seem to have more prolific marriages, as if the preference they enjoy in the matrimonial selection permitted them to marry younger women, or, regardless of age, healthier and sturdier, and, consequently, more prolific ones. As concerns Italy, therefore, the conclusion seems warranted that military service favors, or at least does not interfere with, the reproductiveness of those who undergo it as compared with those equally fit for service who are totally or partly exempted from it.

For Germany, Dr. Burgdörfer, while unable for lack of data to make analogous researches, has given figures and considerations which confirm such results.

He, on the other hand, calls attention to some indirect influences of the system of general conscription: first, the diffusion of city culture and customs among country people and the stimulus on the latter to move into the city, a fact which may cause, together with some advantages, many disadvantages from a eugenic standpoint; secondly, an advantage for those who serve, both from the point of view of health and that of social and cultural education, an advantage, concerning which it is impossible, however, to say whether and to what extent it has any hereditary character. With reference particularly to the effects of military conscription on the diffusion of venereal diseases, I have already had occasion to point out, as regards Italy, that, granted the existence of an unfavorable influence, it does not prove to be such as to diminish the average reproductivity of those who have served in the army as compared with those who, though fit to serve, did not do so. This and the other indirect influences of the military organization in peace time, it is difficult to estimate statistically. We may, however, examine whether the populations which have adopted the system of general conscription show, as compared with those that follow the system of voluntary con-

scription or with those that have no conscription of any kind, systematic differences in the diffusion of venereal diseases, in the intensity of urbanism, in the decrease of the death-rate, in the spirit of discipline, in the physical development of their members, and so forth, We are fully aware, however, that researches of this kind can only reveal to us whether military service has such an influence as would stand out against the action of the other factors, but they cannot discount the possibility that an influence may exist even though it remains concealed.

Szel's paper contains data on the diffusion of venereal diseases among the soldiers of several armies before the war; as regards the civilians of the various social classes, some figures are given by Rosset. But neither of these data, although interesting, can offer us the solution of the problem in question. The great reduction in the diffusion of venereal diseases from 1885 to 1910 which seems to be indicated by Szel's data is, however, worthy of notice. This reduction shows that, from this point of view, the effects of the military organization itself, may vary greatly according to the times.

WAR SELECTION ACCORDING TO THE EUGENIC QUALITIES OF THE INDIVIDUALS

We must first of all define the concept of a superior individual from the view-point of eugenics and later examine whether and how we may conclude that war exerts on the superior individuals thus defined a favorable or unfavorable selection. Strictly speaking we are justified in comparing only individuals belonging to the same social class and we may practically admit that in each class these types are eugenic which society appreciates most.

Researches made by Gini in Italy among elementary school teachers showed that those who had the best careers had been eliminated in the war neither more nor less than their less successful colleagues. Other researches made by Boldrini, Crosara, D'Addario, and L'Eltore showed, as regards the students of the universities or other institutions of higher learning of Bari, Cagliari, Genoa, Padua, Pisa, and Rome, that those who died in the war were neither superior nor inferior to the survivors. On the other hand, the survivors did not show any systematic differences according to whether they did or did not serve in the army. This leads us to believe that if the war had continued and the number of survivors among the students drafted had been smaller, the results would not have been different.

As concerns America, Hunt's researches regarding Harvard students during the last war, do not show any systematic differences with respect to the death-rate of the various classes of students: those, however, who were graduated without distinction show, on the whole, a higher death rate than those who were graduated with distinction and those who held higher aca-

demic degrees. In the Civil War, the students of the University of Mississippi who died in the war had made a better scholastic record than those who survived, whereas among Harvard students the death-rate was lower among the ten highest-standard graduates.

Among the supplementary researches on this question included in the Committee's program, those concerned with the death-rate of each of the social classes are most important, although we cannot be blind to the difficulty of estimating the comparative eugenic value of the various social classes, independently of the effects caused by the differences of wealth, environment, education, and of the stage of evolution of the plasm. Hunt's researches show that the percentage of dead among Harvard students was greater than that of the general population during the Great War, but smaller during the Civil War. Szel, for Hungary, states that the losses were greater for the country people than for the city dwellers, and greater for the workers, peasants, and miners than for the white-collar men.

Another particularly important supplementary investigation is that concerning the comparative death-rate of soldiers and officers. Also on this point the results are conflicting. For America, Hunt shows that the soldiers' death-rate is greater than that of the officers; Burgdörfer finds the opposite to be the case for Germany, and it is very likely that it is also the case for the majority of the European belligerents. It is probable that this difference is connected with the different percentage which those who died of disease and those who died of wounds represent in the losses of the American and European armies.

The physical and psychic characters of the dead service-men, as compared with those of the survivors, may also differ systematically, according to the importance which those who died of illness and those who died of wounds assume among the losses. Granted that those who died of wounds are representative of the totality of the combatants, it should follow, according to the data gathered by Boldrini for Italy, that the constitution of those who died of disease was of a more slender character which in youth is generally associated with less endurance.

Hunt gives us data concerning the percentage of those not accepted for military service, and their constitutional and psychic characters. These data, although surely not devoid of significance, should be supplemented by those relative to the men fit for, but exempted from, service and to the soldiers assigned to stationary or territorial service, in order to be able to judge of the youths drafted who were not exposed to the direct dangers of the war. Such data, nevertheless, could not estimate exactly the selection

effected by the death caused by war factors unless they be placed in relation with the data on the characters of the dead soldiers as compared with those of the survivors.

Furthermore, in order to judge the selective effects of mortality during the war period on the hereditary qualities of the population, it is indispensable also to take into account the death-rate of the civil population. Hersch has calculated that, in the whole world, during the Great War, the surplus losses of the civil population were more than double the amount of losses suffered by the military population. In fact, the number of deaths among service men was 13,000,000, whereas the surplus of civilian deaths amounted to 29,000,000. The importance of the two categories of losses varies greatly from country to country. In Europe the two categories balance, each having 12,500,000 dead. In France, England, and Germany the military losses were higher than those of the civilians; in other countries the converse was true.

As regards physical endurance, I think it may be stated that the selection effected among the soldiers during the war period has an unfavorable effect from the eugenic point of view in as much as it is determined by the rejection of the unfit at the time of the enlistment; an unfavorable effect also, in comparison with the general population, in as much as it is determined by the mortality due to wounds. On the other hand, it has a favorable effect in comparison with the surviving soldiers in as much as it is determined among the soldiers by the mortality due to sickness, but it is uncertain whether it has a favorable or unfavorable effect in comparison with the general population; finally, it has a favorable effect in as much as it is determined by the excess of mortality within the civil population.

We must keep in mind, with regard to what is said above, that the contribution to the war losses made by the wounded and the sick, by the combatants, the men assigned to territorial service, and the civilians, by the soldiers and the officers, and, among the latter, by those belonging to the various ranks, not only may vary greatly from one belligerent to another in the same war, as was the case in the World War, but do actually vary greatly from war to war. In the last war the European armies suffered a percentage of deaths due to wounds of the total losses much higher than in past wars. Data on this subject were gathered for America by Col. Love with regard to the last war. Data for Italy and other countries both for the last and previous wars may be found in papers published by Prof. Gini and by Profs. Gini and Livi.



ANALYTICAL RESEARCHES ON WAR LOSSES AND DISABILITIES

Concerning the analytical researches on war losses and disabilities, data have been published by some members of the committee: Dr. Hunt and Col. Love for the United States; Dr. Burgdörfer for Germany; Dr. Szel for Hungary, and Profs. Gini and Livi for Italy. The paper published by Profs. Gini and Livi deals with very detailed data procured from the bureaus charged with furnishing the soldiers' families with news. These data deal with the losses caused by wounds and diseases as well as with the disabilities and their outcome according to the number of previous wounds and diseases. In Italy, other figures, from unofficial sources, were published by Prof. Boldrini concerning the constitutional characteristics of those who died of wounds or of illness. The data for other countries have been obtained from official sources. I think the time has now come when we can no longer rely on personal researches. The data for other countries, as well as the more detailed ones for the countries above mentioned must come from official publications. Minute researches are now being carried on in Germany under the supervision of Gen. Jungblut, one of the members of the committee. In Italy the Ministry of War is making an inventory of the war losses, which has already covered seven of the sixteen pre-war regions, while the work on the eighth region is well under way. It is probable that similar undertakings are being carried out by other countries. The most practical thing to do with respect to this feature would be, I think, to have the committee address itself through its chairman to the various governments and ask for official figures.

BIRTHS DURING AND AFTER THE WAR

As regards the birth-rate during the war period and the various factors of its decrease (particularly marriages), multiple data and considerations may be found in the papers prepared by several members of the committee: Burgdörfer for Germany, Szel for Hungary, Yanagisawa for Japan, Briand for France, Gini for Italy, Hersch for sundry countries.

Some authors pay special attention to the sex-ratio in births. Dr. Szel treats of the effects of the decrease of consanguineous marriages. Several examine the variations of the composition of the population according to sex, age, and civil state, studying also their effects from several points of view. Prof. Hersch has thoroughly examined such questions.

Of course, the direct effects of the war on the birth-rate, owing to the interval between conception and delivery, manifest themselves even after the cessation of hostilities. That is truer still of the indirect effects of the

war through the modification of the population's composition by sex, age, and civil state; through the diffusion of venereal diseases, etc.

The matter of the birth-rate during the war must therefore be studied together with that of the birth-rate of the post-war period.

The question of the diffusion of venereal diseases in connection with the war was given special attention by Dr. Szel and Dr. Rosset.

Prof. Würzburger, Dr. Burgdörfer, and Prof. Hersch examined closely what part of the decrease found in the birth-rate of the post-war period as compared with the period before the war, may be considered an indirect and transitory effect of the war.

All these researches, although partial, tend to prove that war does have a decisive effect on the birth-rate, and to show that the influence it exerts on the race may be effected through this means in no less a degree than through the death-rate. Therefore, we shall never be able to judge, even approximately, the eugenic or dysgenic effects of the war, until such time as we shall have examined what, if any, selective character the birth-rate decrease of war-time and its increase of the post-war period, have. So far as I know, up to the present time but a few researches have been made on this matter. In Italy they have been carried on by Profs. Gini, Savorgnan, and Pieraccini. These researches lead one to believe that, side by side with the unfavorable selective factors represented by the removal from their families of the more robust individuals enlisted in the army, there are compensatory factors which leave us doubtful as to the ultimate result of the selection effected by war through the reduction of the birth-rate. Definitive researches may be made by studying the characters of the individuals born during the war, first in the schools and later, as concerns the males, when they reach the age for military service, and are subjected to medical examinations.

THE DEATH-RATE AFTER THE WAR

The endurance of the children born during the war is manifested particularly through their death-rate, so that also from this view-point the study of the post-war death-rate assumes a special importance, in as much as it represents both an aftermath of the war itself (mortality of the disabled, deaths due to venereal diseases), and a reaction to its conditions. Systematic researches on this point, so far as I know, have not as yet been made.

In examining the course of post-war phenomena, and in comparing it with that of the pre-war period, we must obviously be careful not to apply the *post hoc, ergo propter hoc* criterion. Often the variations which followed in the post-war period are but the manifestation of tendencies already in ac-

tion before the war, which would have been felt even if the war had not occurred: more often, still, war has exerted an influence,⁵ but only to accelerate or intensify the manifestation of such tendencies.

SOCIAL ACTIONS AND REACTIONS OF THE WAR

For the purpose of judging the effects of wars on the racial characters of the populations, we must take into consideration the reactions which war can cause in the military, sanitary, social organizations, etc. For instance, it is beyond doubt that war determines momentarily a greater diffusion of venereal diseases, but if such diffusion permanently causes a better organization for the prevention and cure of such diseases, it may well be that the result ensuing therefore is, from a eugenic view-point, ultimately useful and not harmful.

It behooves us also not to lose sight of the remote effects of war on the political organization, on the moral sentiments, on the sense of discipline, and on the national and international spirit. While such factors can surely exert a decisive influence on the hereditary qualities of the populations in various ways, and particularly by means of the direction they give to social selection, these can hardly be documented with numerical data, and the treatment of them still falls within the field of study of the historian and sociologist rather than within that of the statistician.

SELECTIVE EFFECTS ON POPULATIONS

A point of vital importance for the judgment to be passed concerning the effects of wars from the view-point of eugenics is, as I have already said, that of their influences on the selection, not of the individuals within a given population, but of the several populations toward each other. This is a most difficult and delicate matter. It presupposes, above all, a definition of what a superior population is from the standpoint of eugenics. It presupposes, furthermore, the possibility of determining how selection among the different populations would work in the absence of war and of war menaces, which evidently can be done only hypothetically, since humanity, so far as we know, has never been in such a condition. In any case, this is another of the points which at the present state of our knowledge, escape, at least for the most part, the possibility of quantitative measurement.

CONCLUSIONS

In conclusion, the problem of the eugenic or dysgenic effects of war on the race is so vast that we can only hope to study, scientifically and with probability of success, but a few particular points or aspects. These will,

nonetheless, give ample material for researches for many years to come; indeed, it is probable that the matter may never be exhausted. The Committee over which I have the honor of presiding, although disposing of very limited means, has already made some contributions to the subject and has now come to a point in its work where, unless it be endowed with greater means for carrying out a more ample program, it may consider, as I said before, the expediency of embodying in a general report the results already achieved and, with said report, to consider itself acquitted of its task.

IS WAR DYSGENIC?

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The great World War has come and gone, but its consequences in the form of economic and political chaos are with us still. About 10,000,000 men gave their lives and over 20,000,000 others were injured during the conflict. The net money cost of the war to all the belligerents was something over \$186,000,000,000. This figure does not cover the value of destroyed property, the money value of dead soldiers and civilians, losses in production, losses to neutrals, and expenditures for war relief work. Certainly, war is a social and biological problem of the first magnitude. It must be intelligently controlled if civilization is not to suffer severely.

The war problem, however, has not been faced realistically. We in the United States particularly are under the influence of two extreme groups of sentimentalists, the flag-waving militarists on the one hand and the idealistic pacifists on the other. Political and economic realism has been given scant attention among us. Wherever there are human relations one of two conditions obtains: there is either government or anarchy. Life, property, and institutions are secure only when law and its agencies have replaced anarchy. If we are to reduce the chance of holocausts like the World War, we must unite in enterprises such as the League of Nations, the World Court, the Kellogg pact, etc., so that all groups may be given the opportunity to bring their disputes to court for settlement, so that all conceivable means for adjusting controversies peacefully may be developed, but we must at the same time provide facilities for forcibly bringing a lawless group to the judicial bench if it truculently persists in an effort to settle its grievance on the battlefield.

War, like bubonic plague and smallpox, is a social disease. We have learned to control many of the great epidemic diseases because we now understand them. Similarly, the road to the reduction of warfare will be cleared by a study of its causes and consequences. The impact of the World War experience turned my attention to this problem in 1922, and for seven years I collected and analyzed data bearing upon the question, publishing the results as a monograph of the Eugenics Research Association in 1930 under the title "Some Biological Aspects of War." The reader is referred to

this publication for the detailed discussion of the investigation. A short paper like the present one cannot possibly include a full account of the statistical difficulties and analyses incident to the work.

War is essentially a problem in human ecology. Just as the plants and animals in an aquarium, pond, or forest constitute a balanced system, so human society is a complicated organism. War affects not only the armies engaged, but also the civil populations of the belligerent nations and even of remote neutral countries. One should constantly keep in mind the fact that different wars may have different biological effects and that the same war might conceivably be beneficial to certain of the nations participating and harmful to others. Conclusions drawn from my investigations, therefore, do not necessarily apply to the effects of wars other than the World War, nor to the consequences of the World War in countries other than the United States of America.

The problem is complex. What happens during the peace-time period of preparation for warfare? Physically and mentally normal young men are sometimes conscripted and segregated in military barracks so that their reproduction is delayed. To what extent do men rejected for military service possess undesirable traits which they transmit to posterity? What are the genetic consequences of venereal infection? When war comes, what types of men are sent to the battlefields and what types are rejected for enlistment because of the possession of physical or mental defects? What about the age distributions of military mortality? What effect does the war have upon the birth and death rates in civilian populations? Finally, there are the aftermaths of war. Does the population of a belligerent country recover both qualitatively and quantitatively from the ill effects of the conflict? It is obvious that a thorough-going appraisal of all the biological effects of any one war would be a colossal task, so we have restricted ourselves to the study of data provided by our own War Department for the United States Army, and to statistics published by Harvard University concerning the participation of Harvard men in the World War.

The study was confined to two aspects of the World War. (1) What types of men were selected and what types rejected for military service? (2) What was the distribution of military deaths in the sections of the population studied? Let us briefly, and of necessity rather superficially, consider selection at enlistment, using first the excellent work of Love and Davenport on the defects found in drafted men. Nearly 237,000 who possessed defects of a probably more or less hereditary nature were rejected and about 50,000 such men were accepted for service in the United States Army. That is about 17 per cent of these defectives were exposed to the

dangers of camp and battlefield, while nearly five times that number, about 83 per cent, were sent home, in many cases no doubt to propagate their kind. It is the old story of the best being sent forth to risk death while the lame, the halt, and the blind were carefully protected.

We have made comparative studies of the enlistment rates among men from the continental United States and for holders of the following degrees from Harvard University: master's degree, doctor of philosophy or science, doctor in medicine or public health, bachelor of law, doctor of juridical science, and bachelors degrees with and without academic distinction. Harvard University grants the baccalaureate degree in arts or science with four grades of merit: namely, without distinction, with cum laude, magna cum laude, and summa cum laude. By means which I need not describe here, I have demonstrated to my own satisfaction that on the average the

TABLE 1

GROUP	NUMBER IN GROUP	PER CENT ENLISTED
Continental United States.....	15,639,178	11.67 \pm .005
Doctor of Philosophy or of Science.....	636	17.14 \pm 1.01
Master of Arts or of Science.....	2,278	17.95 \pm .54
Graduates with distinction.....	2,969	22.06 \pm .51
Bachelor of Law or Doctor of Juridical Science.....	3,234	25.57 \pm .52
Graduates without distinction.....	7,243	28.88 \pm .36
Doctor of Medicine or of Public Health.....	1,183	39.31 \pm .96

higher the grade of distinction at graduation the greater the mental capacity and energy of the person receiving the degree. Thus the difference in enlistment rates between graduates with distinction and those who did not earn distinction is of biological consequence. Table 1 summarizes the enlistment rate in the seven different groups studied. The ages of all the men included ranged from twenty-five to forty-four years.

There were, for example, about 15,639,178 males whose ages were between twenty-five and forty-four years, inclusive, in the continental United States in 1917, and of these 11.67 per cent enlisted in the United States Army. If each of the percentages in table 1 is compared with the next larger one, the difference in all but one case is found to exceed three times the size of its probable error and is, therefore, statistically significant. The one exception is the difference between the holders of the doctors and of masters degrees. Thus, the highest enlistment rate was for the doctors of medicine and of public health. Next came the mediocre college graduates, then the lawyers,

then graduates with distinction, then masters of arts and science and the holders of the doctorate, and finally the males from the continental United States.

To leave the statement of the case at this point, however, would not be very convincing. The data for each group should be subdivided according to age and this has been done in the chart which is before you. It can be seen that the curves of the wall chart tell substantially the same story as the table. These curves show some very interesting things. The medical men had very high enlistment rates, the holders of masters degrees relatively low rates. Graduates without distinction, that is the poorer students, enlisted more frequently than the better ones, while the lawyers showed very erratic behavior, having a relatively high enlistment rate in the lowest age group and a very low rate as compared with the other types for the older men. Thus, within the Harvard contingent there was no consistent relationship between frequency of enlistment and intellectual attainment. The outstanding fact is that all of these types of Harvard men, who are obviously the result of the fairly high selective process of our educational system, showed higher rates of enlistment than the general run of American males of comparable age. This was certainly a dysgenic tendency. Here again we meet the phenomenon of the best going forth to battle with a greater frequency than the mediocre and the inferior.

Military mortalities, both among Harvard graduates and the male population of the continental United States may be considered now. Death rates, of course, are of more biological importance than enlistments, for a man once dead will never return to rear a family. Several aspects of lethal selection have been considered rather extensively in our monograph, but one comparison must suffice here to bring out the essential relationship between mortalities for the Harvard groups and for the males of the whole United States. An accurate comparison is impossible because exact data concerning comparable age groups cannot be obtained. Students seldom graduate from college when younger than twenty-two years. The War Department data on casualties are not classified by age groups, so that we must use the death statistics for the United States army as of all ages from 15 to 49 years. Furthermore, the male population in the continental United States for 1917 was determined not by a census count, but by an estimate based upon the method of interpolation. The Harvard classes from 1891 to 1918, inclusive, comprised men who ranged from about twenty-two to forty-nine years of age at the opening of the World War. In the United States army, $.96 \pm .057$ per cent of this Harvard population perished. What about corresponding death rates for the male population for the continental United States as a

whole? About 118,279 American soldiers, who enlisted from the continental United States exclusive of Alaska and the Canal Zone, died during the World War. The total male population of the continental United States with the age limits of twenty-two to forty-nine years, inclusive, in 1917 was about 21,376,125. If we treat all the deaths in the army as though they occurred among men who were twenty-two to forty-nine years of age, the percentage dying in the male population of the continental United States would be $.55 \pm .001$ per cent ($.96 \pm .057$ per cent exceeds $.55 \pm .001$ per cent by $.41 \pm .057$). The difference is 7.2 times its probable error and is therefore decidedly significant. However, the above deaths in the United States army were not confined to the ages twenty-two to forty-nine years, but occurred among men ranging from fifteen to forty-nine. Thus, the .55 per cent estimate is too high, so that the Harvard mortality exceeded the deaths for the United States as a whole by more than .41 per cent. Thus it is clear that the graduates of Harvard suffered a higher mortality rate than the male population of the United States of comparable age. This was biologically unfortunate because the Harvard group was doubtless on the average inherently superior in mental ability to the general run of males.

In conclusion we may say that the trends in enlistment and in death rates brought out by this study were probably of a dysgenic character. Such a study should not lead to dogmatic statements concerning the biological consequences of all wars. Some of them may have been, and doubtless were, racially beneficial, particularly those fought by primitive man in prehistoric days. Whatever its biological consequences, war is a social and moral evil which should be eradicated as rapidly as possible. If this study has contributed anything to that end, it has been worth while.

THE GENETIC EFFECTS OF THE WAR IN HUNGARY¹

THEODORE SZÉL

Hungary

By the "*genetic effects*" of the Great War which was concluded nearly a decade and a half ago we mean the changes in the composition and peculiarities of the population traceable to the War, which afflicted not only those living at the time of the War but still afflicts the generations coming after, and through which the quality of the future generation and its distribution, according to the different demographic standpoints, changes. In our days, when nearly a generation has passed since the conclusion of the War, these genetic effects are becoming apparent. Therefore it is opportune to speak of them today.

There is no doubt that owing to the great depopulation and demoralisation accompanying the War, of these effects those harmful to the future generation, the so-called dysgenic effects, are preponderant and especially so in Hungary which, besides the War loss of nearly 500,000 men, has also through the Treaty of Trianon been bereft of 71.5 per cent of her territory together with 13,000,000 inhabitants, i.e. 63.6 per cent of her total population. It is merely a matter of scientific accord to look for eugenic effects, that is to say for effects which would be advantageous to the future generations, alongside the extraordinary harm done to the number of the future generation and to their development. Before analysing the harmful genetic effects we shall also briefly summarise the eugenic effects of the World War which may crop up or be inferred from the items of the science of heredity. The most important of these eugenic effects of the War are the following:

1. During the War, owing to the absence of the men at the front and subsequently to the killed, missing and prisoners, the older age groups generated in a larger proportion and played a greater rôle in the increase than previously. In accordance with the items of the science of heredity, however, the older age groups have greater resistance and are exempt in a greater proportion from pathological inclinations than are the younger. Thus, by this means, according to the Chromosoma theory, the proportion of those

¹ Extract from the report entitled "Eugenic and dysgenic effects of the War, with special reference to Hungary," introduced at the Third International Eugenic Congress convened at New York in August, 1932.

tainted with the various hereditary harmful inclinations has diminished in the rising generation. During the War, among fiancés and fathers of legitimate offspring, those exceeding thirty years of age were really in higher proportion than they were either in the last pre-war year or later, in the new peace years after the conclusion of the War. In 1913, in Hungary, 12.7 per cent of the fiancés were between thirty and thirty-nine years of age, while in 1915 they amounted to 22.1 per cent. The proportion of fiancés between forty and forty-nine years of age at the same time rose from 4.4 to 12.0 per cent. From among the fathers of legitimate offspring, for instance, those of forty to forty-nine years rose from 17.3 per cent in 1913 to 25.7 per cent in 1916; while at the same time those of fifty to fifty-nine years rose from 2.5 to 5.1 per cent, only to fall back again to 1.6 per cent by 1930.² Other consequences of this war-time age displacement is the increase of the surplus of male-births, which also exists normally, and the increase of the index of male-infant mortality in comparison with that of female. The male birth surplus in Hungary in 1913 was expressed by 105.8 newly born boys to 100 newly born girls. This index rose to 108.8 by 1918 and from 1926 to 1930 was again, from year to year 106.7 only. Putting the mortality of female-infants as equal to one hundred, the mortality of male infants throughout Hungary in 1913 was 117.9 while from 1915 to 1918 it stood between 112.9 and 114.8. Against this, after the War, from 1920 onward it once more stood from year to year between 116 and 118 and in 1930 it reached 120.8. By examining the infant mortality of the sexes detailed according to diagnosis we see the difference between the mortality of the two sexes in infancy is found in congenital weakness and defects of development. In 1927, for instance, 7.35 per cent of the male-infants and only 6.22 per cent of the female-infants died of defects of development. This difference diminished during the War. The fact that the divergence is caused by the difference in the mortality of the youngest infants is also in connection with the tabulation of the infants according to age. In the same manner we can perceive also in connection with the offspring of the other belligerent nations the war-time surplus births of males and the war-time reduction of the index of male infant mortality as compared with the female.³

² For further particulars *vide* "The Effect of the World War upon our Population," page 440, by T. Szél, Saile, Budapest, 1919,—a competition work awarded the Senger prize at the Peter Pázmány University of Budapest in the term 1918/1919. *Vide* also "The Regularities Apparent Throughout Europe of the Births, Marriages and Deaths of the War-Time Years," by T. Szél, Saile, page 140 of the Hungarian Statistical Review 1923, and the continuation of the same theme in Nos. 5–8, 1924, of the same periodical.

³ For further particulars *vide* "Infant Mortality," page 303, by T. Szél, in "*Egészségügyi Statisztika*," Hygienic Statistics, published by the Hungarian Medical Book Association.

2. If during the War the more talented, healthier and stronger individuals, who were more necessary to the nation, had been exempted from war-service and protected from the effects of the War in the interests of the pacific work of the homeland or of science, it would have exercised a political influence on the composition of the population. It is a pity that the motives for these exemptions were rather the need of filling the positions actually filled and that the persons holding them could not be replaced, without regard to the state of health of the individuals or their genetic capacities. We regret to say that no eugenic effect of preserving the Hungarian race resulted from such exemptions though the idea was plausible as the Hungarian civil service is filled mostly by Magyars, of Magyar nationality and race, and for this reason these also would have been exempt. The Magyars however, burning with patriotic zeal, joined up voluntarily for the War, if need be to shed their blood for their country. The classification of the wounded and slain according to religion shows that in the World War the members of the Reformed Church—the so-called “Hungarian Religion”—headed the list of slain. It was not the thoroughbred Magyars but chiefly the Jews who avoided the War by means of exemptions obtained under the most various pretexts. The statistics of Mike⁴ also testify to this fact.

3. The war-time reduction of the proportion and number of intermarriages is also a eugenic effect, since from consanguineous marriages—as I set forth in detail in my lecture delivered in Rome in 1931 at the International Congress of Demography⁵—individuals are more frequently born suffering from defective development, particularly congenital deafness or albinism, than from other marriages. In Hungary the number of consanguineous marriages, with ecclesiastical dispensation, fell in 1916 during the War to 215 in comparison with the 911 of 1913, i.e. from 0.53 to 0.35 per cent. The mobilised men travelled all over the country, were trained for military service in quite different towns from those in which they lived, while the wounded were distributed throughout the provincial hospitals. Thus the population of the country mixed together more freely during the War than they had done in peace. Consequently relations were often separated by distance from each other and young people contemplating matrimony were thrown into the society of strangers more frequently than in normal times. By this means the probability of the meeting of “gens” burdened with recessive pathological inclinations was reduced.

4. If may be mentioned that the Great War caused the re-awakening of

⁴ *Vide* the treatise of G. Mike in the “Hungarian Statistical Review.” Year 1927, No. 7, page 623.

⁵ *Vide* “*Les Effets Disgeniques de la Consanguinité*,” by T. Szél. Rome, 1931.

the nation and developed its race recognition, and that after the great afflictions the central power is rising with renewed vigour to a consciousness stronger in many respects than before, and taking measures to protect the nation and the race as well as to improve the quality of the future generation. Among these measures are: the *numerus clausus* at the universities, laws regulating emigration, restricting certain political tendencies, particularly the suppression of Communism, repeated application of summary jurisdiction, the conclusion of foreign commercial agreements, with other regulations and prohibitions. We find similar measures abroad also. For instance, even the United States of North America, which is so sparsely populated compared with Europe (14 inhabitants per km²) protects the Anglo-Saxon race forming the majority of its population. In its new immigration law it adheres to the principle of "the preferred race" and places a strict limit upon the immigration of undesired peoples.

There can be no doubt that these eugenic effects of the World War which in certain respects are beneficial become completely dwarfed by the side of the dysgenic effects. The extraordinary war-time depopulation and demoralisation brought dysgenic consequences in many directions. Owing to the bloodshed of the Great War, increase was abruptly arrested. Multitudes were by their premature death precluded from reproducing their kind so that a great deficiency of births resulted. The complete human losses in the belligerent countries are threefold:

1. Deficiency in births resulting from the war-time decrease of the proportion of marriages and births. The proportion of live-births in Hungary up to 1918 fell to 15.3 per thousand from the 34.3 per thousand of 1913. In absolute figures this means that from 1st. May 1925, or in other words from the time of the birth of children procreated in war-time to the end of the War in historic Hungary (exclusive of Croatia-Slavonia), an average of 332,731 births only took place per annum which is 51.2 per cent fewer than the annual average number in the last five years preceding the War. Thus owing to the missed potential births the total loss is one and a quarter million. The most useful and the flower of our manhood perished on the battlefield. Of those suffering from diseases transmissible to offspring, especially syphilis and tuberculosis, the proportion rose in the population which remained at home. Owing to the "counter selection" of enlistment, the proportion of infected infants originating from fathers suffering from chronic diseases has risen in the reduced number of births.

2. We have compiled the direct losses of man-power suffered by Hungary in slain, wounded, missing and prisoners, and finally in the loss of territory by virtue of the Peace Treaty, from the official statements published by the

former Imperial and Royal War Ministry and the supplementary estimates made by the Royal Hungarian Ministry of the Interior, and we have struck an average from the data published in the treatise of Mike above referred to. In the World War the complete loss of the Austro-Hungarian Monarchy was about 5,000,000 men. Of these 2,138,000 fell to the Hungarian dominions, including Croatia-Slavonia, 743,000 consisting of wounded. The remainder were: killed 381,000; missing 400,000; and prisoners 641,000. During the Great War of 1914–1918 of the population of present-day Hungary according to the Treaty of Trianon, 155,799 (or in round figures 156,000) were killed, representing 4.1 per cent of the male population of the present area in 1910. There was a genetic effect also from the loss of blood in that the loss did not strike the different popular strata with equal intensity. The urban population—including those non-residents engaged in business or employment in the towns—suffered less blood-loss than did the rural population. Classified according to religion the blood sacrifice of the Reformed—so-called Hungarian—Religion was the greatest in proportion, while the smallest was that made by the Jews.

3. The untimely deaths increased in consequence of the enhanced mortality of the Hinterlands and the part of the decrease in the growth of population traceable thereto. The mortality of 22.3 per thousand in 1913 on the present-day Trianon area by 1918 rose to 26.4 per thousand. In 1918 there were 53,201 deaths from the epidemic of Spanish influenza alone. In the arduous war-time position of the Hinterland owing to the high price of food-stuffs and the lack of doctors and medicines, the mortality may have been even higher than the figures published, but those absent at the front were not included in this calculation. The war-time spread of the great popular diseases, especially that of tuberculosis owing to the great misery, and that of syphilis owing to demoralisation caused the quality of the population to deteriorate, a fact which could not fail to have a dysgenic effect on the future generation.

Finally the war-time demoralisation, the moral damage, is particularly expressed in the statistics of the law courts. Crime of enhanced proportions caused dysgenic damage, for the proportion of the criminal offspring of criminal fathers increased. Owing to the war-time increase of crime in the years immediately after the War, the legal cases finally disposed of in Hungary, even considering the reduction in the size of her territory, were nearly as numerous as on the larger historic area. In 1922 there were 83,000 while in 1913 there were only 85,000. The proportion of graver punishments inflicted by the courts of justice was shockingly high. In 1922 there were 151 per ten thousand of such cases which is nearly twice as large as in 1913 when

there were 65 per ten thousand. These saddening figures denote the depth of the moral deterioration of the people which before the war was accompanied by a decrease in the proportion of marriages, an increased number of illegitimate births, the prevalence of prostitution and venereal diseases and by dysgenic consequences in many other ways.

This enumeration of the genetic effects bequeathed to the future generation is certainly not complete; it is but a few pictures taken at random from the mass phenomena drawn from the statistical registers. One thing, however, is certain: the numerical damage wrought to the population by the war losses, plus the territorial losses by virtue of the Peace Treaty, were more severe for Hungary than for any other country. Notwithstanding this tremendous depopulation, the Magyars survive, with an unshakeable faith in a better future, trusting in the eventual revision of the unjust Peace Treaty. Never was the Magyars' position today, after their unprecedented war losses, better characterised than in the words of the great Hungarian poet Michael Vörösmarthy:

Diminished yet unbroken
Lives the nation in this land

A STUDY OF THE CAUSES OF PROSTITUTION, ESPECIALLY CONCERNING HEREDITARY FACTORS

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Prostitution and the causes of prostitution have been the subject of numerous scientific investigations. Several extensive surveys have been written on this subject, as for instance, "Die Prostitution," by Iwan Bloch, "Prostitution in Europe," by Abraham Flexner, and "Prostitution in the United States," by Howard Woolston; besides, many extensive and important papers on social-hygienic, criminal-biological and psychiatric investigations of this question have appeared both in Europe and America.

All agree that the causes, which result in women becoming prostitutes, are very complex; it is not possible to single out a few factors to which we can point as predominantly causative, and from different points of view, thorough investigations on the different strata of prostitution in different countries and cities are still required.

The conception of prostitution is also subject to rapid changes in the course of time, as it always depends on the actual social order and on the generally prevailing ethical standard. In a communistic state, prostitution will be of a nature differing from that practised in a capitalistic country, and as soon as the ideas of marriage and sex-moral on the whole are modified, as has been witnessed not least during the last decades, prostitution will also be looked upon in a different manner. However, there will under all circumstances remain a difference between marriage and free-love on the one hand and commercialised prostitution on the other hand.

The investigation, which will be discussed in the following, was carried out in Copenhagen from 1931 to 1932 in cooperation with the morals police, whose chief is police superintendent Schepelern-Larsen, and it is the first time that such a research has been made in Denmark.

Of special factors, which may be supposed to affect the character of prostitution in Denmark, can be mentioned that the population is fairly homogeneous, the rural population amounting to about half of it, and that there is but one really great city, Copenhagen, with about three-quarter million of inhabitants; the social differences are not so great as in most other coun-

tries, the general educational standard is high and social provident care, also for the adolescent, is well developed.

The legislation with regard to police supervision of prostitution differs from that of most other countries.

Police supervision of commercial immorality was abolished by law in 1906, and since that time, the police action against persons practising such trade is executed according to the legislation on vagrancy. According to this law, any one who has no proper means of support or who does not at least endeavour to obtain a legitimate occupation, is punished if there is not certainty that she (he) is sustained without injuring the community. The police is entitled to request her to give an account of her way of gaining a livelihood and to prove the correctness of her statements. If the statements of the person in question are deemed insufficient, the police must order her to seek legitimate employment and report the fact at certain intervals at the police office. Those who neglect this order, are sentenced to imprisonment or forced labour. The order of reporting themselves at the police office at certain times can only be given after a prior warning. (This law is to be altered from the beginning of next year, not in any essential way, however.)

In Copenhagen, the morals police after the legislation on vagrancy gives orders of report to about 100 women a year, their number has been considerably reduced during recent years; at present, there are about 500 women who are compelled to report themselves regularly.

This investigation is not terminated yet, whence I can merely give a *preliminary account* of the results derived from the work of the first year.

The mode of procedure has been, first to examine the information, which the police had gathered with regard to the woman in question; next, to question the woman about her family, the collaterals of both her parents, her siblings (brothers and sisters) and eventually, her children, with special regard to the occurrence of psychic affections, criminality, alcoholism, etc. Moreover, psychiatric tests are performed and, if circumstances are in favour of it, also a general medical examination. Further, information is gathered as far as possible from schools, homes of education, hospitals and other places, where the woman has previously lived and, in many cases, also from her nearest relations.

The preliminary investigation comprises 300 women, whose circumstances were examined by the morals police in Copenhagen.

89 per cent of the examined women had received a warning and 79 per cent were moreover later on compelled to report themselves at the police office after the legislation of vagrancy.

The ages of these women at the moment of examination and their ages at the time when they became prostitutes, is shown in table 1.

In 81 per cent of the cases, more than 1 year had elapsed since the woman had become a prostitute, in 47 per cent more than 5 years, and in 6 per cent more than 10 years.

TABLE 1

	AGE						
	Less than 18 years	18 to 20 years	21 to 25 years	26 to 30 years	31 to 35 years	36 to 40 years	Over 40 years
	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>	<i>per cent</i>
At the woman's first lapse into prostitution.....	9	42	36	9	4	0.3	0.3
At the examination.....	1	14	27	30	17	8	3

The home conditions of the examined, their social and economical circumstances, during childhood and adolescence appear from the following:

The father's trade was:

	<i>per cent</i>
Labourer.....	38
Artisan.....	20
Farmer.....	7
Other trades.....	25
Unknown.....	10

In 12 per cent of the cases, the examined had never known her father, in 2 per cent she had never known her mother.

Seventeen per cent of them had a stepfather or stepmother, 17 per cent were born out of wedlock.

In 11 per cent of the cases, the father had died before the woman was 14 years old, and in 13 per cent the mother.

In 18 per cent, the father died before she was 21, in 2 per cent the mother.

In 6 per cent the parents were divorced before she was 14 and in 18 per cent before she was 21 years old.

The examined came from prolific families, having on an average 5.6 sibs. Eighty per cent of them had been brought up by their parents, 20 per cent by foster-parents, grandparents or other relatives.

Seventeen per cent had been in homes of education (reeducation, reformatories), and the majority of them had likewise been under supervision of boards of guardians.

Eight per cent had gone to a school for retarded and feeble-minded, 1 per cent to special schools (for tuberculous or epileptic children) and 1 woman had not gone to school at all and was an analphabet. Three per cent had gone to higher schools.

The results derived from this calculation agree very well with what could be expected beforehand. Hence, there is no doubt that the environmental conditions, under which the majority of the examined group of individuals have lived during childhood and adolescence, are considerably below the average of the total population; most of them were handicapped from their very start in life. A great many are from poor, and even very poor homes with large families; however, there are exceptions from this rule for a few of them come from well-to-do and in every respect good homes. A comparatively great number of them were born out of wedlock and had been wholly or partially orphaned during childhood or adolescence, some had had step-parents or had been educated outside their homes.

In others, the deficiency of their natural gifts had early been manifest, they had been very backward at school and had even been sent to special schools for feeble-minded or otherwise mentally defective children; others had from their earliest adolescence been placed in homes of education and frequently under supervision of Boards of guardians.

Information as to the circumstances of the examined at the adult age is given in the following figures:

As regards work, 81 per cent of the examined had chiefly been employed as domestic servants (housemaids, scullery maids, cooks), 6 per cent as factory hands, 4 per cent as seamstresses and 9 per cent had had other occupations (artists, models, waitresses, bar-maids, etc.).

Thirty-five per cent had been married, 35 per cent of these lived with their husbands, whereas 65 per cent were widowed, divorced, deserted or separated, 5 per cent had been married two or three times.

Thirty-nine per cent had children, 85 per cent of these had children out of wedlock and 20 per cent of the children were dead.

Sixty-two per cent of them had been fined, 59 per cent had been in prison because of neglect of reporting themselves, 41 per cent because of crimes proper, 23 per cent had been punished for theft, receiving stolen goods, robbery, or fraud; 9 per cent on account of propagation of venereal disease and 18 per cent on account of having incited or enticed to immorality, or of having displayed an immoral mode of life, to such a degree as to offend the sense of decency or to become a public nuisance, or of having disturbed those living in the vicinity, of having practiced immorality as a trade, viz., having a male person or a minor over 2 years living in the same dwelling

with her, or receiving visits for immoral purposes from male persons under 18 years of age.

A few had been punished on account of feticide or incest.

Thus, criminality is very considerable amongst prostitutes.

Seventy-one per cent of the women suffered or had previously suffered from venereal diseases, 32 per cent of these having gonorrhea only, 29 per cent syphilis only and 39 per cent both syphilis and gonorrhea. Let it be remembered, however, that these high figures are due to the peculiar life and the not inconsiderable age (cfr. page 257) of these women; besides the venereal diseases have greatly decreased during the last decades.

Forty-two per cent suffered from serious chronic diseases. 58 per cent of these had salpingitis, 6 per cent gallstone complaints, 9 per cent tuberculosis (in the lungs, bones or joints), and 30 per cent suffered from other diseases (such as epilepsy, reduced vision or hearing, heart diseases, ulcer of the stomach, hemophilia, congenital deformities, traumatic invalidity, etc.).

In the majority of the chronic invalids, who represent an essential part of the total number, the working-power was reduced and prevented them from a legitimate occupation, although they had no aversion to work. At a rough estimate, really reduced working-power was found in 25 per cent and minimal working-power in 5 per cent; 30 per cent had apparently reduced working-power, it was impossible to detect however any cause of the reduction, whence it must be due to lack of industry and of energy and steadiness to attend to regular work.

The psychiatric test of the examined yielded the following figures:

	<i>per cent</i>
Intelligence quotient of more than 90 per cent.....	51
Intelligence quotient of from 90 to 85 per cent (slightly retarded).....	23
Intelligence quotient of from 85 to 75 per cent (retarded).....	17
Intelligence quotient of from 75 to 55 per cent (debile, morons).....	8
Intelligence quotient of less than 55 per cent (imbecile).....	0.3
Refused to submit to the intelligence test.....	1

Thus, 48 per cent of them were retarded, debile or imbecile; 25 per cent were constitutional psychopaths and 8 per cent suffered from other distinctly pronounced, psychic disturbances (hysteria and hysteric disorders of the mind, degenerative insanity, manic-depressive psychosis, homosexuality, etc.).

Moderate alcoholism was detected in 21 per cent, strong alcoholism in 4 per cent.

Only 35 per cent presented no distinct psychic abnormalities

These figures tend to show clearly how far below the average is the psychic habitus of these women, a fact which must be kept in mind, if one reflect upon the causes of their fate and upon the manner in which society ought to act towards them.

As to the chief cause of their having become prostitutes, the examined women themselves gave the following information:

In 33 per cent penury owing to want of employment or other reasons. Very frequently, low wages and, on the whole, the bad working conditions for female hands were quoted.

In 31 per cent was alleged pleasure-loving, the desire of going to dances and restaurants, in many cases combined with fondness of liquor.

In 11 per cent a tendency to vagrancy and vagabondage.

In 11 per cent the influence exerted by pimps was alleged.

As for the rest, many other reasons were mentioned, such as, for instance, the influence exerted by companions, sisters and mothers, bad influence during their stay at the hospital for venereal diseases, and childbirth outside the wedlock. Many of the examined had lapsed into prostitution after a psychic trauma, which in certain cases had brought about a psychogenous depression, for instance by the sudden death of parents or husband, a lover's breach of promise of marriage, or similar occurrences.

A few had become prostitutes on coming from rural districts to the great city, being young and unprotected and inexperienced; many unmarried women had become prostitutes in order to sustain their children, and some married ones in order to be able to keep up their homes. Two married women with 4 and 6 legitimate children, respectively, had been induced by penury, the one after her husband's death, the other on account of her husband's protracted illness.

Some declared themselves to be hypersexual, a very few confessed themselves contented with their trade, whereas by far the majority of them never had cared for it and were only desirous of leaving it.

There is no doubt that *the constitutional factors* are of great importance amongst the causes of prostitution, but it is very difficult to obtain even an approximately exact idea or standard for the rôle it actually plays. Just in a group of individuals of this kind it will be particularly difficult, partly because the hereditary factors, such as, for instance, psychopathy and slight mental defects, which in many cases are involved, are difficult to detect in relations, about whom very little is known, and partly because these women as a rule are unable to give more than comparatively incom-

plete information about their families, either because they have never known any of them or because they have little or no intercourse with them.

From 39 of the examined no information about their fathers could be obtained, in 50 cases no information was available as to the paternal family, in 9 cases the mother was unknown; 18 cases lacked all information about their maternal families and 5 knew nothing about their brothers and sisters.

As for the rest, the figures in table 2 were obtained (the figures in the columns represent the number of the examined, in whose families one of the affections or abnormalities occurred).

TABLE 2

	IN THE FATHER	IN THE PATERNAL FAMILY	IN THE MOTHER	IN THE MATERNAL FAMILY	AMONGST SIBLINGS
Insanity.....	3	5	8	13	6
Feeble-mindedness.....		1	1	2	4
Psychopathy.....	7		6		2
Epilepsy.....		1	2		3
Alcoholism.....	49	13	3	5	3
Immorality.....			6	1	30
Punishment.....	7	6	1	5	17
Suicide.....	6	4	2	4	5
Hereditary deformities or diseases.....	1		1		3

One or several of the affections or abnormalities quoted above occurred in the examined, in the cases where information was obtained about the father, mother and collaterals, respectively, i.e.:

	<i>per cent</i>
In the father or collaterals.....	28
In the mother or collaterals.....	18
In siblings.....	21
In the collaterals of both parents.....	7
In the collaterals of both parents and amongst siblings.....	3
In the paternal family and amongst siblings.....	7
In the maternal family and amongst siblings.....	3

In 44 per cent of the 300 women, on whom this investigation bears, one or several of the diseases or abnormalities cited in the table occur in their families; it is difficult to say how much importance can be attached to this number, as comparative data on nondelinquents are missing, but there is no doubt that the figures are higher than normally, for instance according to the list, 49 of the fathers of the examined were alcoholists and 30 of the examined

had sisters who were immoral (the majority of them being compelled to report themselves).

These two high figures may of course partly be explained from the point of view that the environmental conditions certainly have asserted themselves, notably if one keeps in mind that the majority of the examined come from the lowest classes of society, though they do imply that many of the fathers and siblings have had a psychopathic constitution or some other psychic abnormality.

The examined had altogether 1680 brothers and sisters, 6 of whom were insane, 8 feeble-minded, 4 epileptic and 2 psychopaths; 5 had committed suicide, 34 were on the report list for immorality, 23 had been punished, 3 were alcoholists, 3 were in reformatories, 1 under guardianship, 1 was a pimp, 3 suffered from hereditary deformities or diseases, which gives a total of 93, or 5.5 per cent.

This is in itself a high figure, to which must be added the siblings, amongst whom there certainly is no small number of psychopaths and feeble-minded, who have not been diagnosticated.

Finally, it should be mentioned that the examined had altogether 174 children, 139 of whom were alive at the time of examination. Four of the 139 living children had congenital syphilis; besides, there were 4 imbeciles (1 of whom also had epilepsy and congenital syphilis and 1 of them was blind), 1 had hydrocephalus and was blind, 2 were immoral, making total of 7.

These 7 children were the victims of very considerable familial heredity; not only were their mothers prostitutes, but amongst the collaterals of 6 of them were one or several insane individuals, imbeciles, epileptics, alcoholists, criminals or vagrants, information about the paternal family however being missing.

In my opinion, the pedigrees of such children and, on the whole, the investigations on the importance of the hereditary factors as causative agents of prostitution, are of considerable eugenic interest.

A great number of individuals, who are discussed in this study, are, on account of their hereditary dispositions, predestined to a life of misery and shame, and many of these asocial individuals will become a burden, or even a danger, to society.

It is difficult to conceive that this condition can be essentially altered or improved by means of such an eugenic measure as sterilisation; in the first place, sterilisation of a woman is an operation, which is not to be performed on the basis of purely eugenic indications without hesitation; secondly, in these women or their ancestry there will very often be a question of deficiencies, such as, for instance, a psychopathic constitution or a mental

defect which, though in themselves serious enough, will not be of such an interfering character as to justify sterilisation.

Besides the constitutional causes of prostitution, the environmental causes are, as has been mentioned before, of great importance; in every individual case there is a coöperation of these two chief groups of factors, one of which may predominate in the one, and the other in the other group.

In addition to (1) the hereditary factors, among which the psychic abnormalities usually for the most part are classed, there are, as has already been mentioned, (2) the bad environments during childhood and adolescence, (3) chronic diseases, (4) the low wages and, on the whole, the difficult working conditions for female workers, which constitute the chief causes of prostitution, though there are of course many other factors, which have been united in each individual case.

However, as the causes of prostitution are so complicated and as they must be sought in social life as well as in the very individual and her ancestry, it cannot be expected that prostitution could be limited and its fatal consequences be prevented by simple measures.

Amongst the means, by which this end may be attained, I have in my researches of the conditions in Denmark received the impression that some of the most efficient measures will be:

1. A general reduction of social inequality and in particular an improvement of the working conditions for female hands, especially for domestic servants.

2. Increase of social provident care for the mentally defective both during childhood, adolescence and the adult age, which should not only comprise the actually insane, demented and imbecile, but also the psychopaths and retarded.

3. An augmentation of the enlightenment on the results of hereditary research, particularly in regard to psychic disorders in man in connection with scientific work in these domains and possibly combined to a certain degree with guidance in birth control, "Eheberatung" (advice in regard to matrimony) and sterilisation.

4. It remains to be definitely settled, whether a special legislation concerning prostitution is required; if it be so, punishment of prostitutes ought to be employed to a very moderate extent only, whereas, in connection with morals police and morals court, adequate institutions for the support and guidance of the weak ought to be set up.

IL SORDOMUTISMO NEL CAMPO EUGENETICO E SOCIALE

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1. Il sordomutismo, come stato patologico complesso, non può interessare l'eugenetica. L'esperienza ha dimostrato nell'ultimo cinquantennio come il timore della sua trasmissibilità ereditaria non è fondato sui risultati delle indagini fatte sulla prole dei matrimoni fra sordomuti.

2. Può dunque interessare l'eugenetica solo la *causa*, non organica ma funzionale del mutismo, cioè la sordità prenatale e postnatale dei contraenti il matrimonio. La loquela infatti è un'abilità acquistata dal bambino udente normale con un lungo tirocinio d'imitazione nell'ambiente familiare e sociale. Base di questa abilità *acquisita* sono le preformazioni anatomo-fisiologiche e l'istinto della parola, comuni questo e quelle a tutti i bambini sordi e non sordi.

3. Ogni bambino nasce necessariamente *muto*, e perciò il mutismo infantile deve ritenersi come fisiologico, e non può essere considerato—se non in rarissime eccezioni—come uno stato patologico congenito. In tal caso l'etiologia è squisitamente cerebrale e rientra nella casistica varia e multiforme delle *afasie* (pure senza sordità concomitante).

4. Il bambino di normale intelligenza è *prefasico* (come è prelogico e premorale), perchè la comprensione del linguaggio parlato precede le capacità, organica e funzionale dei meccanismi della respirazione per la parola e delle articolazioni dell'alfabeto fisiologico, etnico, che viene imposto al bambino dall'ambiente parlante.

5. La preoccupazione dei sordomuti di fronte al matrimonio si giustifica dunque soltanto in ragione della etiologia della loro sordità, la quale può essere ereditaria nelle forme già messe in evidenza nei precedenti Congressi di Eugenica, ed in modo particolare dal prof. G. Bilancioni con la sua Comunicazione fatta al Congresso di Roma del 1929.

6. Il problema della mala influenza sulla prole dei matrimoni fra consanguinei deve essere riesaminata dal punto di vista eugenico. Nei sordomuti per insufficienza della facoltà uditiva, e qualificati per tali a causa della consanguineità dei genitori, è risultato chiaramente, quanto la stessa indagine pose già in evidenza rispetto alle altre anomalie congenite o acquisite. Tutte le indagini fatte nella seconda metà del secolo XIX e

nel primo quarto del secolo corrente, confermarono dovunque la conclusione alla quale era pervenuto nel 1870 il prof. dott. Mattei della R. Università di Siena, e cioè "che la consanguineità dei genitori non è di per se dannosa alla prole, ma può accadere che essa aumenti l'ereditarietà." Così concluse più tardi anche il dott. Ladreit de Lacharrière dell'Istituto Nazionale dei Sordomuti di Parigi (1900).

EUGENIC, CACOGENIC AND SOCIALLY INADEQUATE TENDENCIES IN OUR POPULATION

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The total continental United States population as recorded by the Fifteenth Census of the United States for 1930 is 122,775,046. The aggregate numerical increase in the continental United States population in the last decade is larger than for any previous decade,—an increment as large as 17,064,426. However, the percentage increase in the last decade is the smallest in our census history, except for the period that includes the Great War,—an increment as low as 16.1 per cent. The percentage increase between 1790 and 1800 was 35.1.

Are we to infer that in the light of the diminishing percentage of decennial increase in our population the menace of the growth of the United States population will solve itself? Observe that the numerical increase of the last ten-year period was twelve times as great as the period between 1790 and 1800 and more than four times the entire population in 1790.

The real importance of the growth of the United States population turns about the resulting lowered standard of living for the individual which is inevitable because of the constancy of the United States area and the diminishing natural resources of the country. Should our population continue to increase numerically, regardless of diminishing percentage rates, in seventy-five years the country will have to maintain twice as many people as at present.

What quality of our mankind is multiplying more rapidly? Are our superior people multiplying more rapidly than our inferior people? What effect has or will the growing struggle for existence in a growing adverse environment have upon the quality of our population?

A number of vital factors present themselves in our statistics which seriously affect the nature and quality of our population. There is the decline in birth rate and a constancy in the death rate. The birth rate was 23.7 in 1920; 22.5 in 1922; 20.6 in 1927 and 18.9 in 1930. The death rate remained fairly constant during the same period. It was 13.0 in 1920; 11.7 in 1922; 11.4 in 1927 and 11.3 in 1930. Thus the distribution of the age groups of the population is greatly altered. There is an increase in the

proportions in the upper age groups and a reduction in the lower age groups. On the basis of 100, in 1920 the group under five years of age was 10.9 and in 1930 it was 9.3; in 1920 the group from five to nine was 10.8 and in 1930 it was 10.3; and in 1920 the group from ten to fourteen was 10.1 and in 1930 it was 9.8. Thus in each group up to fourteen years there was a smaller proportion of the population in 1930 than in 1920. However, in 1920 the group from fifteen to nineteen was 8.9 and in 1930 it was 9.4; in 1920 the group from twenty to twenty-four was 8.8 and in 1930 it was 8.9; in 1920 the group from forty-five to fifty-four was 9.9 and in 1930 it was 10.6; in 1920 the group from fifty-five to sixty-four was 6.2 and in 1930 it was 6.8. In all the higher groups there is a larger proportion, with the exception of the groups twenty-five to thirty-four. This exception may be accounted for by the losses of the youth of the country during the Great War. The general trend would seem to forecast a definite decline in population since there will be fewer young people to marry and propagate in the succeeding decades, if the death rate remains constant.

Another significant feature of the study of our latest census is the decided decline in the rate of the negro population growth. The percentage rate of increase for the negroes was 13.6 but the rate of increase for the whites was 15.7. In 1920, the negro population constituted 9.9 per cent of the total population, but in 1930 it was less than 9.7. In 1790 the percentage was as high as 19.3. The proportion of the negro population has been declining constantly. This fact represents a significant feature in American life. Numerically, the negro population has increased from 10,463,131 in 1920 to 11,891,143 in 1930.

The Mexicans, Filipinos and Indians show perceptible increases in the continental United States population in the last decade. The increase in Indian population from 244,437 in 1920 to 332,397 in 1930 may be largely due to more accurate statistics. The Mexican population increased 103.1 per cent from 700,541 in 1920 to 1,422,533 in 1930 and the Filipino population increased 706.9 per cent from 5,603 in 1920 to 45,208 in 1930. The admixture of Filipino and Mexican blood to our stock is of significant eugenic importance.

The 1930 census reflects the effects of our program of immigration restriction. The total immigration for the decade was 4,107,209, which is less than half the number for the decade 1901 to 1910. This figure does not represent a net increment to our population. This number of immigrants must be reduced by an emigration of 1,045,076 aliens during the same decade, thus leaving a net immigration of 3,062,133. The total foreign-born white population in 1930 was 13,366,407, showing an increase of 0.8

per cent or 11,013 people, largely in the Middle Atlantic and Pacific states. This increase is the lowest indicated since the 1850 census.

It is interesting to note that the native-born of mixed parentage increased by 20.8 per cent while the native population of foreign parents increased but 9.5 per cent. It would seem that marriage between the natives and the foreign-born is becoming more popular, a factor helping to make our population more homogeneous. The melting of our people is becoming more complete.

The percentage of married males in 1890 was 53.9 and the percentage of married females in 1890 was 56.8; in 1920 it was 59.2 for the males and 60.6 for the females; and in 1930 it was 60.0 for the males and 61.1 for the females. The percentage of unmarried males, fifteen years old and over has decreased from 35.1 in 1920 to 34.1 in 1930. The percentage of unmarried females, fifteen years old and over, has decreased from 27.3 in 1920 to 26.4 in 1930. Contrary to popular opinion, for the last forty years or more, we are becoming more and more a married population. How then can we explain the decline in the rate of growth of our population? Certainly, it is not due to a decline in the number of marriages but due to a decline in the fecundity of our parents.

Another significant feature of our American life is the certain increase of our urban population at the expense of our rural population. In 1910 the urban population constituted 45.8 per cent, and in 1930 it was 56.2 per cent. The concentration of population in the cities is fraught with problems in mental hygiene in addition to significant social and economic ones. Since the occurrence of the depression in 1929 the tendency has been for some of the urban population to return to the rural districts.

Simultaneous with a rapid urbanization of our population, we evidence a constant increase of the unemployed,—a characteristic of the modern mechanization of industry. The mechanical age requires fewer employees in productive industries. Those ten years of age or over in gainful occupations decreased from 53.3 per cent in 1910; to 50.3 in 1920; and to 49.5 per cent in 1930. The percentage of males ten years of age and over engaged in gainful occupations declined from 81.3 in 1910 to 76.2 in 1930, whereas the females of the same age increased from 18.8 in 1900 to 22.1 in 1930. The machine age, the urbanization of our population, the increase of marriages, the decline in the birth rate, the invasions of women in industry are some of the salient features of the new American life.

The number of socially inadequate people in the United States is appalling. We can no longer view with complaisance the constant growth of this incompetence which is undermining our social fiber.

The total number of patients with mental disease, resident in state hospitals, has increased from 31,973 in 1880, to 159,096 in 1910, to 222,406 in 1922, to 264,511 in 1928, and to 272,527 in 1929. The ratio of total patients with mental disease per 100,000 of the general population was 63.7 in 1880, 173.0 in 1910, 204.0 in 1922, 222.3 in 1928, and 225.9 in 1929.

A considerable part of the apparent disproportionate increase of mental disease may be accounted for by the more general use of hospitals in recent years, and the better diagnosis of mental disorders. The transformation of asylums and other custodial institutions into hospitals for the treatment of mental disease is a factor of great importance in explaining the increase in mental patients. The American people now generally recognize the efficacy of institutional care in psychopathology and have broken down much of the prejudice against institutional care.

Another significant factor in explaining the increase in mental disease is the growth of urbanity at the expense of rurality in the United States. Many forms of mental disease are more prevalent in cities than in rural communities. This may be accounted for by the greater prevalence of alcoholism and venereal diseases in cities. This situation may also be explained by the conflicts of culture patterns, mores and artefacts that rural people and immigrants who flock to the already congested cities are confronted with, as they try to adjust themselves to the new environment. Many of them succumb and become psychotic.

Furthermore, the decline in the birth rate and the constancy of the death rate, as already indicated, reflect themselves statistically in larger higher age groups, in which groups many more mental diseases manifest themselves than in the younger age groups. The sciences of medicine, hygiene, and sanitation have worked wonders in increasing the longevity of men, but with the concurrent effect of enabling various mental disorders to manifest themselves in later middle life which might not otherwise have the opportunity of developing.

The foreign-born have two and one-half as many psychotics as they should have. Of the 244,968 resident white patients, 169,296, or 69.1 per cent, were native; 69,984, or 28.6 per cent, were foreign-born; and 5,688, or 2.3 per cent, were unknown with respect to their nativities. That as much as 87.7 per cent of the white population of the United States were native and 12.3 per cent were foreign-born was revealed by the general census of 1930. The rate of mental disease for native whites of native parentage is 159.8 per 100,000 of the same class; for native whites of foreign parentage, 207, and for native whites of mixed parentage, 135.8. The rate for foreign-born white patients was 513.9. Our restrictive immigration laws should

soon remedy this disproportionate representation of foreigners in the hospitals for mental disease.

Mental disease is a disease of adult life. Psychotic disorders in children are rarities. Only 1.5 per cent of the mentally diseased patients are under twenty years. The percentage in the successive quinquennial age groups increases up to the group forty to forty-four years. With the decline of the birth rate, the constancy of the death rate, and the general advances in medicine and sanitation, we may anticipate the baneful result of a statistical increase in the number of psychotics in the next decades. The dementia praecox group of psychoses comprises about 43 per cent of all the psychoses, the manic-depressive group, 15.3 per cent, and the other psychoses appear in much smaller percentages. The frequencies of dementia praecox and manic-depressive psychoses are so great and their resistance to treatment are so stubborn that the situations are alarming.

More than 52 per cent of the patients in all institutions are in institutions for nervous and mental disorders. There were 427,135 patients in the hospitals for nervous and mental cases in 1931. The American Medical Association reports for the year 1931 that the average number of patients constantly in all the hospitals of our country was 775,396 and for the year 1930, the average number was 763,382. The records of previous years show a constant increase, i.e., 553,133 for the year 1923; 629,362 for the year 1925; 671,832 for the year 1927; 702,738 for the year 1928; and 726,766 for the year 1929.

In 1934 we have more than one-half million people in our nervous and mental institutions, alone. Based on the census of the number of people in the United States in 1930, one out of every 160 people in the United States during 1930 was a patient in a hospital of some kind. One out of every 290 people was a patient in an institution for nervous and mental disorders, a larger proportion than for any other group of institutions. From every 100,000 persons of the general population of the United States there were 76 patients with mental disease, and 7.7 mental defectives and 1.2 epileptics admitted to institutions during the year July 1, 1928 to June 30, 1929. For every 100,000 persons of the general population there were in the hospitals, schools and institutions at the end of the year 277.7 persons with mental disease, 50.6 mental defectives and 8.1 epileptics.

In the country as a whole, the number of feeble-minded and epileptics under institutional care shows a steady increase, as shown by the following figures: January 1, 1922, 43,579; January 1, 1923, 46,580; January 1, 1927, 58,367; January 1, 1928, 60,412; January 1, 1929, 64,253. Families that

send a child to an institution for feeble-mindedness average twice as many as those who send a child to the university.

On April 1, 1930 there were 57,084 deaf mutes and 63,489 blind in our country. The state and federal prisoners had increased from 109,619 on January 1, 1923 to 116,626 prisoners on January 1, 1929. These figures do not include 27,238 juvenile delinquents on January 1, 1923. Prisoners committed during the year 1931 reached the large figure of 70,966. Paupers in almshouses numbered 78,090 on January 1, 1923.

Paul Popenoe estimated that in 1928 there were 10,000,000 people at large who were socially inadequate. They would include the mentally diseased, the mentally defective, the criminal, the blind, the deaf, the crippled, the germ diseased, the degenerative diseased, and all other dependents.

The estimates of the number of insane and mental defectives alone, according to the Human Betterment Foundation, exceed 18,000,000 people in the United States, not to mention the scores of other classes of people who are also socially unadjusted.

Deep seated changes are taking place in the quality and quantity of our people. Some of these changes are beneficial; others are detrimental. Statesmen must take heed of these changes and tendencies. Much of it is fraught with danger to the fabric of our country.

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PENNSYLVANIA'S PROBLEM IN ERADICATING FOCI OF MENTAL DEFECT

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Several years ago in going through some textbooks in Sociology to find out what our college students, future voters and taxpayers, were being taught about the problem of mental deficiency, I found this statement in one of them:

It is strange that a problem so easy of solution has been sadly neglected in the past.

This problem can be readily handled. All that is needed is a little agitation, the proper legislation, and a small appropriation for initial investment. Afterwards there will be required only small yearly appropriations for upkeep, and even these in many cases may not be necessary.

In just what Utopia this ideal arrangement was to come to pass after a few years has never been discovered. After many years of much agitation, suitable legislation, and constantly increasing appropriations, we still find the problem of the mental defective as serious as ever. Our institutions, in common with those of other states, have long waiting lists, a large percentage of the population of our institutions for delinquents is defective; and the number of special classes for defectives in the public schools is far too inadequate.

There are, in Pennsylvania, at least, too many defective families which have been allowed to continue and add to our problem. Pennsylvania is, geographically speaking, largely a mountainous, rural state, its industries being concentrated at certain points, and in these mountainous, rural sections we find everywhere little pockets or foci of defective families. They have been engaged in industries now abandoned in these localities,—lumbering, tanning, mining, or oil. The more competent families have moved on; the less competent have stayed behind. Inbreeding is common; even incest is not frowned upon. Living was rather simple, but with the coming of the machine, even such simple jobs as working on the road, or lumbering, have become more complicated and beyond the capacity of these families, and they have not been able to exist without charity, either

public or private. Improved state roads have opened up hitherto unknown and neglected territory, and families of the type just described have come to our attention in increasing numbers. We expect them to conform to our standards—an impossible task—and then they fall into the hands of the school attendance officer, a social agency, or the Court.

In June, 1922, the Bureau of Mental Health of the Pennsylvania Department of Welfare began a system of state-wide clinics, having as one objective of the clinics that gradually all defectives in a community would be identified through them, and registered at the central office. The face sheet of our clinic history blanks provides space for the names of three generations, a statement as to the school achievement of various members of the family gives us some idea of the mental level and type of the family with which we are dealing, and furthermore the referring agency is asked especially for any history of mental deficiency in the family. Our field workers who have been with the Bureau as long as clinics have been organized in their territory—ten, nine, and eight years—are by this time well acquainted with many of the defective groups residing in these sections.

We search out all known relatives, examine them when possible, and chart the families to give us some idea of the seriousness of the problem they present; we follow up the children of defective adults, who are often illegitimate, and if they are defective they are kept under supervision until institutional care is available for them. In the course of our examinations of the inmates of various types of institutions, we are constantly on the lookout for other defective members of these families, and when possible these are kept in the institution until other suitable institutional care can be arranged for them. In so far as our limited institution accommodations permit, we arrange for the commitment of all members of such families who come to our attention.

Much of the success in clearing up such foci depends on the coöperation of public officials and Courts, their comprehension of the fact that the initial cost for care, while heavy, is less than the ultimate cost of neglect, and their willingness to do something about it. Our first clinic was established in a county which is a home of a well-known tribe thoroughly investigated by a member of this Congress. We have had a clinic there for ten years. During that period any number of the tribe have been referred for examination and found to be defective; we have found defective relatives in all types of institutions; a large percentage of the dependent children coming under the care of the Children's Aid Society are members, and therefore "unplaceable"; they make up a large group of the families living on public relief; and the list of names of persons on trial at practically every

session of Court shows a preponderance of the family names of this tribe. Yet little is done about them. Most of the citizens, and therefore the officials, take the attitude, "We've always had them with us and always shall have them," and continue, either trying to reform them or paying the costs of their crimes and dependency.

A far different story can be told when county officials are interested. In 1923 at our first clinic in another county a boy of fifteen was brought in. He was still in the second grade and was obviously defective. His mother who accompanied him was just as obviously defective, and from her we learned that while all of the members of the family had attended school at some time, none of them could read or write, and one girl in particular, Lena, "never took to learning." The father who was a cousin of the mother was also defective. One daughter had married a relative, also defective. In fact, the whole family was known to be poor stock for several generations back. They had been woodsmen, living in the mountains, and had finally drifted into town, where they collected garbage for a living.

The boy seemed relatively harmless and it was recommended that he be excused from school and allowed to work with his father. At the next clinic an official from a neighboring county brought in a young woman and her two stepdaughters, Ethel and Martha. In a recent murder trial of the woman's father, she had seemed so defective on the stand that the Court felt something should be done about her and the family. The daughter Ethel was found to be defective and pregnant and was cared for at a maternity home and then sent to a state institution. Martha was not defective, and a child-caring organization took charge of her. Shortly afterward in our women's reformatory we found the mother of these two girls. She had left her husband years before and had been living around with various men and had finally drifted into Court. She had become sterile through disease and so was not permanently institutionalized. Through her we discovered that this family was related to the defective family previously mentioned.

Next the daughter Lena, "who never took to learning," came to our attention. The family had been put out of the house in which they lived, and as no one else would rent them a place they finally secured a tarpaulin to cover their household goods, and a tent which they pitched alongside the road, and in which the seventeen members of the family lived. Lena, an unattractive, goitrous imbecile, already had one illegitimate child, and was again attracting attention by her promiscuity. She was sent to a state institution, with the coöperation of the State Police, and her child was placed in the children's home. When this child did not develop properly there, she was sent to a private school for defectives, as the state school

space was too badly needed for more acute social problems. Since then we have sent two other members of this family to the same state institution mentioned before, another one to the private school, and another to a state school. Three others who were sent first to institutions for delinquents were discovered there and committed to institutions for defectives before their terms were up. We can no longer persuade the members of the family to come to the clinic, but we are able to examine them through the schools, and so have the defective members listed for future care, as the need arises. Even the few branches of the family mentioned here were under the supervision at various times of 27 agencies and institutions, and before we get all the defective members eradicated, no doubt there will be further expense to the community. But at least we have made a start. We do not expect to clear up the situation in one generation, and are not even attempting to do anything with the older members of the family.

Since the cost of institutional care is proving so prohibitive to the taxpayers, we have to make use of every other facility, special class training, supervision, group recreation, etc., to prevent as much dependency and delinquency as possible. However, this does not get to the root of the situation. In spite of the fact that many of the children of defectives are not defective themselves, and in spite of the fact that nowadays much stress is placed on the idea that mental defect is not as much an hereditary problem as we assumed back in 1912, I have never been convinced that if all the known defectives of this present generation were prevented from reproducing that the number of defectives in the world would not be materially lessened and that then the program mentioned by our sociological friend might ultimately be sufficient. I believe that in sterilization we have the only economical and possible solution.

CONSIDERATIONS ON THE SOCIAL FACTORS IN MENTAL DEVELOPMENT

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Studies on the inheritance of mental disease have invariably used the incidence of this condition in succeeding generations of a family as *prima facie* evidence of an hereditary factor. However, it appears from even a casual examination that the situation is infinitely more complicated. In contrast to the known laws of inheritance of certain physical traits, there is in mental disease an obvious, direct influence of environment in its etiology, as well as the interaction of environment with constitution. Because of these considerations the problem is demonstrably far from the simple one that some genealogical studies would indicate. The very diseases that are being studied in one generation of a family tree and which are presumably inheritable are exerting at the same time a definite environmental effect also. It is the purpose of this paper to indicate the mechanisms by which the unstable parent may so effect the surroundings of the child as to make it an important factor in the development of mental aberrations in the child quite apart from, and in addition to, the problem of inherited tendency.

In consideration of the dynamic concept of mental disease it is postulated that experiences in childhood may lead to a neurosis or psychosis only when the constitution of the individual is phylogenetically predisposed to such reactions. It is also postulated, however, that these childhood experiences act as the pathogenic factor in the etiology of the disease in those who are predisposed. This leads us to the following concepts which are not meant to under-estimate the possible importance of an hereditary factor, but to call attention to the particular environmental factors operating in a situation in which mental disease is present in one or more generations.

We may think of mental disease in its broadest concept as the inability of a person to adjust to his surroundings in a fashion satisfactory to himself and to society. Thus, in order to grow into a socialized human being the developing individual has to make an adjustment between his normal instinctual desires and the desires and ideals of the milieu in which he is reared. Some of these instincts may find a direct or almost direct outlet.

This obviously varies in different cultures. However, those instincts which, in a given society may not find direct expression, must be sublimated or repressed and these two processes start practically from birth. What forms are taken depend probably, in part, on innate abilities and characteristics, and in part on environment, but some expression for these energies must be found either in the individual's own mental life or in his physical activities. It is obvious that the opportunity to find outlets through which sublimation may occur also varies widely in different cultures. But, not only does this opportunity vary according to the society in which the individual finds himself but also with his immediate surroundings, particularly his home and family.

Consider the plight of the child reared in a home with an unstable parent. It is of the very essence of our concept that the child's original ideals of conduct come from his parents—that both what is right and wrong and how he may and may not act are determined by the way in which he is conditioned by them. Furthermore, this conditioning occurring in the earliest years has a profound and lasting effect. The unstable parent, according to our definition of mental illness, is one who has himself been unable to make a successful compromise between his instinctual urges and what he has been taught to consider right and wrong. The resulting conflict must find some expression. It is inevitable, therefore, that the environment that such a parent provides would be a distorted one.

This may be made clear if we consider briefly some of the recent theories on the nature of mental disease. It seems probable from the evidence, that in some individuals there is relatively little ability to handle the instinctual demands; the forces of repression are weak in comparison with them. The balance is lost between external reality with the demands and satisfactions of social living that it implies, and the instinctual wishes. The scale is tipped in favor of the latter. Since development for such a person is rendered difficult and, at times impossible, along the lines which his milieu has laid down for him, he escapes from it by developing a psychosis. But even though there seems to be a constitutional weakness as shown by this inability, it is highly probable that if the life surrounding such a child happens to be, or can be made, acceptable to him, he can adjust to it in a satisfactory manner. In the psychoneuroses the inherent weakness seems to lie in the relative inability to find suitable, healthy, satisfactory outlets in relation to the repressing forces which are too strong. There is too much "conscience," so to speak. The part played by the environment is thus obvious.

In a family in which there is a markedly unstable parent or parents,

there are at least four major environmental factors which might tend to make a child's adjustment precarious, particularly if these constitutional factors were also in operation.

In the first place such a child has to adjust not to the usual demands of his social group, which may be difficult enough, but also to the irrational and distorted view point of the unstable parent. Take for example, the case of a child whose mother has a phobia centering about dirt. The ordinary youngster of one or two years is normally interested in his excreta, as he is in everything else about himself. In the process of socialization he needs such an outlet as is afforded by making mud pies, playing in sand, digging in the garden, and so forth. But this particular child is meticulously kept spotless and is never permitted to live out these normal interests in the usual fashion. He is constantly told that he is bad if he gets at all dirty, and that all such interests are naughty. As a result, one of several things may happen. One boy may retain his interest consciously and live it out on the sly. A second child may do it but feel very guilty about it and hide it. A third boy may escape his mother, play with the crowd, get dirty, take his punishment and feel that it was worth while and that he expiated his guilt by the punishment. And still a fourth child may feel marked resentment against the mother whom he feels is unreasonable, and this helps develop a conflict between the love he feels, or has been taught that he should feel for her, and hatred because of this and other prohibitions. In such a child the prohibition may act strongly enough to repress any overt expression of such interests and he may instead live it out in phantasy. However, he may have acquired such a sense of guilt that he may consider his phantasies bad and repress them. But the energy cannot be repressed, and it may find expression in numerous symptoms or even actual mental disease, particularly as other prohibitions are piled upon him. Who can say in such a case as this last example what part was played by the child's constitution and what by that part of his environment as represented by his mother? This example which, of course, has been much simplified is indicative, however, of some of the factors involved.

In the second place, it may happen and often does, that not only does the child conform to the parental notions in his behavior but in the natural course of his development they will become a part of his own mental structure. If the parental ideas are warped or bizarre, his also may become such and then if he is unable to handle them the conflicts and symptoms arise in him as well as in the parent, although they may find expression in a different form of mental sickness. As an example consider a few of the relevant facts in the case of a woman of thirty-five whose mother was an

undemonstrative person and whose father, although very fond of the patient apparently shared with the mother the idea that any idea remotely concerned with sex should be repressed, and he came to have a definite obsession centering about this. The daughter absorbed his attitude from her earliest childhood and though later she became intellectually emancipated from it, when she fell in love with a man, the association of sexual love with ideas of wrong had been so strongly made that in spite of a good adjustment up to this time, she was unable to enjoy any demonstration of affection from him and gradually drew away enjoying, however, imaginary love-scenes which became more real to her than her surroundings, and finally, came to live in them almost entirely.

This case also illustrates the third point. Namely, that the conflict arising out of the milieu may be intensified by increased experience and knowledge of the world which may make the person realize that what he has accepted differs from the ideas of his group. He wants to be like them, and if he is "normal," he will throw off the unhealthy ideas of his childhood. If not strong enough, there may be several alternatives. Such a person as that described above might, under certain circumstances, enter a convent at a relatively early age and lead a useful and happy life. If circumstances were not favorable for an acceptable retreat and the conflict became too sharp, a breakdown is the result. In the first instance, on the family chart there would be no nervous disease indicated, in the second, a clear cut case. And it is here that the fallacy in much of the genealogical work becomes apparent.

In the fourth place, it is rare to find a home in which there is an emotionally unstable parent, where there is not a lack of harmony, and a feeling of insecurity and fear that may have far reaching results. This was clearly shown in the case of a girl of fifteen who felt that nothing was worth while and was depressed and suicidal. The mother, a schizophrenic, was in a mental hospital but had only been removed when the girl was twelve, though she had been irrational at times for at least ten years. The need for the child to assume the responsibility for the two younger children and the mother, the fantastic demands made on her, and the lack of all security gave her a constant feeling of inadequacy which was not lost even when the pressure was removed, and added to her fear of insanity. It only went after a long period of treatment which brought out the profound effect on her of these earlier experiences and their place in the development of her own sickness.

These four points are intended merely to represent some of the possibilities by which the interaction between environment and inherent trends

may invalidate too definite inferences drawn from family studies. In addition it is frequently found on intimate study of psychoses that these conditions have arisen out of parental maladjustment none the less real, because too subtle to be obvious in the ordinary investigation. The assumption of an hereditary weakness can often be made in many cases, but is felt that this factor can play only a variable part in etiology along with other significant factors which are capable of at least rough evaluation.

SECTION VI

SELECTION, DISEASE,
INFERTILITY

THE PHYSICAL FACTORS IN RACE SURVIVAL

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The first and ever-present problem of a race is whether it is increasing or diminishing in its ability to meet and overcome the obstacles to its survival. The future of a race is dependent upon the increase or decrease in this human quality.

In considering the augmentation of survival value by improvement in racial quality, many have been inclined to stress the improvement in intellectual quality as the prime desideratum. There can be no question of its great desirability and value, but it needs to be recognized that there are other factors that immediately precede it in importance. The first of these is the physical factor. Biological evolution is essentially a physical phenomenon, and the survival prospects of a species depend in the first instance upon the full maintenance of its inherent physical ability to cope with the environmental obstacles that constantly menace its survival. Hence whatever human improvement or advancement might seem to be attained in other respects, the racial outlook can only suffer if the inherent physical qualities of the species that go to insure human survival are in any measure impaired.

Now curiously enough, man through his intellectual superiority over other species, his excursive desires, and an unheeding over-confidence in his intelligence and judgment in pursuing his racial destiny, does much that goes to endanger his physical prospects of survival. Assent is much more readily gained in lauding than in criticising civilized humanity, but sooner or later it will find it necessary to reconsider its position.

In the wild state of men, physical soundness, strength, and activity, together with the requisite equipment to employ these to the best advantage, were factors of supreme importance for their survival. In the civilized state there is the inclination to relegate these factors to a secondary position. In a highly conventionalized and specialized social economy, where the various social tasks fall to particular groups, only certain elements need to possess these physical qualities in any outstanding degree. Biologically, however, they always serve to contribute to the survival value of individuals; and the race has not yet passed the mark, nor ever will, when a

generally high standard of physical soundness and perfection will not still be essential to its best prospects.

In positing intellectual quality as the factor of prime importance, it is sometimes assumed to have an inverse incidence to physical quality. The occurrence of genius, for example, is popularly linked with a frail body. This however has been shown to be erroneous, as the incidence of genius and of high intellectual quality is no greater in physically weak than in physically strong individuals. It is however true that physically strong individuals tend to possess a greater potential capacity for effort and certain temperamental advantages over those who are physically weak. It is a common observation in educational institutions that those who are physically strong and sound as a rule outstrip their weaker companions. Hence a high standard of physical strength and soundness always carries positive advantages and no disadvantages. In two competing racial groups of equal potential mental capacity but of unequal physical soundness, there can be little question of which would have the better prospect of survival.

Undeniably the prime and most important of physical qualities requisite for racial survival is the general physical ability of the female element of a population to bear offspring normally and in sufficient numbers; and it is equally unquestionable that this stands at the head of demographic problems. Nature solves this problem in wild species in an unerring manner by a rigid natural selection. Females that are in any essential manner deficient in this respect succumb, and their weaknesses are not transmitted and perpetuated. As a consequence the reproductive ability and capacity of the surviving females in wild species tends to maintain its standard of adequacy, and a deficiency in individuals is of uncommon occurrence. Unless there is interference with the guidance of biological nature, it is only extrinsic obstacles that may menace reproduction in a species.

It is to be observed that the more nearly the human species approximates to the wild state, the more nearly is this condition attained. In the most primitive tribes that we are able to observe, the women bear their offspring with the minimum travail, the minimum necessity of assistance, and the minimum traumatic complications. Consequently the maternal mortality is low. As we ascend the cultural scale these factors all become less favorable, and the peak is reached in our own civilization. One of the most disappointing things to discover is that with all the advance in medical science,—in obstetric skill, pre-natal care, asepsis, trained nursing, and so forth—and with a greatly reduced mortality in most disease, the maternal mortality of child-bearing has not only had no such reduction in our civilization, but is greater now than it was a generation ago.

For example the maternal mortality in New York City, as tabulated in the accurate statistics of the Health Department, for the period of the 33 years from 1898 to 1930 inclusive, shows some very impressive figures. As these statistics cover almost four million cases of child-birth, they may be taken as indicative. The total maternal death-rate of child-birth gradually rose from 4.77 per thousand in 1898 to 5.43 in 1930, an increase of 24 per cent. But this gross death-rate by no means betrays the full significance of these figures. When we segregate the causes of death in these statistics, we find that the death-rate from puerperal septicemia *fell* from 1.93 per thousand in 1898 to .92 in 1930, whereas the death-rate from *other* causes gradually rose from 2.34 per thousand in 1898 to 4.51 in 1930. Puerperal septicemia is an intercurrent infection of child-birth which is capable of being diminished in its incidence by medical precaution, and of amelioration by medical treatment. But the causes of death in child-birth, other than puerperal septicemia, are mainly due to some abnormal occurrence in labour or to some constitutional weakness. The fall in the death-rate from puerperal septicemia in this period may be fairly taken as the result of an increase in medical skill and care. But increased medical skill and care were unable to prevent the deaths from these other causes from rising from 2.84 to 4.51 per thousand, an increase in maternal mortality in thirty-one years of over 58 per cent. These are startling figures, but they can not be gainsaid. Even making every possible allowance for fortuity, they can only indicate a marked decrease in the physical ability of this large urban group of women to bear offspring successfully.

These facts are all the more arresting when we consider that medical science has been able to bring about a marked diminution in infant mortality, and most diseases, leading to the general prolongation of the average life. We are compelled to draw the inference that our civilization has produced living conditions of women which tend to make human reproduction more perilous, conditions over which not only eugenists but all humanists need feel deeply concerned, and which call for thorough investigation.

A somewhat less alarming, but equally significant fact is to be discovered in the increased percentage of mothers in the United States who are unable to suckle their infants. This increase seems to be general, but rises with the cultural scale. Allowing for the modern tendency toward the artificial feeding of infants, there is still an undoubted actual increase in this physical disability of women. In some reports this inability to suckle their infants runs as high as 75 per cent of mothers. Some observers have found this lacteal deficiency to recur in the daughters of mothers who were so deficient. If such a hereditary transmission should apply to any considerable proportion

of mothers, our population promises in time to become largely dependent for its survival upon other mammals that are more reliable in their lactation. This might not seem to some a very serious threat to human survival, but before it were dismissed as inconsequent, its corrolary biological significance and its nutritional and constitutional effects upon infant development would need fully to be explored.

To determine the exact causes for the increase in unfavorable conditions of reproduction that we have noted would require a most painstaking and exhaustive examination, but the attendant circumstances cannot but come under suspicion. Women bear their children at a later age than formerly, and the average number of children that a woman bears is fewer. Women have changed considerably in their mode of life. Many of them perform much lighter domestic duties, there is a general tendency to minimize such duties, and often to attach much less importance to them than to sedentary occupations external to the home. Indeed many women have averted their attention from tasks that were formerly regarded as germane to them, and turned to interests, to careers, to recreations, and even to dissipations, that were formerly only affected by men. The cogent bearing of these circumstances might be denied by many; but such changes in the mode of life of women must have inevitable physical effects, which may be already asserting themselves.

Equally great weight might be given to the fact that biological nature rigidly cuts off weak mothers and eliminates them from the race, whereas civilized man does his best to preserve them and often succeeds. This is not advanced as an argument against such efforts, but it is only too obvious that it results in lowering the general reproductive ability of the female element of a population. This in itself would constitute a grave racial problem even if medical science had been able fully to compensate this deterioration. Nor does it seem that the gravity of the problem can decrease as long as it is attacked only by the present methods. Medical science achieves its results only through supplementing the processes of biological nature, and these results cannot exceed that for which individuals have the inherent biological capacity. If the biological capacity of women for reproduction and to resist the physical menaces to that crisis is further reduced, medical science will not be able to overcome and compensate this deficiency.

Turning to general physical factors of racial survival and improvement, the broadest evidence of the physical fitness of individuals for survival is in longevity. Individuals who tend to live longest will be those who have the soundest organs and who are most immune or most resistant to intercurrent

disease. Longevity has been abundantly proven by actuarial statistics to be directly connected with heredity. Individuals who come of long-lived parents and long-lived families have been found to have a greater life expectation than those who belong to families whose members have been short-lived. Indeed it is a common observation that individuals, whether they belong to long-lived or to short-lived families show the greater tendency to succumb to affections, and in a manner, that is common in their family, thus indicating susceptibilities that run in families. Hence, environment being equal, the broad means of survival, and we should also note of extinction, lie in heredity.

Under natural biological conditions, individuals with physical anomalies, imperfect organs, and deficient physiological functions tend to be eliminated in each generation, thus removing such physical causes of deterioration in a race. Under our own civilization many such individuals are preserved and often transmit to offspring these physical weaknesses. The racial gravity of this fact has as yet been realized by few. Pathological heredity however is now coming to be regarded as an important study, and the findings from such studies always show the frequent recurrence in many family strains of particular physical defects and weaknesses. Once such defects are transmitted to offspring they go to contaminate and weaken the racial germ-plasm permanently.

Organic defects may be structural or functional, and often are both. They occur in the heart, the liver, the pancreas, the kidney, and the various glands of the body. Thus there may be cardiac deficiencies, hepatic deficiencies, pancreatic deficiencies, renal deficiencies, and glandular deficiencies of various degrees of seriousness. In the great majority of cases these deficiencies are clearly of hereditary origin, and their incidence is frequent or rare owing to whether they are of a dominant or recessive nature, and whether the inheritance factor is present on one or both sides of the individual's pedigree. Their hereditary transmission is abundantly supported by many family studies that have been made of the occurrence of such defects.

While hereditary deficiencies in the sense organs may not always directly menace human survival in our civilization, they are a source of serious disadvantage to individuals and go far to handicap them both in their enjoyment of life and in their accomplishment. Myles Bickerton, one of the most eminent of British ophthalmologists, says: "We know more about the hereditary diseases of the eye than about those of any other organ, for the good reason that, being the most important and complicated of our sense organs, its slightest defects cause marked disturbances of function." We

can only give the briefest summary of Bickerton's findings. From studies extending over a personal experience of forty years, Bickerton shows that there is a hereditary factor in myopia, or short-sightedness, in detachment of the retina, astigmatism, long-sightedness, strabismus, nystagmus, ptosis, ophthalmoplegia, microphthalmia, retinal atrophy, optic nerve atrophy, optic neuritis, aniridia, or absence of iris, congenital and senile cataract, ectopia lentis, glaucoma, blue sclerotics, glioma, night blindness, day blindness, and color blindness. Most of these affections can lead to complete blindness. Bickerton shows beyond any question that there is a hereditary factor in the occurrence of all of them, and that in most cases the recurrence in progeny is high. Hence the contention that blindness seldom or never has a hereditary cause is a mischievous and dangerous untruth.

Davenport has proved beyond doubt that otosclerosis, a leading cause of deafness, is clearly hereditary in its origin. And Blakeslee has shown that deficiencies in the taste function likewise have a hereditary origin.

In any species a high general resistance to disease is of prime importance to its survival. There has been much discussion of the inheritance of disease as to whether a particular disease could be directly inherited, or perhaps only a certain tendency to it. While it is desirable to make this discrimination in regard to a disease and to discover the immediate causes of its occurrence, the importance of the heritable factor can be readily estimated by the frequency in which a disease recurs in family strains. A great number of family studies have been made and family charts compiled showing the incidence not only of physical abnormalities but of particular diseases occurring in family strains. It is invariably discovered that this incidence is far higher in particular family strains than it is in the population at large, and a Mendelian ratio can often be traced. It would seem idle and irrational to assert that this fact was unconnected with the germ-plasm and the genes which are inherited in a family strain, and which determine the physical constitution of individuals.

One might ask the question why some people contract a particular disease and others do not, and receive the answer that it was because such individuals would be the more exposed to such a disease. All observation however goes to show the more correct answer to be that some are the more susceptible to such a disease. In other words they have a congenital constitutional weakness which the more easily admits of the invasion of such a disease.

But let us take an example of where a whole community would be exposed in an equal degree to a disease. Davenport made a study of a community in a valley in the Blue Ridge Mountains in which goitre was highly

prevalent. It need hardly be said the occurrence of goitre is now definitely connected with a lack of iodine in the human system due to its absence in drinking water and in food. Now all members of this community lived under practically equal conditions of exposure to goitre; but it was found that the incidence of goitre was largely confined to certain families in which there was a history of cases in successive generations. In other families who were equally exposed there was almost no record of goitre. It was also discovered that in the families in which goitre frequently occurred there was a marked tendency to deficiency of the thyroid function, to which the goitre could be readily ascribed. Now thyroid deficiency can only be attributed to a hereditary origin. Thus we might expect to find the occurrence of many diseases due indirectly, but none the less certainly, to a hereditary weakness in one direction or another. Further careful study promises to make a similar clarification in the incidence of many diseases.

Observation goes to show that the susceptibility to certain diseases is often associated with particular physical characteristics, which are unquestionably of hereditary origin. We may cite one of many instances. In observations of infantile paralysis, Dr. George Draper found that it affects more frequently children who are brunet, who have mongoloid eyes, deeply pigmented skins, wide faces with widely separated eyes, irregular teeth, and certain endocrine deficiencies. Indeed this might seem to present a picture of physical racial disharmonies consequent upon race crossing at some point in the ancestry. Dr. Draper says that "So far as the paralytic symptoms of polyomyelitis are concerned, the type of child is more important than the virus of the disease itself." And yet an assiduous writer on population conditions, to whom biology must apparently be a sealed book, can ask the question, "Of what practical use is a knowledge of such things as skull measurement and eye color?"

Innumerable instances could be assembled of the transmission from parent to offspring of physical susceptibilities, predispositions, and idiosyncracies. Many are able to trace such inherited traits in their own case, and to observe that they manifest themselves under similar exciting causes, are likely to occur at much the same age, and to follow much the same course as in parents or other members of their family. Physicians constantly encounter such histories, and life insurance companies long ago learned to take account of them. They may not always be a matter of serious consequence, but they go to indicate in many instances the inheritance of physical weaknesses in what can only be inferred to be somatic physical patterns that are closely identical.

To illustrate the causation connection of closely identical somatic phys-

ical pattern with such inherited tendencies, we may cite a case reported of identical twins who were born of a tubercular mother in Wyoming. The mother survived their birth only a very short time and they were at once separated and were never again together. One twin was reared in Wyoming and the other in Arizona. At about the age of eighteen, and within six months of one another, they both developed incipient tuberculosis. This is further remarkable, as the development of incipient tuberculosis is of exceedingly rare occurrence in the climate of the Mountain States. Another case has been reported of identical twins who both developed dementia precox at approximately the same age. It is scarcely to be denied that such cases go strongly to show the inheritance of pathological physical patterns which are practically identical. Such observations lead us to suspect that hereditary predispositions to disease may prove to be far more precise and inevitable in their action than we have hitherto been inclined to think. There is already sufficient positive evidence to warrant the inference that a hereditary factor enters in a greater or less degree into most disease. Many competent observers have reached such a conclusion. Dr. Charles Mayo has expressed the opinion, which we may be certain is not an immature one, that a hereditary factor may be traceable in at least 60 per cent of disease.

Dr. William Carpenter MacCarty has designated two basic causative factors in cancer, namely hereditary susceptibility on the one hand, and prolonged irritation in a susceptible individual on the other. The greater the hereditary susceptibility in individuals, the greater will be the incidence of cancer. Experiments with mice have demonstrated that it is possible to breed a race of mice that is readily susceptible to cancer inoculation, and another race of the same strain that is wholly immune to such inoculation. Now what in our present knowledge offers the greatest promise for the prevention of cancer? Dr. MacCarty expresses the opinion that it lies in the intermarriage of individuals *without* cancer heredity. We cannot afford to neglect such an authoritative opinion, especially when it is realized that the incidence of cancer has practically doubled in a generation. Frederick L. Hoffman, in a careful analysis of the cancer record, shows that the death rate from cancer in fifty American cities increased from 71.6 per hundred thousand in 1906 to 122.3 in 1930. Some mitigation of this increase might be found in the prolongation of the average life and the survival of more people to what is called the "cancer age." But this can scarcely lull us into the belief that a serious and dangerous increase in the most terrible of diseases has not taken place. One cannot disagree with Dr. Hoffman's conclusion that "the menace of cancer is at the present time a more serious problem than ever before during the recorded history of the disease."

But there is still another important observation to be made in regard to cancer. Myron Gordon of Cornell University, by properly controlled scientific experiment, has been able to establish definitely that melanosis, a true form of cancer, may be produced by cross-breeding certain varieties of fish. This fact has also received confirmation in the occurrence of melanosis in cross-breeding by fish-fanciers. To assume that such a principle should not have any application in mammals or in the human species would be against all biological experience. Hence in efforts to eliminate cancer or other pathological stigmata from the human species, the whole subject of cross-breeding would need to come under careful scrutiny.

Thus it might seem that one of the most important fields of preventive medicine, is in the study of pathological heredity, in order the better to understand such heredity and to discover means by which this great cause of disease could be diminished, and in some cases eliminated. Primitive races have always been inclined to attribute the occurrence of disease to inimical spiritual influences; they at least sought a primary cause, and tried to ward off disease by propitiating the spirits. Perhaps it is not altogether a mark of superior intelligence on the part of civilized individuals to assume that the occurrence of disease in the human species is to be regarded as largely casual and fortuitous.

If individuals are free from inherited organic defects and weaknesses, the only serious physical menace to their living out their normal term of life and fulfilling their reproductive and other racial functions may be said to be the intercurrent of infections. It has been known for a good while that such infections are due to germ invasions. Medical science is now able in some instances to combat with greater or less success the invading germ. But the main defence against such invasions is the physiological immunizing function of the human organism. It is possible that medical science may eventually be able to eradicate some diseases. But it will be a very long time before individual resistance will not constitute the main factor in defence against disease and in the maintenance of health. It needs to be remembered that in most cases medical science is wholly impotent to cure a disease without the aid of the physiological resistance of the individual, and the degree and extent of such resistance is inborn and hereditary. The greater this resistance, the less invasion of disease there will be; and the successful or unsuccessful treatment of disease depends again upon individual resistance.

The constant menace of these germ enemies of a species is not to be underrated. There is good reason for thinking that they have at times been responsible for the destruction not only of breeding groups but for that of entire species. Professor Osborn is inclined to attribute the extinction of

the pre-historic American horse to a germ infection analagous to rinder-pest, carried by a fly. This inference has received a certain support from the subsequent discovery of a fossil tsetse fly. A similar occurrence among cattle is to be observed in Africa today. The most plausible explanation that has been offered for the decline of the great Maya race and its civilization is in a lethal endemic or epidemic germ infection. A similar cause has been inferred for the disappearance of racial groups in other instances. The Black Death of the Middle Ages is computed to have destroyed 60 per cent of the population of Europe. In 1919 a world-wide epidemic of influenza, which medical science could do little to arrest or to combat, gave us a mild idea of the human toll that a germ infection can take. It is not difficult to envisage much more serious results in the future in the event of any marked lowering of the general average of racial vitality and resistance.

Biological nature, in what some might regard as its crude and cruel way, sacrifices many individuals in the invasion of infections. But a species emerges with an augmented resistance in the surviving remainder, which tends to become in time a thoroughly protective immunity. A race is manifestly stronger in its resistance that has acquired a measure of immunity through long exposure to infections than one that has escaped exposure or been protected from them. For example there is a large measure of resistance and immunity in European races from long exposure to tuberculosis, the germs of which all individuals breathe in daily. This immunity would be much greater if racial strains which were susceptible to tuberculosis did not interbreed, or made a determined effort toward outbreeding. But while the incidence of tuberculosis in European races might still seem to us all too great, it might be cited that in a company of 30 or 40 Esquimaux, which was brought on one occasion to an American exhibition, something like half of them contracted tuberculosis within six weeks, whereupon the rest were promptly returned to their northern habitat.

It has recently been discovered that the remnant of the Maya race that survives is highly immune to syphilis. Those who contract it recover spontaneously with no serious effects. But many, if not most, are wholly immune to it, and do not contract it on exposure. The reasons for this immunity have yet to be demonstrated, but the most likely inference would be that it arose from syphilis being endemic in this race for many generations, until a completely protective immunity was established. If this is so, it would go to confirm the supposition that syphilis was originally indigenous to America, and was only introduced into Europe after the discovery of America. This does not necessarily indicate however that syphilis was the par-

ticular infection that was responsible for the decline of the Maya race, although that may be a possibility.

The immunologist has three great tasks before him. One is to fortify and relieve individuals who are menaced or attacked by an infection. A second is to eradicate and eliminate the occurrence of infections where that is possible; but this can only be permanently accomplished by exterminating the organism that causes them, otherwise they return upon the least relaxation of vigilance. The third and most important task of all is to build up the general resistance of the race. And this is the greatest, and possibly the only permanent, benefit that the immunologist can confer upon the race.

Now there is one most effective means of building up immunity to intercurrent infections, as well as of eradicating hereditary weaknesses, namely by the interbreeding of those who possess high immunity, and who are wholly free from such hereditary tendencies. We know for one thing that it is possible by such means to breed a race of mice that is entirely immune to cancer, whereas other breeds of mice will be susceptible to it. We also know that it is possible to establish immunity to particular diseases in plant strains by the interbreeding of strains that are found to be immune. Hence through the interbreeding of individuals who are highly immune, and free from pathological stigmata, we may attain high immunity to intercurrent infections and a great measure of freedom from hereditary weaknesses. Through breeding between those of high immunity and those of poor immunity, these tendencies will recur in a certain incidence. And through the interbreeding of individuals of poor immunity, or hereditary predisposition, we can anticipate an inevitably high incidence of such tendencies.

We are compelled to recognize that medical science, in its humanitarian purpose, preserves in many instances individuals who, under the normal biological process of natural selection would be eliminated and cease to be a source of weakness to the race. But surely medical science should take some thought that such racially weakening influences be not perpetuated. We do not maintain that medical science need relax its efforts to prevent disease, to ameliorate suffering, and to save human life, provided that it at the same time seeks effective means of improving the general quality and resistance of the race. But if medical measures, however immediately effective they may be, only succeed in lowering the general resistance and racial vitality by preserving weaker breeding strains, which in turn will reproduce and perpetuate their physical weaknesses, we cannot regard such measures as contributory to the ultimate improvement of a race, or to its survival. Indeed it only raises the possibility of an eventual racial cataclysm in a weak-

ened race, which medical science itself might not to be able to avert or to overcome.

No one would be warranted in thinking that medical science is as yet, or perhaps ever will be, in position to ward off the sudden assault of a virulent infection on a race of lowered vitality and resistance. Indeed unless a race by its own folly took some other short cut to its doom, the gradual lowering of its physical vitality and resistance would seem to be almost the greatest menace to its survival. Hence if medical science does not address itself equally to sustaining and building up the physical factors that lead to race survival, as well as to individual palliation and relief, it promises to diminish, rather than to augment, the racial prospect for survival.

HEREDITARY DEFORMING CHONDRODYSPLASIA

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There is a group of diseases and growth distortions involving the bony skeleton during its period of development, concerning which knowledge is limited, but in regard to which interest is increasing. These affections have a common bond in that they make their appearance in infancy or childhood and tend to become fixed at skeletal maturity, that they depend upon some inherent disorder of bone formation which evidences itself in skeletal abnormalities and deformities, and that they can be traced through family lines.

This group offers a fascinating field for scientific research because it presents clearly that most illusive element in etiology, namely inheritance, and it ties up pathology with biology and genetics in an intriguing fashion. This is properly the field of the physician, because he has the contacts which enable him to observe and record these cases, even if medicine as yet offers little relief and no solution. On the whole slight attention is paid to these obscure conditions; the study of heredity and genetics in general is given limited space in medical curricula, and abnormalities of this sort are frequently dismissed as curiosities, with little effort to solve the mystery of their origin. And yet the only "cure" that medicine can offer is the eugenic prescription of selective mating.

A serious hindrance to a proper understanding of disorders of this class is the hopeless tangle of medical terminology which surrounds them. And the very designations used in describing these conditions are often confused,—the distinctions between such commonly used terms as "congenital," "inherited," and "familial" are not sharply drawn.

What is needed is a strict definition of terms, a standard descriptive nomenclature, and a classification which allows each affection to be placed in its proper relation to other members of the group. For instance, properly speaking a disorder is "congenital" only when it is apparent at birth. A disorder may be called "innate" or "inherent" when it can be referred to some anomaly or peculiarity of the germ plasm. A disorder is "familial" when it occurs in families. A disorder is "hereditary" only if:

- (1) Its distribution corresponds to a primitive anlage, implying an innate anomaly of the germ plasm;
- (2) The identical affection can be traced back through previous generations, and
- (3) All other causes can be ruled out.

Disorders originating before birth (no matter when they first become apparent) may be divided into two major subdivisions, those that are *innate or inherent* and those *acquired in utero*. The first class can be divided into those that have been shown to be hereditary, such as hemophilia, and those which have not been shown to be hereditary, such as hare-lip. The second class can be divided into mechanical, such as intra-uterine fractures or amputations, and infective, for instance congenital syphilis.

Such a scheme as this suggested is inclusive enough to cover the entire field, simple enough to allow of easy comprehension and retention, and is clear cut in its definition. Further subdivisions will readily suggest themselves.

The affection which I am discussing particularly has been known for centuries as something of a freak of nature, but only within comparatively recent years has it been the object of serious scientific study. In 1915 (1) I reported a single case with pathological study at the annual meeting of the American Medical Association as something of a rarity, but within two years I was able to collect in Boston twelve more personal cases. We now know that the affection occurs all over the globe, and its hereditary nature has been established. Percy Stocks reporting in 1925 (2) from the Francis Galton Laboratory for National Eugenics of the University of London, was able to collect 1237 well-defined cases reported in the medical literature. The distribution, as in other known hereditary diseases, is sex-linked,—males being affected predominantly, in the proportion of 3 to 1.

The pathology depends essentially upon a retardation and disorderly exuberance in the bone-forming function of the epiphyses of the long bones. But any bone laid down in cartilage—(ribs, pelvis, vertebra)—may be involved. In the majority of cases (about 70 per cent) this growth distortion involves the skeleton symmetrically; in some, one side of the body is more affected than the other, and in an unusual case one side alone is affected.

As a result of the lack of orderliness the bones become thick or irregular toward their ends, and bony overgrowth occurs. The process ceases, naturally, with the cessation of skeletal growth.

As a result of the retardation, the arms and legs are abnormally short in relation to the body; the patient is accordingly short in stature and the hands hang high. Sometimes the dwarfing is extreme.

All the long bones are not equally affected by this retardation, the ulna is shortened relatively more than the radius, and the fibula more than the tibia. In the forearm this has peculiar results. As long as the upper and lower radio-ulnar ligaments hold, the radius equalizes its increasing length by bowing outward. If the upper ligaments of the radius break loose under the growing strain, a dislocation of the upper end of the radius results. If the lower end gives way, the hand is deflected to the ulnar side.

The relative shortening of the fibula may cause a valgus of the foot, which gives rise to disability in walking. If the legs retard unequally, there is a secondary scoliosis. Asymmetrical growth distortion at the knees may give rise to genu valgus or knock-knee. The phalanges of the fingers and toes may be short, deformed or deflected.

The bony overgrowth and irregularity is much more frequent at those ends of the long bones where growth in length chiefly occurs, thus at upper end of humerus and lower end of radius and ulna, and at the knee end of femur and tibia. At these points the centre of ossification appears earlier in the epiphysis and the epiphysis unites later.

Sharp bony excrescences,—exostoses,—appear so frequently as to be characteristic of the disease. Sometimes these give trouble by pressure on nerves or blood vessels; by fracture; by developing bursae, which inflame; by obstructing the birth canal; or rarely, through proliferation of their cartilaginous elements, they develop a fatal malignancy.

Of immediate interest is the consideration of the transmission of this disease by heredity. And here I will make free use of the statistical study of Stocks.

In 1,172 cases (excluding all cases with associated enchondroma) Stocks found 765 (or 65.3 per cent) that gave definite evidence of the same disorder in relatives or antecedents. In 32 per cent the family history was found indefinitely positive, or was not mentioned. In 3 per cent the family history was reported negative.

In considering these figures, it must be borne in mind that many of the case-reports date back to the days before the diagnostic use of the x-ray, and before heredity was considered seriously as a factor in the disease. Also it must be reckoned that many patients have limited knowledge of their relatives and forebears, and some have a disinclination to give data which they may possess. And the 3 per cent of cases that give a negative family history might yield pertinent data on more persistent inquiry.

Of 758 cases giving their nearest relative affected, 60.3 per cent inherited directly from a parent,—43.5 per cent from the father and 16 per cent from the mother. It is interesting to note that 73.7 per cent of the males in this

group inherited from the father, and 56 per cent of the females from the mother.

It was found that if the father was affected 52.4 per cent of the offspring had the disease, while if the mother was affected 41.4 per cent of the children were affected.

It has long been recognized that the disease may be transmitted by an unaffected female. Stocks found that about 5 per cent of all cases seem to inherit through an unaffected mother, and that about 25 per cent of females who transmit show no evidence of the affection. But these unaffected mothers transmit with the same intensity and in the same proportion of offspring as those affected. No case has been recorded of an unaffected male transmitting the disease.

A study of the grandparents in relation to the parents yields interesting data. It has been found that when the father and his father are affected, 63.4 per cent of the children are affected; father and his mother give 45.7 per cent; mother and her mother 43.8 per cent; and mother and her father give 37.5 per cent. Thus two successive generations of males give by far the highest percentage of occurrence.

Insofar as the affected male is known to transmit to a higher percentage of his offspring than the affected female, it will be seen that in successive male transmissions this effect will be cumulative. But this tendency may be offset in some measure by the observation that a considerable percentage of affected males are likely to remain single.

On the other hand, Stocks records 9 instances of an affected person marrying twice—6 males and 3 females. There was a total of 43 children. In the first marriages 60 per cent of the offspring were affected, and in the second marriages 77 per cent.

Consanguinity has not appeared as an important factor in the condition,—having been noted in only five families in this series. The affection is reported as having been found once in a pair of twins.

In *summary*, I have stated the opinion that scientific medicine in its recent developments has taken but little cognizance of the tremendous force of hereditary factors in the origin and occurrence of disease.

That if the data available in medical literature on the subject of disorders determined by germ plasm were organized and classified, it would lead to a clearer understanding of the subject, and a better appreciation of the influences of heredity upon human life and health.

That hereditary deforming chondrodysplasia, which I have briefly described, clinically, pathologically, and genetically, is a well-defined disease

entity, widely distributed, of hereditary origin, which lends itself well to further study in the hereditary transmission of disease.

That hereditary disorders,—properly defined,—can be eradicated only through the application of the principles of eugenics.

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SELECTIVE ELIMINATION AS A FACTOR IN INCREASING THE IMMUNITY OF POPULATIONS

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"Nature is beneficent—life giving—but also ruthlessly destructive. Its eternal shower of blessings has not effaced or even dimmed the edict that only the fit shall survive."—M. LUCKIESH.

In his presidential address before the American Pediatric Society in 1923, Holt (1) discussing the reduction in the mortality in infancy and childhood in New York City said, "However we may speculate as to the true explanation, the fact remains that we are witnessing a remarkable reduction in mortality in infancy and childhood. We should all like to consider this as a result of the advance in preventive medicine and in hygiene, and undoubtedly much of it is due to these causes, but there remains a large factor for which as yet we cannot satisfactorily account." In a paper (2) published shortly after, I suggested that the explanation was to be found in the action of selection, the most susceptible infants and children succumb and are eliminated as possible parents, the survivors more resistant transmit this advantage to their offspring so that fewer deaths occur. I also emphasized the fact that in large centers of population with their great congestion contact infection was more common, so that such a selective elimination would occur with greater certainty and at an earlier age. In families in which in addition to an infant there are older children who attend school and mingle freely with other children the common communicable diseases of childhood can be introduced into the home, so that even young infants may be infected. Children of preschool age may be infected in nurseries or kindergartens, in institutions for the care of infants and young children, or in the wards or out-patient department of hospitals.

At the outset it is important to distinguish between good health as judged by the state of nutrition or muscular development, and resistance to the specific infectious diseases. Nothing in the general appearance is a certain indicator of adequate immunity reactions. These are dependent on hereditary factors, although they can be modified by the character of the feeding and hygiene. The hereditary factors have been studied most carefully in diphtheria in which by means of the Schick reaction we have a simple

method of determining susceptibility. The Hirszfelds (3) have shown that when both parents have a positive reaction, that is are susceptible to diphtheria, almost all the children have a positive reaction; when both parents have a negative reaction, about one-third of the children have a positive reaction, two-thirds a negative reaction; and when one parent is positive, the other negative, one-half of the children have a positive reaction. The experimental work of Webster (4) on laboratory animals has also demonstrated the hereditary factors in resistance to infection, and the important rôle of selective elimination. "Five hundred female and one hundred male mice of The Rockefeller Institute strain were mated, one male to five females. When the young were weaned, the six hundred parents were given intrastomachally three million enteritidis mouse typhoid bacilli. In cases in which both parents died within ten days after infection and in which, on the other hand, both parents survived sixty days, the respective litters from susceptible and resistant parents were saved for further breeding. . . . Thus far, five lines of susceptible mice and six lines of resistant mice have been selected. The susceptible lines show approximately 95 per cent mortality within fifteen days after exposure, the control group shows 35 to 40 per cent, and the resistant lines show approximately 5 per cent mortality over the sixty-day period of observation."

In infants a very rigid selective elimination process takes place from the time of conception (chart 1). A large number of fetuses do not survive the first few months of intrauterine life, of the remainder many are still born or succumb shortly after birth, unable to meet even the first tests of extrauterine life. Many of those who survive the neonatal period are constitutionally inferior, afflicted with the so-called exudative, lymphatic or neuropathic diathesis, and die as the result of comparative mild infections. At the second international eugenic congress in 1921, Holmes and Goff (5) demonstrated that in intrauterine life and in infancy the male is the weaker sex, and that this is due to biologic factors. It may be stated as a general rule that the greater the selective action the greater will be the ratio of male to female deaths, and as the infant mortality diminishes the ratio of male to female deaths tends to increase, because the selective action becomes increasingly prominent. In England and Wales (6) from 1841 to 1850 the infant mortality was 153 per 1000 births, with a ratio of 122 male to 100 female deaths, in 1926 with an infant mortality of 70, the ratio had risen to 130 male to 100 female deaths. New York City has now an infant mortality rate of 56 per 1000 births with a ratio of 134 to 100, and under five years the ratio is 125 to 100 female deaths, indicating that at that period the selective action is still marked. As Bakwin (6) states during the summer the

ratio of deaths in male infants to female infants is low, in winter high. This we should expect, for in the summer the infant deaths are caused chiefly by digestive disorder, and are due to improper feeding, the use of impure milk, so that the unfortunate infants of the poor and less intelligent are primarily affected. In the winter the deaths are caused chiefly by respiratory infections, against which we have no adequate control, so that the unfit among the intelligent and well-to-do are equally endangered, the selective action is more marked, and the ratio of male to female deaths is higher. As indi-

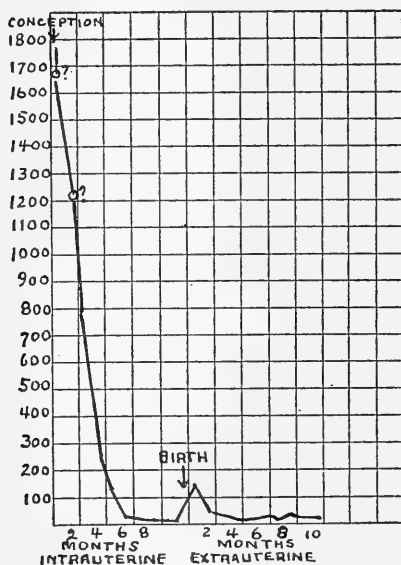


CHART 1. ANTE AND POST NATAL MORTALITY (PFAUNDLER)

cated in chart 2 the sex ratio in digestive diseases is 128 to 100, that in respiratory diseases is 135 to 100. In early infancy the selective action is most marked, so that the ratio is high, namely 139 to 100. This explains why in spite of great improvement in preventive medicine and in hygiene, the deaths at this period have not been reduced. As the mortality in infancy and childhood decreases, the respiratory infections become increasingly important. Measles, whooping cough and influenza, with the frequently complicating pneumonia, become the chief selective agents (chart 3).

The statistical data of New York City have the advantage that in addition to the large number of cases, they have been compiled in a uniform manner under the supervision of the same chief of the Bureau of Vital Sta-

tistics, Dr. Guilfoy. The total mortality has been much reduced (chart 4), largely through a reduction in the deaths in infancy and childhood.

The most important causes of deaths may be conveniently divided into three groups (*a*) Diseases of middle and old age, largely degenerative, in

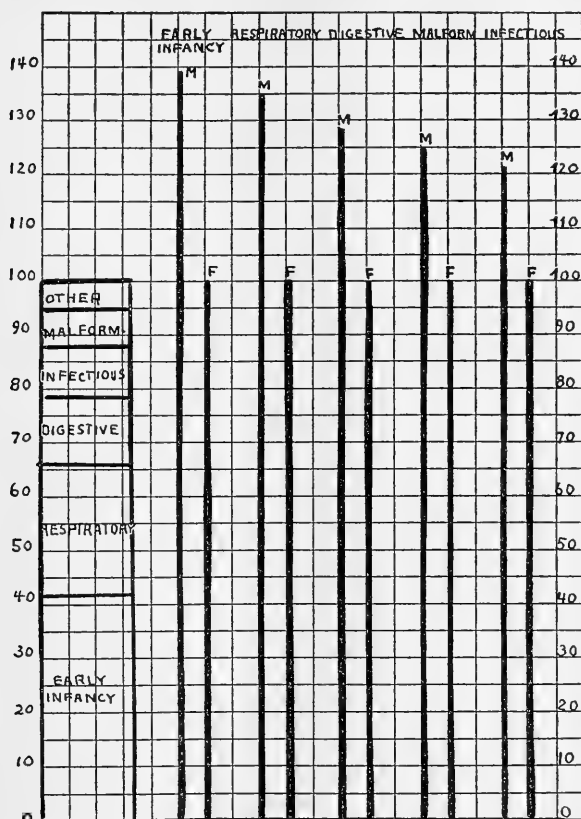


CHART 2. MORTALITY UNDER ONE YEAR OF AGE. PRINCIPAL CAUSES OF DEATH. RELATION OF MALE TO FEMALE DEATHS. NEW YORK CITY, 1928

which there is little selective action, and therefore little or no reduction. (*b*) Diseases of children as well as of adults, in which there is a moderate selective action, and therefore some reduction. (*c*) Diseases almost exclusively of childhood, in which there is marked selective action and a great reduction in mortality. (Table 1.)

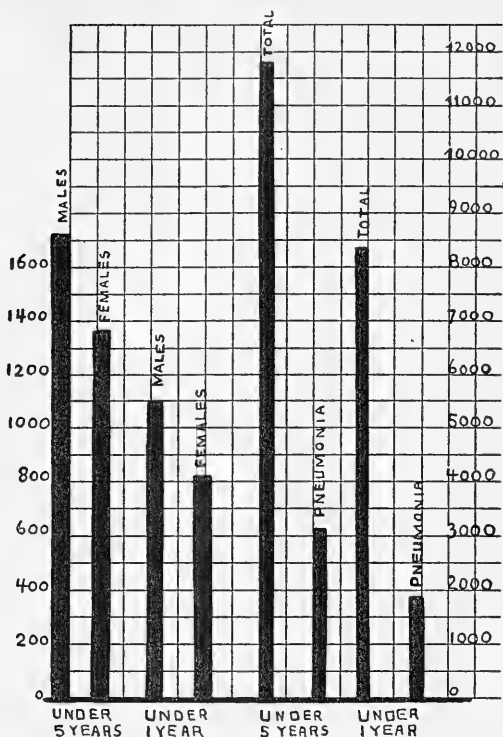


CHART 3. DEATHS FROM PNEUMONIA UNDER ONE YEAR AND UNDER FIVE YEARS.
RELATION OF MALE TO FEMALE DEATHS. NEW YORK CITY, 1928

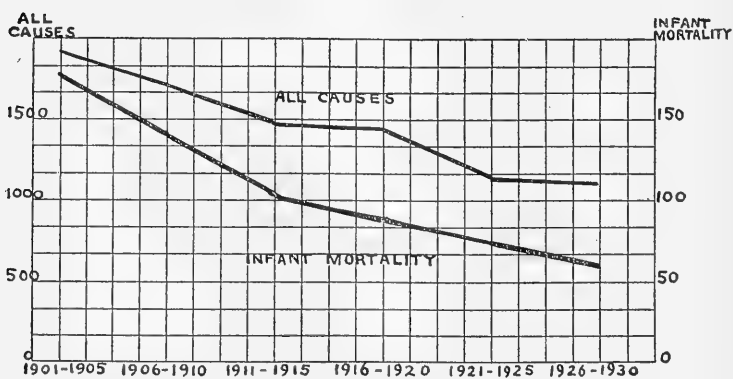


CHART 4. DEATHS FROM ALL CAUSES PER 100,000 POPULATION. INFANT MORTALITY
PER 1000 BIRTHS, NEW YORK CITY, 1901 TO 1930

As a representative of the first group, there has been a steady increase in the number of deaths from cancer (chart 5). As the disease occurs almost entirely in late middle and old age, the reproductive period is not affected,

TABLE 1

Percentage of the total deaths which occur under twenty years of age, New York City, 1928

LITTLE SELECTION	PER CENT UNDER 20 YEARS	MODERATE SELECTION	PER CENT UNDER 20 YEARS	MARKED SELECTION	PER CENT UNDER 20 YEARS
Arterial disease	0.1	Tuberculosis	12.3	Scarlet fever	87
Cancer	1.0	Lobar pneumonia	22.8	Diphtheria	95
Cerebral hemorrhage	1.5	Broncho-pneumonia	51.0	Measles	98
Diabetes	2.2			Whooping cough	100
Chronic nephritis	2.3				
Heart disease	2.9				

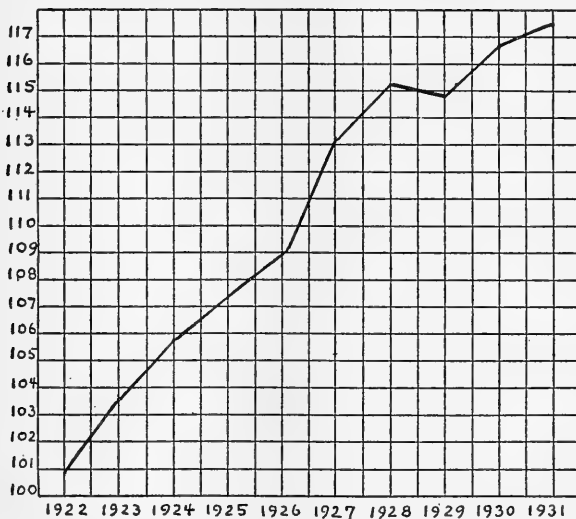


CHART 5. MORTALITY FROM CANCER PER 100,000 POPULATION, NEW YORK CITY, 1922 TO 1931

so that there has been no selective action. With the increase in the number of children who survive, there is an increase in the proportion of adults in the population, so that more reach the age when cancer and the degenerative diseases are liable to occur.

The mortality from tuberculosis has been reduced in all large cities, and the reduction began even before the isolation of the tubercle bacillus in



CHART 6. PERCENTAGE OF DEATHS WHICH WERE DUE TO PULMONARY TUBERCULOSIS, NEW YORK CITY, 1804 TO 1853

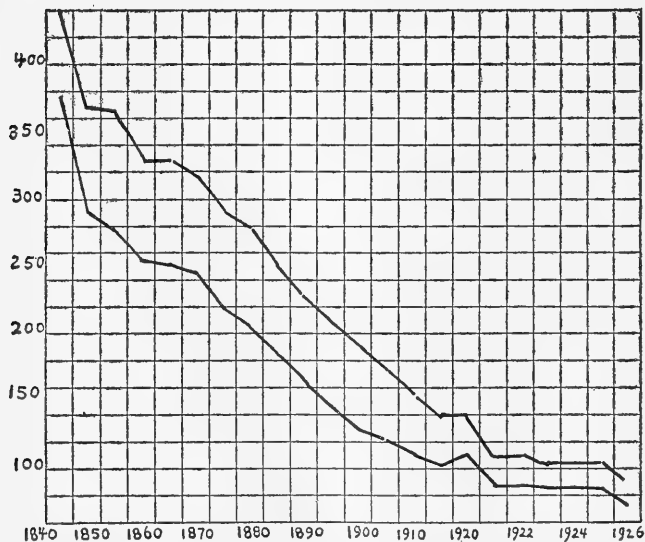


CHART 7. MORTALITY FROM ALL FORMS OF TUBERCULOSIS AND FROM PULMONARY TUBERCULOSIS, PER 100,000 POPULATION, ENGLAND, 1838 TO 1926

1882 (chart 6, 7 and 8). Undoubtedly a large part of this reduction has been due to preventive measures and improved hygiene, greater care in the

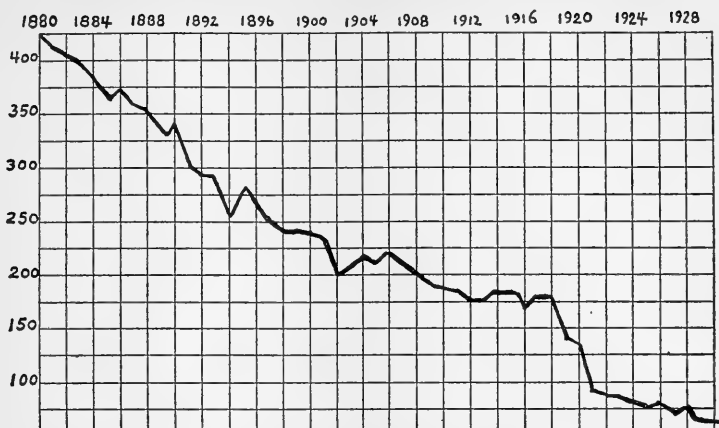


CHART 8. MORTALITY FROM PULMONARY TUBERCULOSIS PER 100,000 POPULATION, NEW YORK CITY, 1880 TO 1931

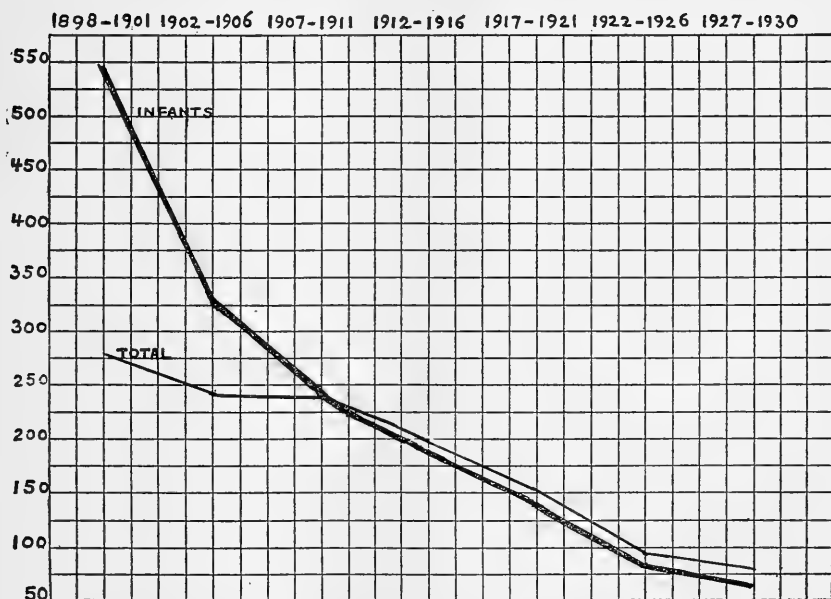


CHART 9. MORTALITY FROM TUBERCULOSIS IN INFANTS PER 100,000, AND TOTAL MORTALITY FROM TUBERCULOSIS PER 100,000 POPULATION, NEW YORK CITY, 1898 TO 1930

prevention of contact infection, the earlier diagnosis and more efficient treatment, but in addition to a certain extent the susceptible strains have been eliminated. It will be noted (chart 9) that in the first ten years of this century there was a marked reduction in the mortality from tuberculosis in infants as compared to the total mortality from this disease. There may be a distinct difference in the mortality from tuberculosis in different groups living in the same city under similar environmental conditions. Fishberg (7) reported that in New York City from 1885 to 1890, the death rates from tuberculosis were, taking the Poles and Russians (principally Jews) as 100:

Hungarians.....	158
Americans.....	209
English.....	329
Germans.....	335
Irish.....	659
Negroes.....	759

Chart 10 shows the mortality from tuberculosis among the Jews in 1925, as compared to the general population, and also the registration area of the United States. Environmental conditions are similar, in fact a large number of Jews are poor and live in the lower east-side of the Borough of Manhattan, in crowded and not too sanitary tenements, where the opportunity for contact infection is very great. Notwithstanding, the mortality at all ages is distinctly less. The accepted explanation is that having lived in Ghettos for centuries, a selective process has eliminated the most susceptible strains. This is well illustrated by the following observation reported by Boyd (8). "The war has recently furnished an interesting example of the truth that when members of an isolated community in which tuberculosis is rare are brought into contact with people among whom tuberculosis is common, they show extreme susceptibility to the disease. The example is provided by the inhabitants of Jerusalem. Two classes of Jews have returned from their exile of centuries. The first comprises the Jews scattered all over Europe and America, living in the most crowded districts of the great cities under the worst conceivable conditions, but with an acquired immunity so great that the disease has no terrors for them. There is universal tuberculous infection but no tuberculous disease. The tuberculin test is positive. The second group is that of the Jews of the Yemen, who have led an isolated nomadic life in the Arabian desert and for centuries have been shielded from tuberculous infection. The tuberculin test is negative. These two groups of the same nation met in the streets of Jerusalem and the result was disastrous to the Jews of the desert, for they

acquired from their urban compatriots not only tuberculous infection but also tuberculous disease and died off in large numbers."

"The deaths which occurred in the severe epidemic of influenza in 1918, were to a great extent selective (chart 11). There was a marked increase in the total number of deaths, due for the most part to the complicating pneumonia. But it was also responsible for a large number of deaths in persons afflicted with diseases of the heart and circulatory system. As practically all children are susceptible to influenza (epidemic catarrh) just

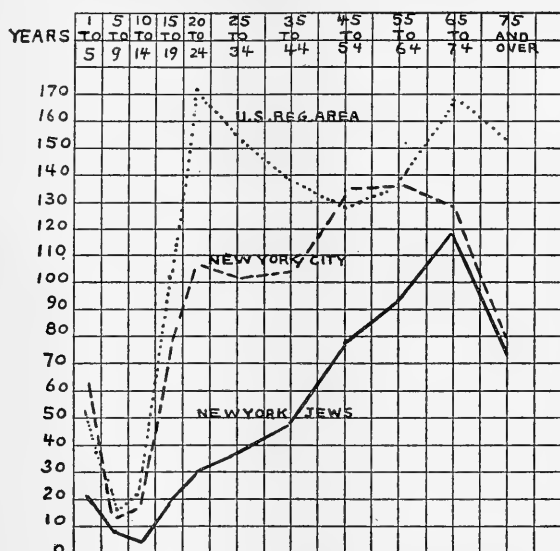


CHART 10. MORTALITY FROM TUBERCULOSIS PER 100,000 POPULATION AT VARIOUS AGES

Dotted line, United States registration area; dashed line, New York City; solid line, Jews of New York City (Jewish Communal Survey, New York, 1928).

as they are to measles, they must all submit to these tests of their immunologic reactions at a comparatively early age especially in large urban centers. These two diseases have therefore an important selective action. An interesting illustration of the difference in susceptibility and resistance in different groups depending on whether or not they have been subjected to selective elimination, is described by Crampton (9). In a vessel sailing from San Francisco several passengers developed influenza on the voyage to the South Sea Islands. The vessel arrived in November 1918, and the passengers were allowed to disembark at Papeete. Within a few days the

disease spread among the inhabitants of the islands, so that nearly all were infected, but in spite of the rather unfavorable climatic conditions of the tropics for foreigners very few died, among the half-castes a small per cent of deaths occurred, but among the natives the mortality was from 15 to 25 per cent."

A similar high mortality has often been noted when measles has been introduced into an isolated community in which the disease had not occurred

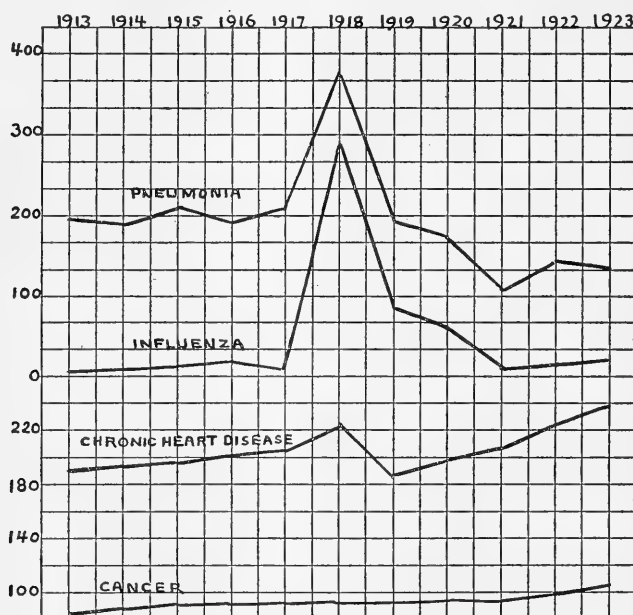


CHART 11. MORTALITY PER 100,000 POPULATION FROM PNEUMONIA, INFLUENZA, CHRONIC HEART DISEASE, AND CANCER, NEW YORK CITY, 1913 TO 1923

for one or more generations. On the other hand when a disease has been common, for example malaria among the Negroes of Africa and cholera among the natives of India, non-resistant strains have been eliminated, so that the native population enjoys a relative immunity as against foreign immigrants.

A very large part of the remarkable reduction in the mortality from diphtheria is undoubtedly due to the introduction of active immunization against this disease (chart 12) but in the case of measles, scarlet fever and whooping cough (chart 13), we have as yet no certain specific treatment.

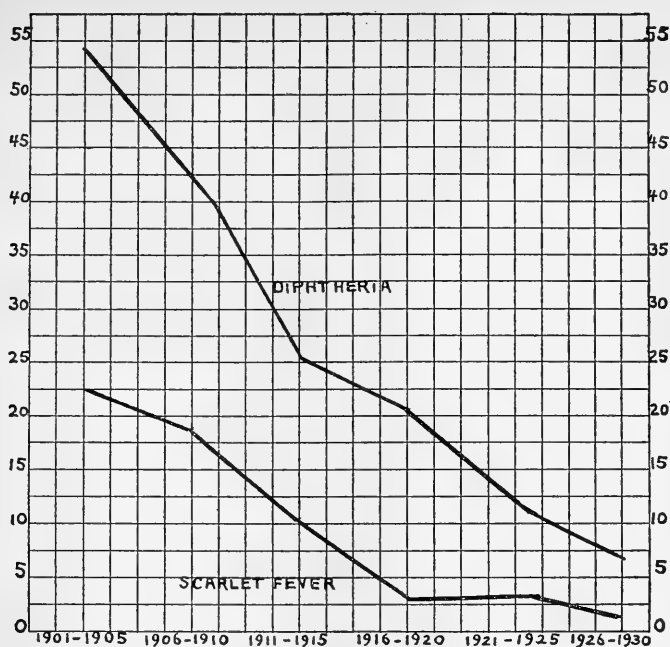


CHART 12. MORTALITY PER 100,000 POPULATION FROM DIPHTHERIA AND SCARLET FEVER, NEW YORK CITY, 1901 TO 1930

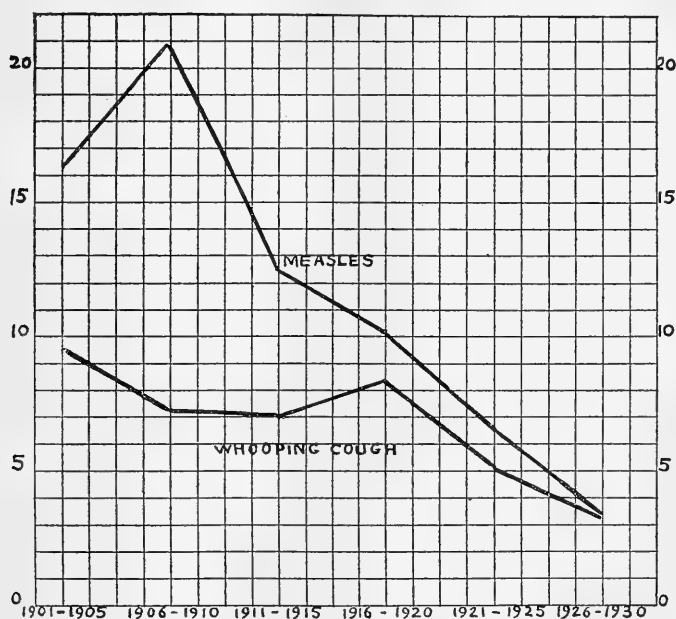


CHART 13. MORTALITY PER 100,000 POPULATION FROM MEASLES AND WHOOPING COUGH, NEW YORK CITY, 1901 TO 1930

Antitoxines, vaccines and convalescent sera have not been employed in a sufficiently large number of patients to have a definite effect in reducing the mortality. Preventive measures and improved hygiene have been of undoubted value, but as Holt says they do not satisfactorily account for the marked reduction. A very good illustration of the difference in resistance to scarlet fever is furnished by Yoyoda (10) and his co-workers. Working in Dairen in Manchuria, they compared the relative susceptibility of the native Chinese and Japanese to the Dick toxin, and made a statistical study of the relation of scarlet fever morbidity. The environmental conditions were similar for both groups. Of 11,000 Japanese tested 37.3 per cent were Dick positive, of 3500 Chinese only 19.4 per cent were positive. The average annual morbidity from scarlet fever among the Japanese was 361 per 100,000 among the Chinese only 8 per 100,000, that is the Japanese were 45 times as susceptible as the Chinese. The Chinese especially those of northern China have suffered severely from famine and disease, and have therefore been subjected to rigid selective elimination so that only the more resistant lines have survived. Of these the hardier and more adventurous seeking more fertile land have migrated to Manchuria. In Hawaii also striking differences between these two groups have been noted. Both have a high birth rate, but among the Japanese the death rate is high, and the infant mortality rate very high, while among the Chinese the death rate is low, and the infant mortality very low.

SUMMARY

1. Although preventive measures and improved hygiene have been important factors in the decrease in the mortality in infancy and childhood, they do not fully account for the remarkable reduction.

2. In addition there has been a selective elimination of the less resistant strains which are thus prevented from becoming parents. In large centers of population, on account of the congestion, contact infection and selective elimination takes place at an earlier age.

3. The relative number of deaths in male and female infants and children, is a fairly reliable index of the amount of selective elimination. The greater the ratio of male to female deaths the greater the selective elimination. As the mortality in infancy and childhood decreases, the sex ratio increases. The respiratory infections as causes of death have a more selective action than the digestive disorders, therefore the sex ratio is higher in winter than in summer.

4. The reduction in the total mortality in New York City, has been due chiefly to the reduction in the mortality in infancy and childhood. This

has resulted in an increased proportion of adults in the population, with a resulting increase in the number of deaths from the diseases peculiar to middle and old age.

5. The most important causes of death may be conveniently divided into three groups. (a) Diseases of middle and old age, in which there is little selective action, and little or no reduction in the death rates. (b) Diseases of children as well as adults, in which there is moderate selective action, and some reduction in the death rates. (c) Diseases almost exclusively of infancy and childhood in which there is a marked selective action, and in which there is a great reduction in the death rates.

6. As the mortality in infancy and childhood decreases, the infections of the respiratory system become increasingly important, and as the etiological factors are to a great extent beyond our control, measles and epidemic catarrh (influenza) with their complicating pneumonia, are the chief agents in the selective elimination process.

7. In different groups living under similar environmental conditions, there may be marked differences in the adequacy of their immunologic reactions, which in turn are dependent upon the amount of selective elimination of non-resistant strains that has previously occurred.

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THE INHERITANCE OF ALLERGY WITH SPECIAL REFERENCE TO MIGRAINE

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For some years during the course of treatment of different forms of allergy at the Balyeat Hay Fever and Asthma Clinic in Oklahoma City, various facts concerning the inheritance of allergy have been noted. It is the object of the present study to determine as far as possible from the material thus collected the type of inheritance displayed by that form of allergy called migraine. The study was made entirely from a genetic point of view and the material used began with the available records of patients of the Balyeat Clinic.

In 1929 the writers of this paper made a preliminary genetic study of twelve family pedigrees. They concluded that there is probably only one gene involved in the different allergies and that the gene acts as a dominant Mendelian unit, although its dominance is often incomplete, sometimes skipping a generation, and that the environment is at least to some extent responsible for the expression of this gene.

In using the term "migraine" we refer to those patients who have paroxysmal headaches characterized by hemicrania (also bilateral headaches) and who have symptomatic evidence of cortical involvement. There are headaches due to hypersensitiveness that cannot be classified as migraine since they do not have cortical features. These cases have not been used in our study. It may be remarked that this restricted definition of migraine makes even more striking some of the genetic situations later described, in which persons who have only migraine transmit several other allergies to their descendants.

The methods used in the present work are similar to those by which material was collected for our preliminary paper. Detailed questionnaires to patients were employed to obtain the family histories used for our pedigrees. The questionnaires asked for specific facts concerning each member of the family. When there was any doubt as to an answer, letters were written about specific points, and in many cases a series of letters was sent to a single individual. Since the patients treated by the clinic are of a high

type of intelligence (see below), the information obtained is looked upon as very trustworthy.

We realized at the outset the necessity of getting full pedigrees of both maternal and paternal sides of the families. The work was done as far as possible with methods commonly employed in genetics. This is in contrast with methods sometimes used in studies of this nature in which records are kept only of the affected parents of the individuals being studied, omitting the contribution to the inheritance made by the parent who may not happen to show the character.

Data as complete as could possibly be obtained were collected from fifty-five families, both maternal and paternal sides of each pedigree being included. Forty-one of these pedigrees gave a sufficiently complete history for genetic use. We have retained only the pedigrees which gave fairly complete information about two and usually three generations. Most of the people to whom questionnaires were sent have suffered from migraine. The preliminary report concerning hay fever was based upon a study of twelve families. Including the pedigrees of the earlier paper, therefore, fifty-three out of sixty-seven different family histories complete enough for genetic study form the basis of this report.

In the preliminary report we found that hay fever and other forms of allergy may act as a dominant character but that their dominance is irregular, for it is often incomplete and sometimes an unaffected individual may transmit the ability to become sensitive to several or to all of his or her children. In the earlier paper the various forms of allergy were considered as different expressions of a single gene, although the possibility of multiple factors as a cause was not overlooked. The genetic evidence then available led to this conclusion, but it is to be noted that it was quite in harmony with the clinical behavior of the diseases.

After studying allergic families for several years we have found that if allergy is present in a strain, it is extremely rare (families 2 and 23) for a generation to occur without some member of the family being affected. We have only five cases of this kind. Unaffected individuals may pass on the allergy to their children, but usually these individuals have allergic brothers or sisters even though they themselves have no allergic diseases. In no case which we have studied does allergy skip two generations; that is, allergic individuals have never been found to appear after the family has been negative for two generations. Occasionally one generation may be entirely skipped, but we have no record of two negative generations followed by a third allergic one, and we have sought carefully for cases bearing upon this point. For these reasons we have come to regard a family as

incapable of transmitting the gene for sensitivity if in our pedigrees it has been entirely negative for two generations.

The changing or incomplete dominance of allergy may best be explained by quoting a couple of paragraphs from our earlier paper:

The time of appearance of the sensitivity in the ontogeny of the individual differs greatly in different people. In some cases a child develops a sensitivity very shortly after birth and in other cases individuals who have never before had trouble develop a sensitivity at the age of seventy. Between these two extremes are a whole series of ages, at any of which a sensitivity may develop. Consequently, if an individual belongs to an affected family and has had no trouble, there is still a great probability that he may later develop it. Thus no chart of an affected family can ever be considered as complete, for those once classed as normal may later develop some form of allergy.

Another point must also be considered. In order for any form of sensitivity to become manifest there must be, in addition to the sensitivity, the external factor that causes the trouble. A child sensitive to certain forms of protein will not develop urticaria or eczema unless he eats that protein. Similarly an individual sensitive to a certain kind of pollen develops hay fever only when exposed to that pollen. In recent years much has been added to our knowledge of the interaction of heredity and environment. Apparently the study of inheritance of hay fever, etc., reveals another case in which a definite environment as well as a definite inheritance is necessary to produce a definite character.

These statements of our earlier paper apply equally well to migraine. This form of allergy sometimes occurs in young children and on the other hand many people from allergic families develop this difficulty much later in life. The environment necessary to produce allergy in members of an allergic family differs with respect to the different allergies. Hay fever does not develop unless the patient comes in contact with a particular kind of pollen which furnishes the necessary irritation. For example, a patient born with the ability to become sensitive who comes in contact with Russian thistle pollen develops a sensitivity to Russian thistle and may have hay fever symptoms on adequate contact. Likewise, those who live in the timothy section of the United States and who come in adequate contact with timothy pollen have developed a sensitivity to timothy and have hay fever symptoms from contact with timothy pollen. Similarly migraine, eczema, etc. develop only when the foods to which the individual is sensitive are eaten. Both the pollen in the one case and the particular food in the other may be regarded as the environment necessary to bring out the allergy.

The data upon which these conclusions in regard to migraine are based are less open to criticism than in the case of hay fever on the score of the environmental condition necessary to bring out the sensibility. That is, there is less possibility that the negative cases are not truly negative, but have merely not happened to meet the proper environment to cause the

allergy to manifest itself. The reason for this is that with the normal varied diet which most adults enjoy, there is little chance that a person can escape the sensitizing protein long after reaching adulthood.

That both a definite heredity and a definite environment are necessary to produce a given character is well known and many cases of both animals and plants might be cited to support this principle.

An interesting fact early observed in this study was that allergic persons commonly marry into allergic families. This is still true even in the cases where one or both of the individuals concerned are themselves negative. Our records include only a few cases in which marriage occurs between a person from an allergic family and one from a negative line. The explanation for this fact can only be conjectured. Allergic families have been found to be usually of a high grade of intelligence, and as Balyeat (1929) has shown, a hay fever sufferer customarily has a higher IQ than does the average person. It may be surmised that this fact has something to do with the frequent marriages between allergic families and that in some cases their higher intelligence serves as a mutual attraction. Since allergic persons make up only a small percentage of the entire population, their frequent marriage is worthy of note, although no means is at present known which favors the mating of these persons.

In our paper on hay fever we have stated that some families show only one form of allergy. It is seldom, however, that any family is specific for one allergy alone. Only one of the twelve families of our earlier paper showed no allergy but hay fever. One had only asthma and hay fever, and the other ten had in addition either eczema, bronchitis, urticaria, migraine, or a combination of several of these allergies.

Our present study of forty-one families shows similar conditions. Only five (families no. 22, 23, 27, 37, and 40), exhibit branches which before crossing with other allergic families, show nothing but migraine, and in most of the families there are various combinations of the different allergies, a single individual sometimes suffering from four to five types. (Example, family 8.) In eleven families there are two kinds of allergy and in twenty-six there are three or more.

Since in the families from whom we have collected data, so many forms of allergy are present, and since allergics commonly marry individuals from similar families, it is extremely difficult to determine positively the number of genetic factors that cause the different forms of sensitivity.

In our present study we have endeavored to ascertain whether our pedigrees could be explained as due to the operation of several genes acting together, perhaps one gene being necessary for an individual to become

allergic and a special modifying gene being necessary to produce each type of allergy. This possibility mentioned in our previous paper, has been suggested by several critics, but the number of pedigrees previously considered was insufficient to settle the point.

In order to gain some light on this matter we have examined carefully the pedigrees of those families in which an allergic individual marries into a negative line. As already stated, a line is considered negative when for two generations no member has exhibited an allergy. The study of this type of mating has proven the most productive phase of our research. Obviously a cross of this kind will show at once what types of allergy are dominant, for if any allergy appears again in the F_1 from such a cross, its dominance is certain.

Unfortunately, as we have stated before, marriages of this type are not numerous. We have among our fifty-three pedigrees twelve matings of this type (Nos. 1, 5, 12, 18, 29, 32, 34, 37, 38, 41, 42, 43). In pedigree 1, hay fever and migraine act as dominants; in No. 12, hay fever; in No. 29, urticaria and migraine; in No. 34, eczema; and in No. 43, asthma acts in a similar manner. Thus, each of these five types of allergy may show dominance.

These marriages between allergic individuals and persons from negative lines reveal several definite points. In spite of the dominance of the different forms of allergy, not even half of the F_1 which we should expect, if the allergic parent were heterozygous, develop the sensitivity.

Another fact revealed by this type of mating is that a person with one form of allergy may transmit other forms to his or her children. Examples to illustrate this condition are to be found in many pedigrees and are of two kinds: Either the allergy not present in the parent may have been observed in other members of his family, or in other cases some form entirely new to the strain may appear.

A summary of the results of some of the matings between allergic and negative families will make these facts more evident (see table 1).

If we consider sensitivity as due to one gene and each allergy as due to a modifying gene, then we must assume that in each of these cases the negative line brought in the special modifiers necessary to produce the different types of allergy. If these modifiers exist, it has just been shown that in connection with the gene for sensitivity they must act as dominants. Since these possible modifiers are dominant, the negative lines referred to above would have to bring in one or more dominant modifying genes for the different forms of allergy, these modifying genes being unable to express themselves without the gene for sensitivity which is lacking in the negative

line. Following out this line of reasoning and assuming that there is a specific modifying gene for each allergy, we would expect these dominant modifiers to cause new allergies in a fair percentage of the children. If the negative parent were heterozygous for the modifying gene, only half the children would have the new allergy. In any event we should never expect complete dominance, since we have shown that the dominance is variable. However, the new combinations in the F_1 are of various kinds; one individual having one new allergy, another a second, and still others having different combinations of them. Sometimes only a small percentage of the progeny show the dominance of a particular type of allergy, and in other

TABLE 1*

FAMILY NUMBER	NEGATIVE LINE CROSSED WITH	ALLERGY IN PARENT FAMILY BUT NOT IN PARENT	ALLERGIES IN PARENT AND ALSO IN F_1	ALLERGIES OF PARENT FAMILY ALSO IN F_1	NEW ALLERGY IN F_1
1	MH	A	MH	A	E
5	EM		M		
12	H		H		M
18	A	M		M	
29	UM		UM		H
32	MH		H		E
34	E		E		MU
38	HA		H		E
41	M	H	M	H	UE
42	HA		HA		HE
43	A		A		H

* Note: A—asthma; B—bronchitis; E—Eczema; H—hay fever; M—migraine; U—urticaria.

cases the same allergy that has been shown in similar crosses to act as a dominant does not appear in the F_1 although it may be present in the parent.

As this chart shows, the allergy of the parent may not appear at all in the F_1 , although in other cases this same allergy acts as a dominant. Since the person from the negative line, after crossing with the allergic line, produces various combinations of allergies, some present in the allergic parent, some present in members of the family of the allergic parent, and others entirely new in the family, and since these allergies, old and new to the family, do not appear in any regular proportion, it seems illogical to consider that the negative line has brought in modifying factors for a new set of allergies. If such were the case these new allergies, being dominant as we have shown, should appear in a fairly large proportion of the F_1 , a result not found to be true.

Matings between allergic families also establish this point. In family 8, migraine had appeared for two generations on both sides and no other allergy had been manifest. The father and mother, both free from allergy, had seven children, two of whom suffered from migraine, and another from five allergies, namely, migraine, eczema, asthma, urticaria, and hay fever. How was it possible for four allergies, apparently new to both sides of the family (three of which have been shown in our other crosses with negative lines to be dominants) to be present for two generations without manifesting themselves?

Other matings of two individuals, both from allergic families, also produce children with allergies which have not appeared in either family. Thus in families 2, 20, and 13 urticaria appears as a new allergy; in family 11 migraine; in family 17 eczema; in family 31 hay fever. In this last case, as in the cases with negative lines, two allergies present in the family did not appear in any of the progeny. One parent had asthma and a grandparent had bronchitis, neither of which reappeared in the children.

These facts all lend support to the theory that there is only one gene for sensitivity and that this gene expresses itself in various ways in different individuals. This point, we believe, is definitely established by our crosses with negative lines.

In reviewing our charts, it is at once evident that migraine is more prevalent in females than in males. Among our pedigrees we find 64 males with migraine and 126 females so affected. At first sight, it might seem that migraine has something to do with the sex chromosome, for if it were dominant, as we have shown, but also sex linked, we should expect more migraine females than males. Our records show, however, that a son may inherit migraine from either his father or his mother. He may have migraine if his mother is from a negative family (family 41) and his father has migraine; or if his father is from a negative family and his mother has migraine (family 5). Apparently a son may be allergic if his parents are from allergic lines, regardless of which parent has migraine, or even if neither has that special form of allergy. The following chart makes this matter clear. In these cases both father and mother are most probably from allergic families. (See table 2.)

Since our records show that with the same inheritance females are more likely to have this allergy than males, the reason for this difference must probably be sought in the physiological differences between the sexes. One might conjecture that the more highly organized nervous system of the female, or the hormones related to sex may be the cause of the different proportions.

The conclusions of this paper are in harmony with the work of most other

students of the inheritance of allergic diseases. Except for the works of Adkinson and Buchanan the types of allergy have been considered as due to dominant factors. Adkinson's results can be explained as due to a dominant gene, dependent for its expression to some extent upon the environment. Migraine has been regarded as a sex linked character by several writers because of the large number of females who have it. However, we have shown that migraine may be inherited by the son from the father when the mother's line is negative and therefore cannot be sex linked. Also migraine is interchangeable with the other allergies and acts as the expression of the same gene for sensitivity which obviously has no connection with sex. Since allergic women are apt to suffer from these headaches during the menstrual period (a fact which has been referred to a number of times in the literature and which we also have observed) the preponderance

TABLE 2*

SON	FATHER	MOTHER	FAMILY
M	—	M	15, 17, 21, 51
M	—	MEA	31
M	M	—	51, 21
M	H	MU	33
M	E	M	26
M	—	HB	3
M	—	—	8, 17
M	—	A	15
M	M	M	21, 22

* See table 1 for meaning of letters. (—) no allergy.

of migraine females can best be explained as correlated in some way with the sex hormones and with physiological processes. Finally we have found no connection (as did Study and Gänsslen) between gout and the allergic diseases mentioned.

We have shown that any allergy may act as a simple dominant, and an allergic individual may transmit either the same or another type of allergy. There is thus no regularity in the transmission of the different types of allergy and the individual known to carry the gene for sensitivity may be normal. Our evidence thus shows that most probably allergy is not due to multiple factors, but rather to the expression of a single gene for sensitivity which manifests itself in different ways, depending to some extent upon the environment of the individual. The gene for allergy is not sex linked. The greater number of migraine females cannot be explained as due to a sex linked gene.

HUMAN INFERTILITY

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ENDOCRINE ASPECTS

The science of eugenics deals with the improvement of race by selective breeding. Infertility must be regarded as a true eugenic agent where it prevents the transmission of the undesirable qualities or conditions which have engendered it, as for example, in the syphilitic. Equally, however, there are many physical factors lowering the mating index to the point of unproductive union, following the correction or palliation of which truly eugenic offspring may be engendered. For this reason, studies of the physical impedances to fertile union and the methods for correcting them may be offered with propriety to a group of eugenicists.

Among the several highly significant constitutional factors which may determine a relative infertility, aberrant function of the individual glands of internal secretion play a most important rôle. These powerful regulators of growth and development, operating severally through their incretory activities, influence both directly and indirectly the ultimate productivity of the individual. How far functional derangements of the endocrine glands in man should be regarded as hereditary, transmissible characters, remains for a later generation to determine. The just recognition of endocrine disorders in all but a few conditions exhibiting gross somatic change such as acromegaly and exophthalmic goiter, is very far from complete even today. A generation ago, what may be called the science of endocrinology was scarcely in its infancy. True, a thyroid enlargement of sufficient magnitude could be and was frequently recognized; and in not a few instances, as we know today, incorrectly interpreted in terms of abnormal function. Barring the rare disease acromegaly with its striking somatic changes, pituitary malfunctions fail to produce any such characteristic stigmata as the goiter. It is to this fact that I ascribe the greater frequency of reported thyroid disease in the family histories of the present generation. In a current consecutive series of 2100 cases, carefully studied for diagnostic purposes, there were 1440 patients with pituitary as against 660 with thyroid malfunction.

Time will not permit an elaboration of this theme. Suffice to say, that there seems to exist a general endocrinopathic tendency in individual families. This serves only to render the soil more fertile should the later years introduce subversive elements tending to engender incretory dysfunction. I am minded of a patient of Dr. J. J. Thomas with whom I have intermittent contact who was born a cretin, but who has received adequate treatment throughout the years. She has borne two healthy normal children who give no evidence of an inheritance of the serious early maternal endocrinopathy.

The level of function of each of the several important endocrine glands has a direct bearing on the ultimate fertility of union. Supporting data derive from several sources. Reynolds and Macomber (1) quote a value of about 12 per cent as the normal degree of community infertility, and in arriving at this figure no allowance is made for artificial infertility through

TABLE 1
Endocrine influence on fertility

GROUP	PER CENT INFERTILE
Normal.....	12*
Non-endocrine disorders.....	20
Pituitary.....	29
Thyroid.....	31
Ovary.....	35

* See Reynolds and Macomber (1).

contraception. The data from a consecutive series of over 1000 cases studied by the speaker are germane to this point. Eliminating patients with less than three years' exposure and those where contraception or induced abortion could affect the outcome, the figures for the relative infertility of the several groups are collected in table 1.

The group designated as "non-endocrine" was composed of individuals referred for diagnostic study who disclosed functional derangements or organic disease unassociated with the ductless glands. The group contained a number of cases of syphilis, of lesions of the central nervous system, and yet other conditions well recognized as depressing fertility. While less fertile than the usual community level, their unions are far more productive than are those with an endocrine factor.

A second datum on the productivity of mating derives from a series of 115 infertile couples carefully studied by the procedures discussed today.

Of this total of 230 individuals, 145 or nearly two-thirds had a demonstrated incretory malfunction as one significant impedence to fertile union. The diagnosis of an endocrine disorder thus becomes a matter of prime importance in the resolution of the factors potentially causative of an infertile mating. There are two steps involved; first, the proof of an existing endocrinopathy and, if found, second, the determination of the gland at fault. Though time precludes the documentation of the statement, it may be affirmed that pluriglandular involvement, in the older conventional sense of the term, will not be demonstrated.

The days when endocrine diagnosis derived from the shape of the eyebrow or a selective distribution of the adipose resulting from a healthy appetite are gradually becoming a thing of the past. Less certainly has been laid aside the interpretation of all lowered basal rates as indices of thyroid failure. With but minor exception it may be safely said that the diagnosis of disturbed endocrine function must rest upon the collection of a large amount of diverse factual evidence with the interpretation of each single factor in terms of all of the other data. For simple illustration, let us revert to the lowered basal rate which in addition to anterior lobe, adrenal and ovarian as well as thyroid failure, may derive from so remote a cause as a partial protein inanition. The urine nitrogen offers a basis of precise interpretation of this factor as does the blood morphology in the case of leukaemia where the basal rate attains the level usually associated with thyrotoxicosis.

So-called vital function testing, the term used in comprehensive sense, offers a direct objective approach to the partial resolution of the problem. Basic to the thesis, however, is the fact that in function testing only the end result of what is usually a wide variety of causes may be measured. The test thus lacks a clear-cut specificity. On the other hand, this multiplicity of control factors offers the largest element of value in the form of approach. The application of a series of function tests gives, not a single criterion of a single disturbed function, but a series of inter-related criteria in each of which several functional activities are involved. Thus, while several factors influence both the magnitude and direction of the result of each observation, it is highly improbable that all of a series of widely divergent tests should be uniformly affected both in quality and amount by each of the several agents implicated. The accuracy of this assumption has been amply proven in the experience of the past twenty years.

For this reason, then, in the study of our infertile couples, the carefully compiled medical history and thorough physical examination already discussed by my colleagues are supplemented by a series of objective measure-

ments, the significance of which has been established by the many years of earlier study. Each has been standardized by application both to the proven normal and also to those exhibiting with certainty the conditions under consideration. My own discussion will be limited to these methods of approach.

Another point that may not be ignored is the frequent simulation of endocrine disorders by conditions unassociated with the ductless glands. These too must be investigated and eliminated by test and observation—not opinion—before the interpretation of the evidences in terms of aberrant endocrine function is warranted. While a detailed analysis would far exceed the modest limits of this presentation, a few of the more significant points of the differential diagnostic procedure may be offered as illustrations. Discussion is limited to the pituitary, thyroid and ovary as principal endocrine structures. The elimination of the testicle rests upon the fact that in adult years the incretory activity of this gland, if indeed there be any, is relatively unimportant. Pancreatic diabetes rarely needs so elaborate a diagnostic approach; the partial control of the level of blood calcium is the only function, capable of objective demonstration, that is certainly associated with parathyroid activity. The participation of the pineal, the thymus and the spleen in the endocrine concert is too uncertain to warrant their inclusion.

In the following discussion, states of hypofunction are considered primarily. General trends only will be reported with just recognition of the fact that any individual case may depart from custom in any one of many of the tests recorded. To facilitate discussion, a few simple tables have been prepared. Certain of the physical data are collected in table 2.

But few matters call for additional comment. The pituitary obesity both occurs more frequently and to a greater degree than with the other two glands. Thyroid failure may be associated with obesity or less frequently in patients without myxedema with definite underweight. These latter depart sharply from the classical picture of hypothyroidism, cannot be diagnosed without the clear-cut objective data, and gain weight on replacement therapy with thyroid substance. The significant loss in lung volume is typical of thyroid failure and does not derive from obesity. In the main, the pituitary is normal or approaches it, the thyroid shows a general lowering of the physical data, and the ovary one that is selective. The low alveolar CO_2 of hypogonadism is characteristic and, like the same finding in pregnancy, not associated with acidosis.

The more striking urine findings are collected in table 3.

The urine of the thyroid failure presents a general picture of lowered

renal permeability associated with pathological change. In hypogonadism, the suggestion is rather one of faulty hygiene—which is frequently the fact. In the main, the pituitary is normal, but significantly augmented volumes are frequently recorded. Both the thyroid and ovary cases show an apparently poor level of protein metabolism which in the former includes poor absorption and elimination as causal factors while in the latter, dietary restriction seems to be the more frequent agent. High residual nitrogen

TABLE 2
Physical measurement

OBSERVATION	GLAND		
	Pituitary	Thyroid	Ovary
Weight.....	Increased +++	Increased ++ or diminished —	Normal or increased +
Lung volume.....	Normal	Decreased ++	Decreased +
Temperature.....	Normal	Decreased	Normal
Pulse rate.....	Normal or decreased	Decreased ++	Normal or increased
Blood pressure.....	Decreased —	Decreased — —	Decreased — —
Alveolar CO ₂	Normal	Normal	Decreased

TABLE 3
The urine

DATUM	PITUITARY	THYROID	OVARY
Volume.....	Normal or increased	Decreased	Normal or decreased
Albumin.....	Absent	Present	Absent
Casts.....	Absent	Present	Absent
Sugar.....	Absent*	Rarely present	Present
Total nitrogen.....	Normal	Decreased	Decreased
Residual nitrogen.....	Normal	Increased	Normal

* Present in dysfunction.

is a general evidence of disturbed metabolism; it is more characteristic of the thyroid group in frequency and amount.

The blood findings are given in table 4.

The pituitary shows a selective increase above normal in the uric acid, the thyroid like high values for the other two nitrogenous constituents, but with normal uric acid. This fact is one of the several indices that the renal factor in thyroid failure is a "pseudo" and not a true nephritis. In

long-standing myxedema with arterial changes and hypertension, true renal pathology supervenes. This stadium, however, does not enter into the present consideration. Thyroid failure is usually associated with a mild secondary anaemia. All three of the endocrinopathies tend to exhibit lymphoid bloods though in varying degrees of frequency. The pituitary alone shows a slight eosinophilia, a possible diagnostic point where the numerous non-endocrine causes are ruled out.

In table 5 will be considered two important observations, namely, the respiratory and the carbohydrate metabolism. The several quantitative

TABLE 4

The blood

DATUM	PITUITARY	THYROID	OVARY
Non-protein nitrogen.....	Normal	Increased	Normal
Urea nitrogen.....	Normal	Increased	Normal
Uric acid.....	Increased	Normal	Normal
Haemoglobin.....	Normal	Decreased	Normal
Lymphocytes.....	Increased or normal	Increased	Normal or increased
Eosinophiles.....	Increased	Normal	Normal

TABLE 5

Respiratory and carbohydrate metabolism

DATUM	PITUITARY	THYROID	OVARY
Basal rate.....	Depressed +	Depressed +++	Depressed +
Galactose tolerance.....	Increased +++	Normal or increased +	Decreased ++

and directional variations are most helpful in the formulation of a differential diagnosis.

While functional failure of all these glands produce a lowering of the oxygen requirement, that of the thyroid is far greater than the modest decrement shown by the other two. In making this statement, it is assumed that the basal rate is actually measured. Unfortunately, the observation is peculiarly sensitive to subversive agencies—chief among which is the patient—and the confidence in the record, so freely granted because it is determined mechanically, is frequently unwarranted. It is no common experience in the speaker's laboratory, where the test is repeated day after day for purposes of education with the nervous patient, to have a final

record 30, 40, or even 50 per cent below that of the first test. The correlated physical measurements of pulse, blood pressure, and the like are helpful in reaching an estimate of the authority of any given reading. With the nervously unstable—a class in which the ovarian patient certainly falls—the best that one can hope for from even repeated tests is frequently no more than to establish the existing trend.

The sugar tolerance is studied with galactose, a carbohydrate peculiarly adapted to this form of investigation (2). While failure of the posterior lobe determines a massive increase in the power of the organism to utilize the sugar, ovarian failure depresses the tolerance in some cases to a level but one-half of that of the normal adult. Thyroid failure shows the same directional influence as the pituitary but in very modest degree, fully two-thirds showing normal levels and the remainder increases of a very moderate degree.

Time is lacking to consider the differential features of a number of other special tests which form part of the routine of study and which possess tangible diagnostic value. To illustrate, the eye examination in the pituitary group will frequently demonstrate yellowish discs, enlarged blind spots and some contraction of the form and color fields.

For the same cause, discussion must be reserved on those non-endocrine conditions which simulate endocrinopathies, such as hepatic dysfunction and syphilis, the pituitary, or primary anaemia and leukaemia, the thyroid.

Enough has been said, it is hoped, to indicate that in the study of the factors causative to human infertility the evaluation of the endocrine status is of prime importance. And that further, if the function levels of the individual members of the endocrine concert are to be evaluated with some degree of precision, careful laboratory and clinical studies must complement and supplement each other. A judicious diagnosis is the synthesis of all of the material deriving from these several sources.

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OVARIAN AND PITUITARY MODIFICATIONS RESULTING FROM STERILITY INDUCED BY VARIOUS MEANS (WITH DEMONSTRATIONS)

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Inasmuch as the possibility of producing a "birth-control serum" has been frequently suggested, it was thought that a brief account of a recent study on some of the effects of such sterility-producing materials as spermatotoxins, testicular nucleoproteins and pituitary anterior lobe might not be without interest to members of this Congress. The experiments in question were made mainly on rats although in a few instances rabbits were used. The complete account of the work with all statistical data is being published in *Physiological Zoology*.

It has long been known that various laboratory animals may be rendered sterile temporarily by means of spermatotoxins, developed according to ordinary immunological technique through successive injections of spermatozoa. It has also been discovered that a succession of injections of anterior pituitary substance in sufficient quantity is followed by temporary sterility. Likewise, the present study discloses that a period of infertility results from the repeated injection of testicular nucleoproteins. Obviously the next step in such experimentation is to try to determine just how the sterility is being accomplished and to discover other possible effects.

SPERMATOTOXIN EXPERIMENTS

Of twenty female rats given seven injections of an emulsion of desiccated bull epididymis filled with spermatozoa, all showed retarded fertility. Six were still sterile six months after the last injection, when the experiment was terminated. The litters of those which resumed fertility were reduced in numbers. In another experiment eighteen female rats were injected six times intraperitoneally with washed bull spermatozoa at five day intervals. Fertility was noticeably delayed and diminished when compared with control animals injected with mammary gland emulsion, and six of the sixteen females which survived the treatment were apparently rendered permanently sterile. In still a third experiment forty-one females were rendered temporarily sterile by successive injections of bull spermatozoa while

twenty-five control animals injected with extract of rabbit salivary gland had their fertility diminished little if at all. Although the attempt was made, it was found that the sterility induced by spermatotoxins could not be maintained by oral administration of dried material containing spermatozoa of the bull.

Following the development of spermatotoxins, as just described, changes in both the ovary and the anterior lobe of the pituitary body occurred. Histological examination of the ovaries of such rats revealed many mature, unshed ova, with evidence of lutein-like material in the walls of the follicles. And sections of the pituitary anterior lobes showed an increase in oxyphile cells but no visible change in basophile cells. Possibly this increase is followed by the release of a secretion which induces precocious formation of corpus luteum substance in the follicular wall and thus prevents shedding of the mature ova.

The oestrous cycles of sixteen rats kept sterile through injections of spermatozoa were followed by means of daily vaginal smears and were found to be interfered with but slightly if at all. Four of the females killed within six to thirteen hours after copulation were found to have non-motile spermatozoa in the vagina, uteri or oviducts. It would seem, then, that the sterility induced by the development of spermatotoxins in females is due more probably to immobilization of the spermatozoa in the genital tract than to any interference with the oestrous cycle. However, since the oxyphile cells of the pituitary anterior lobe are supposed by some investigators to release a luteinizing substance into the blood stream, it may be that in sperm-injected animals an increased amount of such material is being released, which, although insufficient to suppress the oestrous rhythm as manifested in the vaginal epithelium, is sufficiently potent to cause the formation of corpus luteum-like material which imprisons the maturing ova and prevents their discharge.

EXPERIMENTS WITH ANTERIOR LOBE MATERIAL

Twenty female rats were injected intraperitoneally with extract of dried anterior pituitary body (0.75 cc. of a dilution of 1 part of dried material to 25 parts of liquid) every second or third day during a period of two months. Males of tested fertility were introduced into the cages after the sixth injection. Of the sixteen females which survived the injections one bore three young during the course of treatment, three were apparently permanently sterilized, and nine displayed temporary sterility and subsequent reduced fertility. The ovaries of the remaining three, killed for histological study, contained more than the usual number of corpora lutea, in some of which

unshed ova were discernible. These observations bear out Evans' (1924) interpretation that corpus luteum substance develops precociously under such circumstances and imprisons the ovum.

In a second experiment the oestrous cycles of nineteen rats injected with anterior pituitary substance was followed by means of daily microscopical inspections of vaginal smears. It was found that the cycles became irregular with a tendency for the dioestral period to be much prolonged. Inhibition of fertility occurred as in the previous experiment with injected anterior lobe substance.

EXPERIMENTS WITH TESTICULAR NUCLEOPROTEINS

In the first experiment seventeen female rats were given intraperitoneal injections of testicular nucleoproteins from one to three times over a period of some four weeks. Four of the animals eventually bore young and four would not mate. Although the remaining nine were observed to copulate and living spermatozoa were recovered from their vaginas the individuals all remained sterile until discontinuance of the experiment some months later. In several of the latter, prolonged dioestrus followed mating but whether this was a pseudopregnancy induced by mechanical stimulation, such as is known to occur sometimes, or the result of some form of endocrinal imbalance is uncertain.

A second experiment, with lighter dosages of testicular nucleoprotein extract was conducted with 50 experimental and 17 control rats. The oestrous cycle was followed by means of microscopic inspection of daily smears. When a rat showed evidence of resuming its regular cycle the dose was increased. The results showed that the cycle was generally rendered irregular, with prolonged dioestral periods. In most of the animals fertility returned, at least in part, in about six weeks after the cessation of injections.

Sections of the ovaries of rats rendered temporarily sterile by injection of nucleoprotein usually showed an increase in both the number of corpora lutea and of follicles containing unshed ova. In some follicles ova were in process of disintegration; in others, a fragmentation that suggested precocious cleavage had occurred. There was no evidence of premature luteinization such as seemed to occur in sperm-injected rats.

The pituitary anterior lobes of rats rendered sterile by nucleoprotein injections showed a marked increase in the number of basophile cells in comparison with the oxyphile and chromophobe cells. The condition strikingly suggested that seen in castrate animals or in those to which cancer has been transplanted. While in females there was slight if any

change in oxyphile cells, in males there was a noticeable increase in the numbers of this type of cell as well as of basophiles.

While it seems not improbable that what exists in the females injected with nucleoprotein is essentially a castrate condition, the ovary being functionally so affected as to be incapacitated, this conclusion cannot go unchallenged, since it may be possible that the injected material acted simultaneously on ovary and pituitary. In an earlier study (Guyer and Claus, 1932) it was found that transplanted cancer, after about two months of growth, induced much the same histological picture in the anterior pituitary lobes of both males and females as that following castration, yet in the case of cancer the action seemed to be directly upon the pituitary, since no visible ovarian modifications could be detected, and the females continued their oestrous cycles and even bore young up until they were practically moribund.

In order to test their relative potencies in bringing about precocious sexual development, the anterior pituitary lobes of nucleoprotein injected rats and of controls were transplanted into immature young rats and mice so selected as to correspond in age. It was found that in general a greater development of the ovaries of the young animals followed implantation of anterior pituitaries from nucleoprotein-treated rats, than corresponding implants from normal rats, indicating increased potency of the former. The anterior pituitary lobes of castrate rats are also known to be more potent in this respect than are the lobes of non-castrates.

IS HEREDITY A CAUSATIVE FACTOR IN THE MANIC-DEPRESSIVE PSYCHOSES?

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Although several comprehensive studies on the inheritance of mental diseases have appeared in recent years, the problem is far from solution. There is no general agreement as to the fact or manner of such inheritance or as to the relation of mental disease to other mental abnormalities in the composition of a so-called neuropathic taint. The whole matter is so involved that years of investigation will be required to reach satisfactory conclusions.

This paper is a preliminary note on a study of heredity as an etiological factor in the manic-depressive psychoses. As the more detailed analysis is still under way, the views herein set forth are but tentative. The analysis is part of a larger study of causative factors in the manic-depressive psychoses. The latter study is in turn part of a larger program of research undertaken jointly by the New York State Department of Mental Hygiene and the State Charities Aid Association in 1928, with the financial assistance of the Laura Spelman Rockefeller Fund. This financial grant made possible a three-year investigation of the social significance of the prevalence of mental disease in the State of New York.

In this study of causative factors in mental disease the reliability of the data was carefully checked by field workers who interviewed relatives and other interested individuals. The cases under investigation included first admissions with manic-depressive psychoses admitted to the Utica State Hospital in the three years, 1928, 1929 and 1930. Aside from the matter of diagnosis, no other selective factor was at work in the choice of cases for study. The Utica State Hospital was chosen as the locus of the investigation, because its admission district includes a population more accessible to investigation than that of a metropolitan district in which the population shifts rapidly and where it is therefore often difficult to trace family histories.

The schedule used in the investigation called for information concerning the mental and physical health of the father and mother prior to the birth of the patient; the health record of the paternal and maternal grandparents; the economic condition of the parents and their social life during the pa-

tient's childhood; the prevalence of mental and nervous diseases, mental defect, alcoholism and criminality in the relatives of the parents, and in the siblings of the patient, his wife (or husband) and children; the patient's early environment; the composition of the household; his relations to step-parents, foster-parents, or grandparents; the physical condition and character of the patient's early home; the patient's environment at the time of onset of the disease; the developmental history of the patient; his social history such as occupational record, sex history and marital relations; and an account of all factors having a bearing on the onset of the psychosis. It is thus evident that the final report will consider relationships in addition to those usually included in a discussion of heredity.

The study deals with 155 patients, of whom 60 were males and 95 females. This agrees with the usual ratio of males to females found among all manic-depressive first admissions to the New York civil State hospitals. The females were older than the males, the average ages at first admission being 42.3 and 39.3 years, respectively. The average ages at the onset of the psychoses were but slightly less, being 42.1 and 38.9 years, respectively. Of the 60 males, 54 were described as of average mental status, and 6 as of borderline mentality. Among the 95 females, 78 were of average mentality, 2 were morons, and 15 were of borderline intelligence.

Table 1 summarizes the distribution of siblings in families of the patients.

There was an average of 5.9 siblings per family among all patients. Among the families of the male patients the average was 5.4, compared with 6.3 among females. These averages are high, and represent practically completed families. They exceed the average size of families of schizophrenic patients at the Bloomingdale Hospital as found by Dr. M. Bleuler, but this is due largely to the fact that the two groups of patients come from different social and economic levels.¹

Table 2 summarizes the order of birth of the patients.

From the fact that the female patients came from larger families, we would anticipate that they are later in the order of birth. This is verified by the average results which show 3.3 for males, and 3.8 for females.

From this general description of the data we now turn to the problem of heredity. In this analysis we shall refrain entirely from using the method of genealogies, for such a method is, in this case, subject to gross errors arising from subjective bias: Rüdin has well described the weakness of this method in his writings on inheritance in mental disease.²

¹ See A Contribution to the Problem of Heredity Among Schizophrenics, in the *Journal of Nervous and Mental Diseases*, Vol. 74, No. 4, October, 1931, page 397.

² See *Vererbung und Entstehung Geistiger Störungen*, by Ernst Rüdin, especially Chapter 1.

There remains the statistical method, which is applicable in either of two ways. We may, by applying particular theories of heredity, group our matings so as to compare the progeny with the expected theoretical propor-

TABLE 1

Number of siblings in families of patients with manic-depressive psychoses

NUMBER OF SIBLINGS IN FAMILY (INCLUDING PATIENT)	FAMILIES OF MALE PATIENTS	FAMILIES OF FEMALE PATIENTS	TOTAL FAMILIES	
			Number	Per cent
1	4	6	10	6.5
2	10	3	13	8.4
3	4	11	15	9.7
4	7	4	11	7.1
5	10	14	24	15.5
6	7	18	25	16.1
7	7	9	16	10.3
8	4	8	12	7.7
9		6	6	3.9
10 and over	7	16	23	14.8
Total.....	60	95	155	100.0

TABLE 2

Order of birth of patients with manic-depressive psychoses

ORDER OF BIRTH	MALES	FEMALES	TOTAL	
			Number	Per cent
1	13	20	33	21.3
2	14	20	34	21.9
3	8	14	22	14.2
4	9	10	19	12.3
5	7	9	16	10.3
6	4	4	8	5.2
7	4	9	13	8.4
8	1	3	4	2.6
9				
10 and over		6	6	3.9
Total.....	60	95	155	100.0

tions. This is, for example, the method of Mendelian analysis. Much work has been done in this manner in the past two decades but it must be admitted that the results are as yet inconclusive. This follows primarily

from the difficulty of classifying parents in Mendelian language. In order to apply theories of unit characters and determiners, we are compelled to make assumptions with respect to the nature of the mind, in health and in disease, which are in the highest degree improbable. Additional sources of error lie in the difficulty of securing samples that are adequate from the point of view of size and representative character. As a result of his own investigations, Rüdin has been able to arrive at merely a negative conclusion to the effect that it has not been demonstrated that Mendelian methods of inheritance do *not* obtain in certain types of psychoses. This, of course, is a far cry from an affirmative statement that they do. In this preliminary report, therefore, we shall not consider the possibility of Mendelian inheritance, but shall turn to the method of mass statistics. Pearson applied this method in 1905, using data reported by Diem in the *Archiv für Rassen und Gesellschaftsbiologie*.³ His reasoning with respect to cancer applies directly to mental disease as well. He wrote as follows: "In dealing from the standpoint of the theory of statistics with the inheritance of any character, say a special form of disease, it is needful to start with a general population, or a random sample of a general population, which has been determined in absolute independence of the presence, or absence of this disease. If we wish to determine the hereditary influence in the case of cancer we must start with a random sample of the general population, or in some manner reconstruct this sample of the general population. We cannot obtain any definite conclusion as to inheritance from the case books of a cancer hospital alone." The last sentence is of particular significance, as only too often has the attempt been made to study the inheritance of mental disease by recourse to case books only.

The biometric method may be applied as follows: By means of our family histories we are able to count the parents, grandparents, uncles, aunts and siblings and to enumerate the number of psychotic individuals in each group of relatives of the patients. The proportion of affected individuals may then be compared with the corresponding proportion for the general population. If each class formed a random sample of the general population, the proportion of affected individuals in the class should not differ materially from that of the general population. If, however, the proportion in the general population was significantly greater or smaller, we would reason that the two populations are differentiated from each other; and if the family histories indicated a higher proportion of affected individuals, we would reason, *caeterus paribus*, that the group under investigation has an inherited

³ See K. Pearson, On the Inheritance of Insanity, in the *British Journal of Medicine*, May 27, 1905, page 1175.

constitutional tendency towards mental disease. If, on the other hand, the proportion of affected individuals in such group was equal or sensibly less, it would be necessary to look elsewhere than in heredity for an explanation of the origin of the disease.

In an earlier study we defined the expectation of mental disease as the chance of an individual being treated in a hospital for mental disorders in the course of a life time. In accordance with this definition it was found that in 1920 in the State of New York, males had 4.7 chances in a hundred

TABLE 3
Frequency of mental and nervous diseases and defects among relatives of 60 male manic-depressives

RELATIONSHIP	TOTAL NUMBER OF RELATIVES	OF WHOM		OF KNOWN CASES			TOTAL DISEASES AND DEFECTS RECORDED*
		No details recorded	Histories recorded	Total without mental or nerv- ous disease	Number with psychoses	Number with other defects or diseases	
Father.....	60	1	59	42		17	17
Mother.....	60	1	59	46	2	11	14
Paternal grandfather.....	60	13	47	45	2		4
Paternal grandmother.....	60	13	47	45		2	2
Maternal grandfather.....	60	8	52	52			
Maternal grandmother.....	60	7	53	50		3	3
Paternal uncles.....	104		104	99	2	3	5
Paternal aunts.....	89		89	88		1	1
Maternal uncles.....	103	2	101	95	1	5	7
Maternal aunts.....	95		95	90	3	2	5
Brothers.....	118	9	109	99	4	6	10
Sisters.....	145	6	139	130	4	5	9
Total.....	1,014	60	954	881	18	55	77

* One individual may have more than one defect or disease.

of becoming insane, females 4.4 chances in a hundred. On the theory of random sampling, therefore, approximately 4.7 per cent of our male populations, and 4.4 per cent of our female populations should develop psychoses necessitating the admission of these individuals to a hospital for mental diseases. Since the expectation of mental disease has been increasing from decade to decade, these rates are probably too high for the older generations. However, this is counterbalanced in our family statistics by the fact that some individuals who were undoubtedly psychotic were not treated in insti-

tutions, and therefore do not conform to our definition. In order that the statistics may be comparable, we do not include in the psychotic group individuals classified merely as nervous, feeble-minded, alcoholic, etc., unless these were also associated with a definite psychosis.

Tables 3 and 4 provide the data concerning the families of the 60 male patients.

There was a total of 1014 known relatives of the male patients. No data could be obtained in 60 cases, leaving 954 with recorded histories.

TABLE 4

Classification of psychoses and other defects appearing among relatives of 60 male manic-depressives

RELATIONSHIP	PSYCHOSES							OTHER DEFECTS				
	General paralysis	Alcoholic psychoses	Manic-depressive	Dementia praecox	Epileptic psychoses	Psychoneuroses	Undiagnosed psychoses	Neurotic traits	Feeble-minded	Epileptic	Alcoholic	Suicide
Father.....								5			10	2
Mother.....							2	10	1		1	
Paternal grandfather.....							2				1	1
Paternal grandmother.....								2				
Maternal grandfather.....												
Maternal grandmother.....								3				
Paternal uncles.....		1					1			1	2	
Paternal aunts.....										1		
Maternal uncles.....				1							5	1
Maternal aunts.....			1				2	1		1		
Brothers.....	1	1		1	1			2			3	1
Sisters.....			2	1		1		4				1
Total.....	1	2	3	3	1	1	7	27	1	3	22	6

Of these only 18, or 1.9 per cent, had a history of mental disease, whereas we should have anticipated a total of 42.9 ± 4.3 cases, in accordance with the general expectations in the State of New York. It is evident therefore that the number of affected individuals is much less than one would expect as a result of random sampling. Of course the generation of brothers and sisters has not yet completed its span of life, and more cases of mental disease may be expected before the family histories can be described as completed. In order to change the results, so that the families of patients would be significantly in excess of a random population with respect to the

number of affected individuals, we would require a total of at least 56 cases of mental disease. In other words, 38 more cases would have to arise among the brothers and sisters, and possibly among parents, uncles and aunts, a result which is in the highest degree improbable.

Turning to the several degrees of relationship we find the following results: Among fathers, expected cases 3, actual none; mothers, expected 3, actual 2; grandfathers, expected 4, actual 2; grandmothers, expected 4, actual none; uncles, expected 10, actual 3; aunts, expected 8, actual 3; brothers, expected

TABLE 5

Frequency of mental and nervous diseases and defects among relatives of 95 female manic-depressives

RELATIONSHIP	TOTAL NUMBER OF RELATIVES	OF WHOM		OF KNOWN CASES			TOTAL DISEASES AND DEFECTS RECORDED *
		No details recorded	Histories recorded	Total without mental or nerv- ous disease	Number with psychoses	Number with other defects or diseases	
Father.....	95		95	73	3	19	24
Mother.....	95		95	76	4	15	21
Paternal grandfather.....	95	21	74	70	1	3	5
Paternal grandmother.....	95	24	71	70	1		1
Maternal grandfather.....	95	21	74	71	1	2	3
Maternal grandmother.....	95	19	76	75	1		1
Paternal uncles.....	125	17	108	102	3	3	6
Paternal aunts.....	98	12	86	83	2	1	3
Maternal uncles.....	125	8	117	115	1	1	2
Maternal aunts.....	136	6	130	127	2	1	3
Brothers.....	262	2	260	234	11	15	26
Sisters.....	242	5	237	216	10	11	23
Total.....	1,558	135	1,423	1,312	40	71	118

* One individual may have more than one defect or disease.

5, actual 4; sisters, expected 6, actual 4. In every case the actual results are less than the expected results.

From among the families of the 60 male probands we may select the 17 in which the father had some mental or nervous defect or disease, including 2 suicides. The 17 patients had 53 brothers and sisters, among whom there developed 1 psychosis. A total of 2.4 cases would be expected on the basis of random sampling. Selecting similarly the cases of 13 patients whose mothers had some mental or nervous disorder, we find a total of 40 brothers

and sisters, of whom 4 developed psychoses. We may compare this with a total of 1.8 expected cases. In view of the fact that the generation has not yet completed its span of life, and that 2 brothers and 4 sisters show signs of a psychopathic personality, we may reasonably expect additional cases of mental disease in this group, thus indicating a probable significant divergence between actual and expected findings.

Tables 5 and 6 provide data concerning the families of the 95 female manic-depressives.

TABLE 6

Classification of psychoses and other defects appearing among relatives of 95 female manic-depressives

RELATIONSHIP	PSYCHOSES							OTHER DEFECTS						
	Senile psychosis	With cerebral arteriosclerosis	General paralysis	Manic-depressive	Involution melancholia	Dementia praecox	Undiagnosed psychoses	Neurotic traits	Feeble-minded	Epileptic	Alcoholic	Drug addict	Suicide	
Father	1	1		3				8	1	1	9		2	
Mother				1			2		15			1	1	
Paternal grandfather				1								4		
Paternal grandmother								1						
Maternal grandfather							1						2	
Maternal grandmother							1							
Paternal uncles							2				3			
Paternal aunts							2	1						
Maternal uncles					1						1			
Maternal aunts							2	1						
Brothers				2	3		4	2	5	5		4		1
Sisters			1	5	1	1	2	7	3	1			2	
Total	1	1	3	14	1	7	13	37	9	2	22	1	7	

Of the 1558 known relatives of the female patients, no details were recorded in 135 cases, leaving 1423 individuals with recorded histories. There were 40 cases of known mental disease giving a ratio of 2.8 per cent. This is considerably in excess of the ratio found among the families of male patients, but nevertheless, much less than the expected ratio. On the basis of 4.7 per cent among males and 4.4 per cent among females, we would have an expected total of 66 ± 5.3 cases. The number of actual cases therefore falls within the limits of random sampling. The strictures with respect to incompleteness of generations again apply, but, nevertheless, it is hardly likely

that 42 additional cases will arise among the brothers, sisters or other relatives, the minimum number necessary to effect a significant change in the results.

Among fathers, there were 4 expected cases and 3 actual cases; among mothers, expected 4, and actual 4; among grandfathers, expected 6, actual 2; among grandmothers, expected 6, actual 2; among uncles, expected 10, actual 4; among aunts, expected 10, actual 4; among brothers, expected 12, actual 11; and among sisters, expected 10 and actual 10. In none of these degrees of relationship can the divergence between actual and expected results be considered significant. In the case of brothers and sisters the total of affected individuals will however, undoubtedly exceed the expected total in the course of time.

Among the 95 female patients, we find 22 cases in which the father had some mental or nervous defect or disease. The patients represented in these 22 families had 154 brothers and sisters with known histories. Of these 7 developed psychoses, compared with an expected total of 6.6. Additional cases may be expected before the generation has completed its span of life. Considering the 19 families in which the mother of the patient showed a mental or nervous disorder we find that there were 105 siblings, among whom there were 7 psychoses, compared with an expectation of 4.8 cases. Making allowances for the incompleteness of the generation and for the 12 brothers and sisters who showed some mental or nervous disorder other than that of a recognized psychosis we may state that there is a strong probability that the difference between actual and expected results is significant and indicates a preponderance of mental disease in the siblings of these patients.

Taking all types of mental disease into consideration we may conclude that the frequency of affected individuals in the families of the 60 male and 95 female patients with manic-depressive psychoses does not seem to point to a hereditary explanation of the origin of mental disease in this stock. When we select those cases in which the father of the patient was affected, we again find inconclusive results. But when the mother was affected, we find reason for believing that the frequency of affected children was greater than the expected. The results are clear cut in the case of the female patients, and in view of the greater total of such cases to begin with, these results should be given greater weight than in the case of the families of the male patients.

We have, however, been dealing with an aspect of the polymorphic theory of the transmission of mental disease. Let us now consider the facts with relation to the manic-depressive psychoses exclusively. We have no

authoritative statement at present of the chance of developing a manic-depressive psychosis in the course of a life time comparable to the expectation with respect to all forms of psychoses. But we may make a fair estimate of such a probability by noting that male first admissions with manic-depressive psychoses average 10 per cent of all male first admissions and that female manic-depressives average close to 20 per cent of all female first admissions. Since the expectations of mental disease are 4.7 and 4.4 per hundred for males and females respectively, we may estimate the expectation of manic-depressive psychoses at roundly 0.5 and 0.9 per hundred for males and females, respectively.

On this basis we find that the 954 individuals in the families of the 60 male patients have an expectation of 6.7 ± 1.7 cases of manic-depressive psychoses. Actually there were only 3 cases. However, as many of the siblings have not passed the age of incidence, we may expect several additional cases to arise among them. Furthermore, there were 7 cases of undiagnosed psychoses, some of which may have been of the manic-depressive type. Making allowance for these two facts, we should undoubtedly have to increase the number of cases in the given families. Nevertheless, there is little likelihood that the resulting increase would exceed the expected total in any significant degree.

In the case of the families of the 95 females however, there is reason for believing that the expected number is exceeded by the actual number. Thus of the 1,423 individuals with known histories, 14 developed manic-depressive psychoses, compared with an expected total of 9.9 ± 2.1 cases. There were 13 individuals with undiagnosed psychoses some of whom were possibly manic-depressive cases and we may confidently expect that there will be additional cases among the siblings before they outgrow the age of incidence. Taking these into consideration there is a fair degree of likelihood that the total patients would reach 18 or even more, and this would indicate a significant divergence from a chance result. Because of the much greater number of individuals represented in the families of the 95 female patients these results must be given greater weight than those for the remaining families.

As indicated earlier in this report, the analysis has not yet been completed and our conclusions are therefore tentative. Bearing this in mind we may say that our data do not indicate that families in which one member has a manic-depressive psychosis are likely to develop relatively more psychotic individuals than will be found in the undifferentiated population. But there is some reason for believing that in such families a disproportionate number of individuals with manic-depressive psychoses will appear.

CHILD HYGIENE IN HUMAN ECOLOGY

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United States Public Health Service

Probably as late as a decade ago some surprise might have been felt, if not expressed, that a specialist in child hygiene should have been invited to present a paper at a eugenics congress. Much of our efforts has been called dysgenic. We have been accused of moving heaven and earth to save the unfit, the propagation of whose kind is most undesirable.

In recent years, however, the eugenicists themselves are telling us there is no real conflict between eugenics and preventive medicine; that eugenics is not concerned with heredity alone, but is concerned with the interaction of heredity and environment; that human ecology must claim a large share in the interest of us all.

Speaking for the child hygienists, I know of no science that could make our task easier than eugenics. Medicine, surgery, psychology and social service can help us to solve some of our problems, but eugenics would actually wipe out part of them.

I have no doubt that we do save some that are unfit. I am quite willing to admit that some of the children whose lives are saved in our child hygiene campaigns will grow up to increase the inferior strains in the population. From the published statements of many of you, I am sure you are equally willing to admit that it is quite impracticable to separate the fit from the unfit in any public health program. We cannot limit our diphtheria immunization to the children of college professors or refuse to vaccinate the feeble-minded son of the day laborer.

Last year at the centenary meeting of the British Association for the Advancement of Science, Dr. Sherwood Dawson, à propos of the greater fertility of the less intelligent elements of the population, stated that it was possible some of the present day schemes to promote welfare might be doing something to preserve the dull and so accentuate social problems. However, when I was in London last month I saw no evidence that our British friends had begun to restrict their child welfare work to those children having an intelligence quotient of 125 to 150. The child hygienist has to work with the child population as he finds it. Some features of the differential birth rate make us fearful of what that population may be in the not very

distant future. If the eugenicist can provide us with a better population, our work will be more productive of good than it is now, and far less costly.

There can be little doubt that eugenics can and will make this contribution, chiefly through education of the public and research. Of all forms of health education, eugenic education needs to be on the soundest foundation. We cannot put out propaganda so profoundly affecting human life without being more than reasonably sure of our ground. The researches of the members of this and similar organizations are accumulating basic facts for the foundation of this public education.

We know there are certain types which are a drag on higher civilization. Unfortunately, we are not always sure just how and when some of these types will develop. In some instances the laws of Mendelian inheritance are closely followed and we can predict with considerable assurance the types of offspring likely to result from certain matings. In other instances our knowledge is far from being complete. This seems to be especially true in the case of some of the insanities.

We are still too uncertain and have too little scientific data to justify our incorporating any hard and fast dicta on the inheritance of mental disease in our eugenics education program. And because we feel eugenics education to be vitally important to the life of the nation, research work must be continued in order that we may be able to give a reason for the faith that is in us. We look to eugenic research to give us a better child in the future.

When we come to consider any possible contributions which child hygiene may make to eugenics, I feel that we have something to offer. We are agreed that eugenics, in its broader aspect, is not concerned with heredity alone but with the interaction of heredity and environment, and our efforts in child hygiene tend to provide an environment worthy of the best inherited traits. By promoting the general health and nutrition of the child, protecting him from disease, and providing the best mental and physical surroundings, we furnish opportunity for the development of the potentialities inherent in good stock. A continuously bad environment is a handicap to the best stock.

There is also no doubt that we are doing something to prevent a decrease in the good stock in the population. In laying so much stress on the fact that we are saving the unfit, the fact that we are also saving the fit seems to have been forgotten. If by various measures of child hygiene we save a definite percentage of children each year, it is reasonable to believe that some of those saved will be "builders of America," and that they will propagate their kind. Without our efforts some of this good stock may have succumbed. Very superior stock, both mentally and physically, may have

no immunity to certain serious diseases and it is our privilege to aid in preserving such strains.

Again, by means of prenatal and intranatal care we can prevent the birth of a certain number of defectives. Not that such care can have the slightest effect on germ plasm or heredity, but since a sound healthy population is our objective it has distinct eugenic value. The mental defectiveness and physical disability resulting from birth injury can be largely eliminated by careful, skilled obstetrics. By adequate treatment of the syphilitic pregnant woman the incidence of congenital syphilis can be lowered to a very marked extent. The reduction of the incidence of syphilis, with its predilection for the nervous system, is certainly much to be desired from the standpoint of national efficiency.

It may be that child hygiene's best contribution to eugenics will be found in the field of research. From the standpoint of eugenics there can be no greater problem than that of mental defect and disease and it is there that research is most needed.

The problem of the hereditarily feeble-minded is a very discouraging one, and at the present time its best eugenic solution seems to be segregation for their shorter life span or sterilization. As a class they are least susceptible to eugenics education.

In the case of insanity, however, we have a quite different proposition. Late studies seem to indicate that sterilization of the insane would have little effect on the amount of insanity in the general population. But there is some indication that certain biological and sociological factors, together with measures in the field of child hygiene, may tend to slowly reduce the number of the insane in the population.

The office in the Public Health Service of which I am in charge—Field Investigations in Child Hygiene—has recently completed a study of a small group of children of psychotic parents, which corroborates some of the findings of other investigators, and brings out some interesting facts.

This study of children of patients in State hospitals for the insane was undertaken with a view to finding some answer to the following questions:

1. Do children living in family groups which have contained definitely psychotic persons show potentially psychotic behavior, delinquency, school maladjustment, or personality problems to greater extent than children who have not been associated with psychotic adults?

2. Do any significantly causative relationships exist between the behavior of children and the presence of psychotic adults in the family group?

3. Do children living in family groups which contain psychotic adults constitute a responsibility which should be met by some specific public health or welfare agency, or by some member of the hospital staff?

In other words, the major purposes of the study were to determine whether these children indicated, by their behavior, any serious need for psychiatric assistance, and whether the children of psychotic patients constituted a profitable foundation on which to base a public mental health program. These children were subject to a double handicap. Not only were they the offspring of defective stock, but they had been subjected to such an unfavorable environment in the home as would naturally result from a developing psychosis in one of the parents.

The study was made in Maryland and was under the direction of Dr. George H. Preston, Commissioner of Mental Hygiene of that state. The data here given is taken from his report to the Washington office and an abstract made for the American Orthopsychiatric Association. The cases were limited to white patients living in Baltimore City having children under 18 years of age. Special attention was given to those items of behavior which we have been accustomed to look upon as significant of instability, and possibly indicative of future neurotic or psychiatric developments.

During the eleven months covered by the study, 523 psychotic adults were admitted from Baltimore to the Psychiatric wards of the Baltimore City Hospital and two of the Maryland State Hospitals for the Insane. A striking fact that met the research staff in the beginning was the difficulty in finding patients with children under 18. After certain necessary eliminations were made there remained a group of 19 families containing 49 children under our age limit. This feature was in agreement with the findings of Dayton in a study of patients in two large State hospitals for the insane in Massachusetts. He found the average number of children ever born to the patients to be decidedly smaller than for the general population of the state. There was also a low marriage rate in both the Baltimore and Massachusetts groups.

The patients who were the parents of the children in our study had remained in their homes following the onset of their psychoses for periods ranging from 4 months to 8 years—an average of about $34\frac{1}{2}$ months. In many cases the children were exposed to a marked, though gradual, change in the home atmosphere. These children ranged in age from infancy to 18 years. With a few exceptions, their health seemed to be quite good. In the whole group there were only 4 children who were retarded—none who could be classed as feeble-minded.

An analysis of their personality traits showed among other features, that 20 per cent were disobedient, 18 per cent exhibited temper tantrums, 18 per cent were the victims of fears, 12 per cent had food fads, and 24 per cent were described as "sensitive."

At a first glance this picture would seem to indicate that these children represented a definitely psychopathic group and that their psychopathy was related to the psychoses of the parents. However, to properly evaluate the findings it was necessary to compare them with control material. For this purpose groups of children were selected from broken homes, from among the "problem" children referred to a child guidance clinic, and unselected children from a rather better-than-average public school. The control material was analyzed along lines similar to those used in the study group. An effort was also made to compare our group with other children of psychotic parents, but the two older studies available were made before the development of the newer technic and hence a comparison was not satisfactory.

The comparison of our group (children of psychotic parents) with the control groups, where similarity of technic made the analyses comparable, caused a revision of our first impression. Our group seemed to be rather better adjusted than the wards of the child-placing agencies, and they compared very favorably with the unselected school group—the so-called "normal" group.

The traits noted most frequently in the study group were sensitiveness, disobedience, temper tantrums, fears, aggressiveness, and food fads. In every instance, except in aggressiveness, these traits were more marked in the "normal" group. While 24 per cent of the study group were classed as sensitive, this trait was found in 56 per cent of the normals. Twenty per cent were disobedient as against almost 23 per cent in the normal group. In the matter of temper tantrums and fears, these traits were found in 18 per cent of the study group, while 27 per cent of the normals had temper tantrums and almost 59 per cent showed fears. Twelve per cent of the study group exhibited food fads which were present in nearly 35 per cent of the normals.

Apparently these personality traits in the children of psychotic parents could have little relation to psychosis in the parent. As Dr. Preston remarks: "On the basis of percentage occurrence of 'undesirable' behavior traits, the advantage seems to be with our group"—which is the group of children of psychotic parents. The group of "normals" showed much more frequent deviations from an accepted "normal behavior pattern" than did the children in the homes from which psychotic parents had been removed.

It was also shown that, on the whole, the children of psychotic parents showed far less deviations from so-called "normal behavior" than the children in the problem group.

There were no frankly psychotic children in our group, but this may easily

be due to the fact that none of them had reached the age when they might have been expected to show reliable signs of latent or frank psychosis. Hence the non-occurrence of actually developed psychotic behavior was not indicative of the "psychotic potentiality" of the group.

In order to check the parent-child mental relationship among Maryland psychotics Dr. Preston examined the records of 1040 patients in the State Hospitals to determine whether their parents had, in turn, been hospitalized. It was found that only 29 had psychotic parents.

There is a low marriage rate among people who become psychotic, and the sterility rate among those who marry is high. In addition, the actual size of completed families of psychotics is small. The figures from a group of State hospitals for the insane, comprising about 3070 matings show an average of 2.9 children per patient. This is quite close to the number (2.4) of children in the so-called "normal group" which was drawn from an upper middle class suburban community, in which the families would tend to be small.

The difference in this respect between the insane and the mentally retarded is shown in the contrast between the size of the families of the State hospital patients and of families containing retarded children in Baltimore public schools. In the former group there was an average of 2.9 children per family; in the latter the average was 4.4.

Since it has been shown that there is a low marriage rate, a high sterility rate, and small families among the psychotic cases, it would seem that Dayton is justified in saying "it appears that this stock is barely holding its own, if not actually decreasing."

These findings certainly give support to the statement of Gill, when he declared in 1930 that "the great majority of certifiable defectives are not the progeny of mentally defective parents, and that sterilization of the insane at any given period would have little effect on the number of insane individuals in the next generation." These English and American data "do not deny the hereditary nature of the liability to some forms of insanity," but do call attention to a tremendously important fact. That it is not the actually insane who constitute the real problem of mental hygiene from the eugenics point of view, but the stock which is subject to some mental disease. The carriers are more dangerous than the cases.

The control of the development of insanity means that we must bring our preventive work to bear on the carrier. Control of the carrier of physical disease results in lessened incidence of disease itself, and it is the carrier problem that confronts us in mental hygiene. Perhaps it is too much to assume that all members of a stock which had produced cases of insanity

were probably carriers of mental abnormality. There is the psychiatrist who says that mental abnormality is so general and so frequently exogenous that we should search for the carrier both in family stock and social setting.

Preventive work among these carriers, wherever they be found, must be preceded by a more intensive study of the physical, social, and economic, factors associated with the development of the psychoses. We must remove such factors from their environment in the interest of human ecology.

The study of physical factors should include further consideration of the relation of physical defects and physical illness to mental diseases, glandular dysfunction, and possible biochemical disturbances. We know the relationship between the thyroid gland and cretinism, and it has been suggested that some insanity has an endocrine basis. The whole subject needs further study.

The racial factor in mental hygiene cannot be ignored. Pollock and Malzberg have shown that the expectation of mental disease is considerably higher among the foreign-born than among native American stock. We do not know definitely why this is so, and can only infer that probably environmental factors play the dominant part.

The compilation of family pedigrees may discover many unsuspected carriers as well as cases, and it is to be hoped that this work will increase in volume. But it is slow work and it is more practicable to apply preventive measures in mental hygiene to the whole population. Prevention should undoubtedly begin in childhood, and the researches of the eugenicists, ecologists, psychiatrists, physicians, surgeons and all other scientists in related fields will provide us with our armamentarium. If we are to provide an environment that will stimulate favorable reactions between the organism and the environment we should begin with the baby at birth. The Child-Guidance Clinic takes the child that is already developing symptoms and attempts to abort the attack. We should not wait till symptoms appear if we are to empty the insane hospitals of the future. If it is true, as has been said, that in the long run nature evolves types to suit environments, child hygiene may have a share in bringing about a desirable evolution.

SECTION VII

DIFFERENTIAL FECUNDITY

MEASURES TO ENCOURAGE THE FERTILITY OF THE GIFTED

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Before proceeding to discuss the various measures calculated to encourage the fertility of the gifted I should like to preface them with a few considerations.

1. *Those subjects are described as gifted who excel or could excel in the scientific, artistic, technical or organized sphere.* The eminence of those who show a special aptitude for scientific study is probably due to their intellectual superiority. Others whose technical skill is above the average have no doubt an intelligence of a particular kind, whilst artistic endowment is due to the influence of other factors.

2. *Intelligence is inborn and so are special aptitudes. This intelligence can be measured by the well known intelligence tests of which one of the oldest and best known forms is the Binet series, with its ramifications, such as the standard Binet tests and also, in a wider sense, the National Intelligence test.*

Intelligence is expressed in the intelligence quotient (I.Q.) i.e., the mental age divided one hundred times by the chronological age of the subject tested.

3. *Superior intellects are desirable for society.*

The nation's progress depends, to a large extent, on what is achieved by its gifted subjects. They are the source from which issue great discoverers and inventors; they supply the leaders in the various spheres. And in these days of cosmopolitanism and great international problems, the full extent of which cannot possibly be compassed by one person alone, the community, now more than ever, has need of intellectually gifted individuals. Technique in its highest stages and its extensive specialisation—the complication and differentiation of social life—has need of a large number of gifted people. A nation's prosperity very largely depends on the number of its intellectually gifted.

4. *Talent is not equally distributed between the several classes of the population.*

According to many of the investigations made, the number of intellectually gifted subjects is proportionately larger in the higher social classes than in the lower strata. We would mention the investigations carried on by

Terman, by the American Army during the war, by Prak, Hartnacke and Kramer, Duff and Thomson.

5. *The fact that there are higher and lower classes of the population is not due to any fortuitous circumstance.*

The more gifted a child is the more chance he has of rising in the social scale, for in these days of democracy many intellectual children of less well-to-do parents are given an opportunity to develop their gifts, thanks to the financial help granted by the State or obtained from private sources. And if for some reason or other these children do not, after all, succeed in using their intellectual gifts to reach a higher rung of the social ladder, the next generation may have better luck. As a rule it takes more than one generation to achieve the social rise although often enough the highest offices are filled by persons who, as children, belonged to the lowest group of the population. America numbers many such gifted personalities among her sons, and Europe can also be proud of a few such examples.

6. *In addition to the inborn aptitudes, environment will also influence the development of gifted subjects, but this outside influence is of relatively small account.*

Environment certainly has some influence but only in the nature of a stimulus. It cannot engender gifts when none are inborn. Besides the social environment, the urban environment is also of importance. In the towns the process of selection was and continues to be much more intense than in the provinces, or rather the rural districts.

7. *Gifted subjects should therefore be given the best opportunities to develop their talents.*

This is made very clear in the foregoing comments, but we see that, in practice, more attention is bestowed, more energy and more money are spent on the mentally deficient child than on the gifted child. The gifted child is made to take a back seat for he is sure to succeed, or so we think. And the literature on the subject contains relatively little on gifted people while an enormous amount of writing has been devoted to the socially inferior.

8. *The offspring of gifted parents have a bigger chance than others of being above the average.*

Galton has already calculated the chances which an individual, owing to his blood relationship with an eminent man, has of being himself considered eminent. In 1928 Wingfields published the results of his investigations on this aspect of the question.

9. *We are compelled indirectly to separate the gifted as a group from the others.*

It is practically impossible to select all gifted persons by intelligence tests. We must, therefore, be satisfied with the attainable and apply the measures suggested to that group of the population in which a relatively large number of able people are found. As we have seen from the foregoing that in the social upper classes the number of intellectual children (I.Q. above 120) although not 100 per cent is still considerably greater than in the other classes, the measures to promote the fecundity of the gifted amount in practice to the encouragement of the fertility of the upper classes.

10. Statistics show the fecundity is lowest among the higher social classes.

This fact has been observed everywhere. We need only recall in this connection the research work of Fahlbeck, Bertillon, Mombert, Brentano, Wolf, Pearl, Burgdorfer and so many others. Lenz writes that formerly positive social selection went together with positive biological selection. Nowadays it is exactly the reverse. The intellectual classes of the population marry at a more advanced age, they have a smaller number of children than the less educated classes. Positive social selection goes together with a negative biological selection. To lose the biological race may actually mean victory in the social contest. The circumstance that family limitation may lead to social advancement is an inducement to restrict the size of the family. People are willing to lose from a biological point of view for the sake of social victory; worse, the loss is a means thereto. Thus social selection, under the modern way of looking at life becomes the cause of a biological contraselection in grand style. In practice it amounts to this: the intellectually gifted are more numerous amongst the upper classes than amongst the lower classes, while it is precisely among the upper classes that the lowest number of children is registered. The irrefutable result is, therefore, that if fecundity continues in the same proportion, the intellectuals poor in children, will be, in a few generations, in a great minority; to all intents and purposes they will have disappeared and we shall then have a predominance of the less gifted with numerous children.

11. In recent years, however, various investigations have shown that the fecundity of the social lower classes of the population has not only substantially declined but is here and there even lower than amongst the upper classes.

I would mention in the first place the researches of Prof. Edin of Stockholm who found that, since the war, the birth rate in the labour districts was lower than in the well-to-do districts. Further the reports of Grotjahn at the World Population Conference held in Geneva in 1927, the publication of Bierens de Haan in 1924, that of Wolf in 1928, the important results of Prof. L. Hersch with regard to the birthrate in Paris in the different "arrondissements" (borough-districts) in relation to the degree of prosperity. In

Zürich also it was found that the birthrate among the working classes was not higher than that of the better situated. The figures collected by Lotze in Stuttgart and by Freudenberg in Berlin showed the same results. I myself have found in Rotterdam that the birthrate of the working classes has, in the last 50 years declined much more than amongst the upper classes of the population, so that one may say that there is in this respect a strong tendency to level up.

12. The decline in the birthrate is not so much a biological and physiological phenomenon as a psychological, moral and cultural phenomenon, that is a voluntary one.

It cannot be assumed that the decline of the birthrate is the result of endogenic causes, that is a physiological decline of fecundity. Several phenomena plead against this, such as:

(1) Such a big decline in the birthrate of more than 50 per cent in 50 years cannot be biological because biological changes usually take place much more slowly.

(2) Statistics go to prove that after a child's death another child is born much more quickly than if no child had died. In other words the birth interval is shorter after a child's death.

(3) A difference in the birthrate amongst different strata of the population can never be explained from endogenic causes.

(4) The same applies to the difference in the birthrate in the various religious groups.

13. Here and there in the higher social strata of the population there is now a tendency to increase the number of children.

We see that in Bremen, in the wealthy districts, the birthrate is at present a trifle higher than it was at the beginning of this century. The same fact has been observed in Amsterdam and in Paris. The cause of this is not yet quite clear. It is my opinion that had we been spared the world crisis the phenomenon would have been observed in many more cities. Who has ears to hear what is going on in the upper classes will discover that the former objections to larger families have disappeared or at least been weakened. People are even heard to say that it is again fashionable to have three or four children. I foresee, therefore, the possibility of an increased birthrate among the upper strata of society. In how far this will increase the total number of children, one cannot tell. But I do not believe that the increase will be a big one.

14. In the long run this increase in the number of children will be imitated by the lower classes.

This phenomenon of an increased birthrate—it would perhaps be more

accurate to speak of birth control on a smaller scale—will slowly penetrate amongst the middle classes and subsequently at a faster rate amongst the labour classes. One cannot tell within how many years the latter will take place, but it will not be for some time to come. The practice of birth limitation is as yet far from general amongst all strata of the working classes. It has only comparatively recently made its appearance amongst these classes.

15. This is the psychological moment to take measures to encourage the fecundity of the gifted, now that in the strata of society in which there is the largest percentage of gifted individuals, a probably slight increase in the birthrate is to be expected.

We now get a hearing in the higher social classes because their objections to a larger family are not felt so strongly as before, and can even be said to be non-existent in the case of a good many people. We must take advantage of the change of thought registered in this class of the population, and we must do so in two ways:

(1) by guiding the increased birthrate into the right eugenist channels.

(2) by stimulating it whenever it is desirable to do so from a eugenist standpoint.

16. The education of those who by virtue of their calling will in later years be the advisers in matters of eugenics should aim at this.

The training of medical men, theologians, lawyers, teachers, biologists, psychologists still leaves much to be desired in this respect. Taking the tuition of genetics and eugenics as given in Holland, for an example, I must confess that the outlook is unfavourable for the education of the future so-called expert advisers.

17. One should, therefore, begin by changing the tuition at educational institutions in such wise that as much of genetics and eugenics is taught as students will require to exercise their profession in a really satisfactory way.

This tuition need not be so very extensive, especially not for lawyers, theologians and men of letters but they should know something about the subject. For medical men and biologists the tuition should, of course, be more complete. Doctors in particular should know enough about it to be able to give their patients scientific advice on marriage and pro-genetics.

This more extensive tuition for future medical advisers and research workers should also be given in the training colleges for teachers as the latter should be capable of discovering the gifted children not only by their scholastic achievements but also by means of tests. In order to fulfil this task with zeal and intelligence, teachers should understand its full significance.

18. The educated public should be properly informed of the importance and progress of genetics and eugenics.

This is an extremely difficult task, for the initial success depends on the manner in which public opinion has been enlightened on the matter. There are plenty of examples to show that untimely and inaccurate information has often had the opposite effect. I need only mention psycho-analysis and the rejuvenating cure of Steinach.

19. If genetics and eugenics are to make good progress it is imperative that there should be in the different countries well equipped institutes where genetics and eugenics may be practised in all their ramifications.

Admittedly, several institutes have been formed in Europe in imitation of the Eugenics Record Office of the Carnegie Institution under the leadership of Dr. Davenport. In this connection mention should be made of the Lundborgs Institute in Upsala, Rudin's in Munich, Fischer in Berlin-Dahlem, Mjoen in Oslo, Govaerts in Brussels, Schlaginhaufen in Zurich; in London the Eugenics Society is working under Darwin and Pearson's Institute. The Science Academy of Leningrad appears to possess a heredity institute directed by Philipschenko.

20. For Europe it is desirable, even necessary, that one central institute be created where the results of all research work should be collected and published, where every investigator may obtain information and where the general lines on which investigations should be carried out are indicated.

Briefly this general bureau should in future become the centre of all genetic and eugenic research work in Europe. This will primarily depend on the willingness of eugenists to cooperate and also on the financial basis of such a central institution.

21. Women should in the first place again be won over to the idea of a large family. Clothes should not be so made as to render pregnancy impossible because fashion decrees a slim line.

Nowadays women prefer fashion to children, for large families are inimical to the slim figure, as every pregnancy increases the chance that the body will not regain its former shape. Fashion designers should, therefore, cooperate by introducing other models which do not emphasize slenderness.

22. We must get rid of the idea of feminism in its old form, according to which woman should be man's equal in every respect, professionally, politically, as regards salary, etc.

The theory of this so-called equality of the sexes is absolutely incorrect not only physiologically and biologically, but also socially and politically. Woman is indeed a man's equivalent, but they each have their own particular task to perform in the world. The woman's main duty always has been and always will be the family. The University woman must know, understand, feel that marriage and children represent, after all is said and done,

the highest ideal. This can be so only if women accept the task which nature has imposed upon them; the care of their offspring, the community, tomorrow's population.

23. *Not only the women but the men must also be induced to desire a larger number of children whenever the chances of bringing gifted children into the world are at least greater than the average probability.*

There must be a complete change effected in public opinion. Both men and women must again learn to desire to have several children. In every country every available means should be pressed into the service of a suitable and extensive propaganda. Our investigations and their results should convince not only the leaders of the feminist movement of the great importance of practical positive eugenics for succeeding generations, i.e., the population, the world's future citizens. The leading political men should also be made to realise that eugenics represents a powerful instrument for the nation's future in the struggle for existence.

24. *It is imperative that the attention of the gifted be drawn to the importance of marrying at an early age in connection with the number of children.*

Statistics show that, especially as regards the female section of the population, the younger a woman is when she marries, the more children she is likely to have.

25. *Owing to the fact that the gifted just because they are so gifted cannot gain their ends without going through a long period of study, they can start exercising their profession and therefore get married only at a relatively advanced age.*

This could be avoided by reducing the period of study for the intellectually superior since they usually learn more quickly than the others.

26. *In so far as these gifted people will find paid employment later on, their initial salary can be higher than the one generally paid, for we know that they are above the average and that more may be expected of them so that a higher salary is justified.*

And in so far as they choose a liberal profession the fact that they are known to have been talented pupils will enable them to earn more than others.

Once business men when selecting their staff both in the higher and the lower ranks can rely on such a sure recommendation as that of a successful course at a school for the gifted, the latter will undoubtedly always have a big advantage over other applicants who did not attend such a school.

27. *The large number of unmarried persons among the gifted must be kept in check.*

It is quite certain that very often people do not marry owing to physical or mental deviation, which they regard as a bar to marriage. But many others, both men and women, remain single for quite different reasons. For

instance gifted people who wish to devote themselves exclusively to the profession they have chosen, and which they regard as their vocation from which neither marriage partner nor children may divert their attention.

In the case of men their superior intellect is often responsible for their celibacy. According to Lenz, this is true of the Roman Catholic clergy who not infrequently remain single as a result of their exceptional mental gifts, for innumerable young men are picked out to be ordained priests just because of their great intellectual superiority. Only a very small percentage of the population is so highly gifted as the average Roman Catholic priest.

28. Men and women of marriageable age should be medically examined in order to ascertain whether they have the right to marry in connection with the procreation of offspring.

Such an examination is necessary not only in case there should be objections to the marriage or at least to the procreation of children from a eugenic point of view but—and this point is quite as important if not more so—expert opinion should be obtained as to whether the parties concerned may expect offspring physically and intellectually above the average. In cases of this nature eugenists could, in the interest of the race and of the community, advise prospective parents not to restrict too much the number of their children, should they be inclined to do so.

However, I am of opinion that this pre-marriage examination should not take place just before marriage, at least not the first time. Every young man and girl, say at the age of 20 should obtain advice in regard to whether they are justified, from the point of view of eugenics, in begetting children. Should there be reasons why they would do better not to perpetuate the race, it is infinitely better that the parties concerned should be acquainted with the facts before there is any question of an engagement, to say nothing of a marriage. A medical examination shortly before marriage is undoubtedly also desirable but only to find out whether there are any traces of venereal disease, tuberculosis and perhaps a few other hereditary diseases.

29. It is extremely desirable that the church should not only observe neutrality as regards eugenics propaganda but she should collaborate with all the means at her disposal to give effect to positive practical eugenics.

At the second International Congress for Eugenics in 1921, and in his book published in 1926, Leonard Darwin said: "Failure is, however, certain if the problem is not attacked with religious zeal. There ought to be a great moral campaign against the selfish regard for personal comfort and social advancement."

I too am of opinion that it is the duty of the Church to encourage the eugenic movement to the utmost. The Church must realise that to encour-

age the gifted to have more children than they have today is to work in the interest of humanity. The Roman Catholic Church does not take a negative attitude towards eugenics, as the encyclic "Casti Connubii" clearly proves. The Jesuit father, Professor Muckermann, is one of the principal advocates of eugenics in Europe.

30. *The only action the state can take is to encourage desirable cases by granting special facilities to parents with large families.*

It goes without saying that in civilised countries the State cannot compel the inhabitants to have a large number of children. Enough has been said to show that only a complete reversal of public opinion can increase the desire to have children. But the State can by various measures, both social and financial, grant privileges to large families.

31. *The state should grant a family allowance or reduce taxes in proportion to the parents' income.*

Although I do not attach great value to these measures—they have only a stimulating effect—I am of opinion that they should not be rejected. In various countries family allowances or tax reductions have already been introduced, but these measures have the great disadvantage of acting dysgenetically instead of eugenetically. At least when the allowance or the rebate is a fixed amount, it is of value only for families with a small income, consequently for the lower social classes; precisely for those who have the lowest number of gifted children.

32. *If the system of tax reduction and family allowances is to serve eugenics reform, the annual income tax rebate or family allowance should be so large for all the beneficiaries, regardless of their income, as to cover a substantial part of the amount expended on the children's education.*

We have made it clear, I think, that this allowance cannot possibly be equally large for the various classes of the population. But it is advisable that the money thus supplied by the State should be furnished by the childless couples, those with few children and the bachelors, the rate to be according to the respective social classes.

33. *The law of succession should be modified in such wise that only part of the property should go to the children of those who have had only a relatively small number of children.*

What percentage should be assigned to the heirs in small sized families should, in my opinion, depend on the number of children, the latter's age and the value of the inheritance. If the children are still so young that their bringing up will involve expense and they cannot yet earn anything, their share should be larger than when the children are already grown up. Furthermore, I think that the percentage should decrease as the inheritance

increases. Then, at any rate, parents would be less tempted to leave as much as possible to a few children.

34. *The state should give every gifted child every possible opportunity to develop its talents and should prevent its being hampered by financial or other difficulties.*

Gifted children of less well-to-do parents should be aided by the State by means of scholarships to a much larger extent than has been the case hitherto, both quantitatively and qualitatively. Money thus employed is never wasted but will be bountifully repaid. Although the number of the gifted is not large proportionately in the less well-to-do classes, the absolute number will nevertheless be very high because the class itself is so large. Quite a considerable number of gifted children will, therefore, be able to develop their talents and will very certainly contribute in a marked degree to the nation's prosperity.

SUMMARY

In the preceding pages I have outlined several measures by which the fertility of the gifted could be encouraged. If I do not consider them all equally important and if I doubt whether some of them are really practicable I am nevertheless convinced that every means at our disposal should be made use of to achieve our aim. I do not cherish the hope that the measures I have proposed will or can all be put into immediate operation, but they do include a few for which the time is now ripe. It is possible to make the essence and aim of eugenics known by means of a propaganda on a large scale; literature, lectures, the stage, the pictures, broadcasting can all be pressed into the service of eugenic reform. It is possible to urge upon the governments the necessity of giving tuition in eugenics and genetics of making the study of both compulsory in the training institutes which come into consideration for this object. It is possible to secure here and now the co-operation of the Church. It is possible to accelerate the education of gifted children. It is possible to convince the governments of the necessity of reforming the system of taxation in the interest of eugenic principles, without increasing thereby the State's financial burden. All these measures can now be put to the test. It goes without saying that they cannot be confined to only one country. The international Eugenics Society must be the controlling spirit and frame our policy. It will then be for the national societies to carry out this policy adapting it to the conditions obtaining in the several countries.

In addition, scientific research work must be carried on energetically. I consider an international institute absolutely essential to a really satisfac-

tory collaboration. Efforts should be made to collect the requisite funds in one way or another. If we join our forces we shall reach our goal.

Let me conclude with the words spoken here, 11 years ago by Leonard Darwin, Chairman of the English Eugenical Society: "We should recognize that we shall best serve our country by bringing healthy and intelligent children into the world, provided that we can give them a sound education and a fair chance of winning a good livelihood; and all of us should be ready to make some sacrifice of social position in order to obey our country's call in this respect. The nation that wins in this moral campaign will have gone half way toward gaining an all round racial victory."

THE REDUCTION OF THE FECUNDITY OF THE SOCIALLY INADEQUATE

BERNARD MALLET

London, England

It has been stated that "Eugenics involves the study of the principles of human heredity in their bearings upon the conservation and progress of the human race. It aims at improving the race by (1) promoting the reproduction of sound stock, and (2) restricting the fertility of stocks with bad heredity and inferior capacity." These are the aims of "positive" and "negative" eugenics respectively.

The question I am asked to deal with, of course, concerns negative eugenics. As regards positive eugenics there is little controversy, but it is not easy to see how the tendency towards families too small to ensure the perpetuation of sound stocks can be counteracted. A system of family allowances is strongly advocated in some quarters, but no statistical proof of the eugenic effect of the existing systems in such countries as France, Belgium, appears to be forthcoming, and the only system which will have a practical chance of success in England is that of Flat Rate Allowances of 5/- a week for each additional child, which would provide little inducement to parents with a relatively high standard of living to increase their families, but would certainly constitute an inducement to the less desirable element of the population. There is little hope in these days of further relief from the burden of taxation upon the classes whose limitation is deplored, but there is, perhaps, room for experiments like that of the Eugenic Settlement at Les Jardins Ungemach near Strassbourg, which gives a practical demonstration of a most valuable kind of what can be done to preserve and increase the birth rate among the better type. The only real hope, however, seems to lie in the spread of eugenic knowledge, and of the realisation of the danger arising from the differential fertility of the social classes, which may in time have the result of encouraging and increasing reproduction from sound stocks in all classes. Equally important is the creation of a eugenic conscience among those classes and persons whose fertility there are reasons for wishing to see restricted; and the education of the whole community on these questions must, therefore, always be the primary object with eugenicists. Propaganda lectures and addresses, combined with the publication of the

Eugenics Review, therefore, continue to form the most important part of the activities of the London Society.

The chief problems with which we have to deal are those concerned with negative eugenics, and it must, unfortunately, be recognized that little progress has yet been made in the solution of the problem of the reduction in the fertility of the undesirable elements in our populations. It is, on the contrary, a commonplace that birth control has so far acted dysgenically, by reducing the fertility of the better-endowed strains, while leaving relatively unchanged the birth rate of those who are less fit for parentage. The eugenicist regards a differential birth rate as racially harmful, but he is sometimes apt to create class-prejudice by an unqualified assumption that the poor are necessarily less well endowed from a racial point of view than the well-to-do. An investigation which our Society has set on foot as to the existence of what was described by the recent Mental Deficiency Committee as the "Social Problem Group" is of some importance in this connection. The existence of such a group has long been realized by eugenicists and sociologists, but the existence among us of a definite race of chronic paupers, a race parasitic upon the community, breeding in and through successive generations, and only to a small extent recruited either from the ranks of unskilled labourers, or by the sufferers from the fluctuations of employment, was, perhaps, first noted and investigated by Mr. E. J. Lidbetter, who for many years has conducted a study of this group in a Poor Law area in East London. The report of the Departmental Committee on Mental Deficiency in 1929 thus defined the group in question:

Let us assume that we could segregate as a separate community all the families in this country containing mental defectives of the primary amentia type. We should find that we had collected among them a most interesting social group. It would include, as everyone who has extensive practical experience of social service would readily admit, a much larger proportion of insane persons, epileptics, paupers, criminals (especially recidivists), unemployables, habitual slum-dwellers, prostitutes, inebriates and other social inefficients than would a group of families not containing mental defectives. The overwhelming majority of the families thus collected will belong to that section of the community, which we propose to term the "social problem" or "subnormal" group. This group comprises approximately the lowest 10 per cent in the social scale of most communities.

Of this group the report further stated that its anti-social characteristics are the result, mainly, of inferior heredity, and that its fertility is higher than that of any other social element. It is this group which the Society is now investigating. Our General Secretary is about to edit a collection of contributions by authorities with special knowledge of the sub-groups of the Social Problem Group, in which an answer will be sought to the question as

to the extent to which the families which procreate the different sub-groups are appreciably below the average. But the existence of such a group may be taken as established; and the fact that high grade mental defectives and the classes which produce them are incapable of regulating the birth of their children, and are practically untouched by the spread of contraceptive knowledge, has brought the question, how to restrict the output of children from this group, both in the interests of its members and of society at large, into special prominence. For recent authoritative enquiries have placed the number of certifiable mental defectives in England and Wales, not including the insane, at 300,000, and demonstrated that the incidence of mental defect has substantially increased in the last twenty years, and is still increasing.

Faced with this situation, and with the apparent impossibility of providing sufficient institutional accommodation for mental defectives—such accommodation under the Mental Deficiency act provides at present for only one out of twelve mental defectives—the public is now ready to give impartial consideration to alternative methods of limiting the increase of the numbers of this subnormal group. Leaving aside segregation in institutions to which allusion has been made, and voluntary abstinence from sexual intercourse which is impracticable, these methods include abortion, legal prohibition of marriage, contraception and sterilization.

As regards abortion, it is stated that the adoption of this practice in Russia has resulted in a reduction in female mortality and morbidity, but until further data are available from that country or elsewhere, the Eugenics Society is not likely to make any pronouncement on this question.

Legal prohibition of marriage has been officially advocated in this country as a means, not only of retaining control of mental defectives under guardianship and supervision, but also as a means of checking their fertility. But it is obviously inapplicable to any but mental defectives, and among other objections to such measures it may be supposed that it is ineffective as a check upon fertility as it could not prevent illegitimate births, and would encourage promiscuity in sexual intercourse. We then come to contraception. The serious fall in the birth rate, due undoubtedly to the spread of the knowledge of contraceptive devices, which has occurred in the last fifty years, is perhaps the most momentous social and biological phenomenon of our time; and it is impossible to contemplate without alarm the effect of its probable future development on the future of the race. But whatever objection may be felt to birth control on religious and social grounds, it cannot but be deplored that, from the nature of the case, the classes in which the use of contraceptive methods would be eminently desirable are incapable of

applying any methods yet devised. It is possible, of course, that simple and reliable methods may in time be discovered by the labours of such organizations as the Birth Control Investigation Committee, of which the Hon. Secretary is Dr. C. P. Blacker, the Secretary of the Eugenics Society; but for the time being apart from segregation, which is clearly the best method, it is only to sterilization that we can look to limit the fertility of mental defectives and of those classes composing the Social Problem Group. An important point in this connection is that the parents in this group rarely desire the large families which are our problem; an increase in their family, after the first two or three, is looked upon as a misfortune, as is proved by the great amount of attempted abortion; and there is reason to believe that advantage would be willingly taken by married women of facilities for sterilization if offered.

It is for this reason that two years ago the Eugenics Society undertook to advocate the application of sterilization to mental defectives, and to persons afflicted with hereditary defects seriously impairing physical or mental health or efficiency; and as it appeared doubtful whether eugenic sterilization was legal in Great Britain, we promoted the introduction of a bill in Parliament to allow *voluntary* sterilization under certain safeguards.

The Society has been careful to explain that sterilization is not proposed as a substitute for segregation in institutions, but merely as an accessory method which it is held will add something to check the increase in mental defectiveness, and to refrain from exaggerating the practical effect of the limited application of sterilization at present advocated. If, as a result of its legalization in the case of mental defectives, the practice should become recognized as normally applicable to a well-ascertained Social Problem Group, a much more serious impression would be made on the problem. The result, however, of the advocacy and the publicity given to the subject in the Press and in public discussion during the last year or two, has been to remove much prejudice on the part of the British public in questions of eugenic reform. I need hardly add that the sterilization laws of the States of the American Union has been much quoted and referred to in our pamphlets and discussions. These pamphlets will be found in the "exhibit" of the Eugenics Society.

One of the effects of this growing interest in our subject is an increased demand for eugenic prognosis. More and more persons contemplating marriage, who have ancestors or collateral relatives exhibiting some hereditary disability, are applying for advice as to the chances of their children being affected by such and such a disease or disability. In the present condition of our knowledge of hereditary diseases it is by no means safe or easy to give

advice in such cases. With a view to remedying this deficiency our Secretary, Dr. Blacker, is now engaged in editing a book, to which medical men with special knowledge of diseases recognized as hereditary are contributing, in order to place before the general practitioner the information at present available for giving eugenic prognosis. It is hoped that the publication of this book will stimulate the production of more accurate and abundant data than at present exist. And in this connection I may add that Dr. Blacker has prepared a schedule for recording the pathological elements in pedigrees, and also a second schedule designed for the preparation of full pedigree records for genealogical purposes in such a way as to bring out their eugenic aspects.

Although, then, I cannot claim that any real impression has yet been made upon the fertility of those individuals and classes whose reproduction must be considered racially undesirable, this brief account of the recent activities of the Eugenics Society, and especially its concentration on the questions of the Social Problem Group and Sterilization, will show that steady advance is being made. The importance of the subject of Eugenics is now much more generally recognized than at any previous period, both by the leaders of public opinion in this country, and by the public at large.

A DISCUSSION OF SIR BERNARD MALLET'S PAPER ON "THE REDUCTION OF THE FECUNDITY OF THE SOCIALLY INADEQUATE"

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I am quite in accord with the greater part of the excellent paper of Sir Bernard Mallet. The seriousness to the future of race progress, and to civilization itself, of the decreasing fecundity of "sound stock" and the relatively increasing reproduction of the unfit, weak, unstable, bad heredity, to the student of eugenics, is appalling. Correction by education of the fit seems slow and unpromising.

Any system of family allowance for children, in the United States at least, would fail. A case in point is reported in California where the state provides for the orphaned children such aid as may be necessary. From this recent report we learn that a mother of seven children was committed as insane to the state hospital. Her mother and sister had died insane and her brother had committed suicide. The superintendent suggested to her that she would probably be in and out of the hospital the rest of her life, and that as she could not care for her children properly she should have no more. The woman replied that she would consult her husband, a sickly tailor, and then reported: "My husband and I have agreed that I couldn't be sterilized now. You see, we already have seven children for which we are receiving half-orphan aid from the state (\$10 per month per child). We have always figured that when we had two more the income would be enough so my husband could stop work, so it wouldn't do for me to be sterilized yet." Such provisions in laws will defeat themselves unless they are protected by some provision to prevent the hereditary unfit from burdening posterity by the rapid reproduction of children doomed to defects which render them incapable of becoming self-sustaining good citizens.

Poverty in this country is little proof of deficiency in mental endowments. On the contrary it is often a material stimulant to effort, and to ultimate success. Many of our most prominent and successful citizens have profited by the stimulant of poverty in their youth. The "fit" youth will succeed anywhere. It is the unfit youth that is dangerous to the state

and to posterity. The intelligent, successful, educated citizens will control the number of their offspring to suit themselves. We hope that in time it will become popular and fashionable for such parents to have four or more children. It is the unfit that is dangerous to civilization. The real problem is to prevent their inferior posterity from deteriorating the race.

Nature's law of the survival of the fittest took care of that problem in past ages. In those stages of race development it was only the physically strong and mentally alert that could survive the severe tests of endurance, reach manhood and womanhood, and become the fathers and mothers of the next generation. "Nature bred from the top."

With the dawn of the spirit of charity and human sympathy, of which we are justly proud, nature's hard but effective law was nullified. The weak and unfit are nursed to maturity and allowed to reproduce their kind. Our charity organizations have not completed their job until they have made some provision for the prevention of reproduction in the recognized cases of the hereditary inadequate.

The method of segregation is impractical, because no country has sufficient buildings to house more than a small per cent of the increasing multitudes of that class. Besides it must be remembered, such a method means imprisonment and unhappiness for the unfortunate victims.

Birth control by contraceptives cannot be used by the unfit. They have not the necessary intelligence, stability, or will power. Sterilization, as used in California continuously for 23 years, offers the only adequate method of materially checking this approaching shadow of race degeneracy. The study of actual results in more than 6,000 cases by the Human Betterment Foundation has shown that the operation did not in any degree unsex the patient, that it had no effect upon the health or sex life of the patient, except to make parenthood impossible, that the patients with few exceptions were pleased with the results, that the families of the patients, the social workers parole officers, and physicians familiar with the work were practically a unit in favor of sterilization as practiced in California. The same report further shows that among the feeble-minded girls released on parole after sterilization, most of them had made good in their social adjustments, largely as servants in homes, many were married to men of similarly limited mentality, and such marriages were as successful as usual. They could never have properly cared for children, particularly deficient children. Such unfit and their families, when the problem is understood, welcome sterilization.

The misinformation or utter lack of information as to eugenic sterilization among the educated as well as the uneducated people is simply monumental. An editorial in a prominent magazine recently referred to eugenic ster-

ilization as unsexing the patient. With such blunders it is not strange that to the great majority of the public sterilization means emasculation, unsexing, and humiliation to the patient and the family. When they understand what it is and what it is not, none are more ready to accept it than the more intelligent of the unfit and their families. We believe therefore that relief must be sought, first, by the education of the masses of the people of each state or nation as to the necessity of this relief to the individual, to the family, to the state, and to posterity; second, by the dissemination of a rational idea of what sterilization is and what it is not; third, by the enactment of clear, definite, conservative, workable sterilization laws, with the omission of unnecessary "red tape," but clearly protecting the rights of the patient. Such a law should provide for sterilizations at public expense wherever it is necessary for the protection of the state and posterity, and where the patient is unable to pay the expense; fourth, for the sane, unencumbered, conservative, diplomatic administration of these laws.

In borderline cases doubts may often arise, in which sterilization should not be performed without the full knowledge and consent of the patient or guardian.

Where serious hereditary defects are unquestioned, marriage should not be permitted except after sterilization.

In this educational campaign of the general public, a clear distinction should be drawn between castration as a punishment for crime, and eugenic sterilization of selected cases of the unfit, which is in no case a punishment, but is the most humane protection of the patient, of the family, of the state, of human progress, and of civilization.

CONTRA-SELECTION IN ENGLAND

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It is interesting that the multiplication of the socially inadequate is, for Western civilisation, a modern phenomenon. To what extent it may have occurred in early civilisations must remain somewhat problematical. The theories concerning the cause of the fall of former civilisations include the reduction of fertility of the leading class or race, which appears to have occurred regularly whenever society was sufficiently organised for a great accumulation of wealth. As the ruling classes are on the whole the wealthiest classes, it is illogical to presuppose (as many of the less historically-minded sociologists do today), that wealth and loss of fecundity are directly correlated. This idea comes, probably, from Galton's interesting study of the extinction of families who owed their wealth to marriage with heiresses, heiresses representing an infecund stock. In most nations this would apply only to a small proportion of the ruling class. The present infertility of the upper strata may readily enough be explained by the sudden rise in the standard of living and the consequent rise in expenditure on children, which is proportionally greater for the well-to-do than for the poor.

Round about 1850 the wealthy throughout Western civilisation had, on the whole, the largest surviving families and must thus be reckoned as a fecund group. Fecundity has been shown to be a highly heritable trait and fifty years is too short a time for an inborn character to be selected out. In England there has been a very rapid spread in the control of the numbers in family, starting with the wealthier and reaching now through every grade to the skilled artisan and competent and ambitious workman. Even today studies of birth rates by class in France, as well as studies of the wealthier classes in America, published in Huntington and Whitney's "Builders of America" demonstrate that in every group the most successful and the wealthiest have the largest families within their own stratum. Carr-Saunders has given the clue to the earlier condition in which the wage-earning classes had a lower fertility than the wealthy—a condition which persisted up to the early days of the Industrial revolution. Before the simpler processes of the factory came into being, and so made children useful as workers in their early years, employers, whether agricultural or in

crafts and trades, relied on a relatively small number of employees, and all these, whether as apprentices or young working people "lived in" as we term the system of an employer housing his own work-people. The board and lodging counted as part of the employee's earnings, and until the worker had gained much skill and experience he or she had too little in the way of money earnings to think of leaving the employer's roof. Thus the age of marriage among the workers was late and the less competent probably never rose to the skill which enabled them to make a home of their own. Once the labourer or poorly-paid worker started a family, the struggle for existence was keen and the death-rate in infancy and early years very high. In the Bulletin of the Union for the Study of Population Problems, we have already a couple of preliminary reports from an investigator among the primitive villages of the Balkans, which give a picture comparable in some measure to the (presumed) life figures of this pre-factory period. Although in the Balkans workers are almost all small independent peasant proprietors and marriage is early, the high birth-rate is countered by a very high infant mortality rate, somewhere about one-third among the poorer families. If to such birth and death rates we add the former late marriage-rate prevalent in Northern, middle and Western Europe, we get a picture which would explain the evolution of the virile stocks of the past in Scandinavia and Great Britain. Very low survival among the "socially inadequate" prevented this group from increasing. The least skilled workers probably also barely maintained their numbers and the slow growth of these populations depended on the gradual increase of the most successful types.

Our present situation can readily be explained by the conjunction of two vast social changes, the first being industrialisation, already referred to, and the second, the sudden blossoming of philanthropy. This coincided with the ill-founded anthropological conception of mankind as potentially equal, equal that is at birth and moulded subsequently by environmental conditions. The social theories of which the Marxian doctrine is the outstanding example have welded these two ideas into the notion of State responsibility for every individual born; thus the fine flower of private charity which grew rapidly in the early part of last century paved the way to the gradual formation of State schemes for the alleviation of every type of human trouble. Science has played its part in making effective these attempts to secure an ever-increasing survival rate for the least competent types. By this reference to science I mean, of course, the growth of sanitation, hygiene and State medicine.

England is probably the best example in the world of the disastrous results of this interference with Natural Selection, for the social conditions

referred to above represented in Europe natural selection within human society. The spread of the British peoples over the world is adequate proof of the evolutionary success which the severe methods achieved, not omitting of course your own great Continent which, peopled originally by Britain, Holland, France and Spain, will demonstrate for all time the potentialities of human development.

In Great Britain the industrial era was first established and the geographical position and manageable proportions of the population enabled the new contra-selective forces (having a lead in time) to work at their full capacity. With the exception of the most highly organized cities and regions of the United States, we may say with some pride (though to our cost), that Great Britain has probably the most effective social services.

(A) For the sick: The public health services secure prenatal advice, care in confinement and help with early rearing for every child born. In the schools, medical inspection and treatment both by doctors and visiting nurses obtains.

(B) On the side of destitution, we have always had, in England, a system by which each parish was responsible for the relief of all who could not maintain themselves,¹ but within the last century the rapid rise in the standard of living of the working classes has been followed by a similar rise in the amount of relief given. While in earlier periods this relief was in the form of maintenance in a work-house, achieving segregation and at least temporary prevention of procreation, since the early years of 1800 out-relief did away in part with this check on fertility.

Unemployment Insurance stands on a somewhat different level. While England is to-day groaning under the burden which this provision creates, we must nevertheless be thankful for the extent to which this system has prevented the acutest misery in our country. The system has failed, however, to make any distinction between the unemployable and the unemployed from economic causes.

Another aspect of social inadequacy must be mentioned, that is crime. Up to 1840, deportation and the death penalty were allotted for theft, indeed many types of law breaking. Since that period the segregation afforded by long terms of imprisonment has been greatly reduced and in the last generation and a half, the system of putting young offenders on probation has grown to such an extent that while to-day our figures for offences against property and against persons stand very high, our prisons are almost empty. This class of the socially inadequate have presumably increased.

¹ First under the religious houses, and after Elizabeth's reign as a local financial responsibility.

Now let us look at the results. England has not that rough-and-ready yard-stick available in every country with military conscription; we get however the best picture of the general virility of our population from the recruiting records of the three national services, Army, Navy and Police, although recruiting is voluntary. At the time of the Boer War, 1900, only one man in three could be accepted for service, in a period when recruiting was exceedingly heavy. Recently in London rejects have reached the figure of three out of four, to four out of five. This has to be put against the steadily lowered standard for every measure of physical vigour. Reports for the Navy where virility is essential, give rejects as nine out of every ten. Recruiting today for our Police Force is intensive, as the Commissioner of Police is insatiable in his requirements; the standards required include intelligence, education and character; on the other hand, the youths presenting themselves are already a well-selected group. Acceptances among Police recruits for the last seven years have not been more than five per cent.

We have two other sets of figures indicative of national status correlated with mental health. I will take first the feeble-minded. A careful sample study by mental testing was made under a Royal Commission 1906-8 and reported the certifiable feeble-minded as between four and five per thousand. A similar investigation undertaken in the years 1926-8 by a Departmental Committee has given the figure of certifiable defectives as between eight and nine per thousand.

Insanity is notably an unknown quantity in every country. In England, however, the law regarding certification leaves the medical practitioner responsible open to severe financial penalties in any case of error; this is sufficient to secure great caution in certification, and this legal procedure remained unchanged since the middle of last century till two years ago. Our figures for insanity give only certified patients in mental hospitals, ignoring those who return to the community on recovery. The proportion in 1859 was roughly one in 500 of the population; in 1913, one in 250. This increase lay almost entirely within the publicly assisted group of patients and is, in itself, a measure of the growth of the socially inadequate, among whom the recent study of the Departmental Committee on Mental Deficiency has shown insanity to be high.

Studies assessing intelligence for samples of any population give the same biometric curve of distribution that one expects to find in a biological character depending upon multiple genetic factors. Thus a very slightly higher grading for certification would give a much greater number falling within the group. These facts are a wholesome reminder that, with the exception

of certain specific types (e.g., Mongols, Microcephalics, etc.) feeble-mindedness is not a special and particular condition, but merely a grade of intellectual capacity. The Chief Medical Officer of the Ministry of Health, Sir George Newman, has during the last few years attempted to rouse the country to the real issue divulged by such a high proportion of certifiable mental deficiency (as was previously given) by showing that it points to a lamentable amount of poor intellectual capacity. He terms the grades immediately above certifiable feeble-mindedness, "mental subnormality," and it is asserted in one report after another that the subnormal in Great Britain have now attained the proportion of one in ten. The same group is receiving public notice under the title "The Social Problem Group," a conception put forward already many years ago by a prominent member of the English Eugenics Society, Mr. E. J. Lidbetter from his intensive investigation of the families of persons receiving public assistance in the Parish for which he was responsible as senior Relieving Officer.

It will be remembered that as much as thirty years ago the veteran German eugenicist Dr. Ploetz coined the term "Contra-Selection" as descriptive of the trend of modern civilization. He issued a warning that this trend, where pursued without hindrance, would result in racial deterioration. I have tried to show by this brief historical sketch how contra-selection has become increasingly operative in Great Britain over a period covering something like seven generations of the working class. It is important to remember that industrialization has reversed the marriage age in Europe, bringing it down to about nineteen or twenty years, for the least skilled, while it rises steadily up to round about thirty for specialists. It is true to give the English population increase today as lying entirely within the unskilled group and that which is dependent more or less permanently on public assistance. This group numbers something like five generations in the century to at most 3.25 of the skilled specialist workers—and we cannot emphasize too strongly that the intellectual and skilled workers are not only slightly decreasing from the point of view of children born, but are contributing nearly two generations less per century to the population.

We stand in a very grave situation and demonstrate in actual fact the accuracy of Ploetz' prophesy. From whichever point of view we try to assess our racial values, we find an exceedingly low level of virility. The situation is paradoxical and this probably accounts for the extent to which not only the general public but also specialist workers, in the main, fail to recognize the gravity of the case. Our standard of living has risen steadily (and during, and since the war with increasing rapidity), so that we find every child in the community better in health and better nurtured than that

same child would have been fifteen or twenty years ago. Nevertheless, our health figures, mental and physical, demonstrate steady deterioration. Indeed, in the figures given above for the increase of feeble-mindedness and insanity, the rise is so startling that hardly any one dare believe it to be true, and every possible excuse is made to detract from the validity of statistics. In conclusion, let me give the rough figures for recruiting in the national services. The Army has lowered its standard of physique periodically since 1885; while in the Boer War one man in three was fit for service, the normal rejections today stand at four out of five, despite the hideous amount of unemployment which should bring large numbers of virile men to this service.

The Navy, while accepting men of low stature, necessarily requires a certain degree of toughness—rejections for this service are nine out of every ten candidates. For the last nine years the Commissioner of Police has used every means to attract more men into the force. It is with us a popular service and only youths of acknowledged superiority venture to apply. The tests concern not only health but also intelligence, education up to the highest elementary school class, and necessarily also, character. For the period quoted, ninety-five out of every hundred applicants have been rejected on grounds of unsuitability.

England has the longest record of contra-selection, and until recently her wealth and scientific philanthropy have put her population furthest probably of any from natural selective agencies. Other civilized countries should take warning by the result before, with them also, the inevitable degeneration has gone to the lengths which our health statistics show.

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MESURES A ENVISAGER POUR FAVORISER LA FÉCONDITÉ DES INDIVIDUS LES MIEUX DOUÉS

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1. Le type de l'individu considéré comme "*bien doué*" est variable suivant les pays, suivant les époques et suivant une série de circonstances; mais de toute façon c'est un individu qui ne doit pas être d'une façon coutumière à la charge de l'Etat et secouru par des fonds publics.

Dans l'ensemble, les postes sociaux importants sont occupés par les citoyens apparemment "*les mieux doués*," mais les qualités physiques, morales ou intellectuelles de l'individu le mieux doué peuvent n'être pas transmises à sa descendance s'il contracte une maladie nuisible à la race (syphilis, alcoolisme, etc.,) ou s'il s'unit à un conjoint déficient ou taré.

Les individus "*les mieux doués*" seront principalement pour nous ceux qui donnent naissance à des enfants sains et "*désirables*" et au plus grand nombre possible de ces enfants. C'est donc surtout par l'examen de leurs enfants que nous reconnaitrons ceux qui méritent le plus d'être encouragés à procréer.

2. La notion de "*qualité*" primera un jour celle de "*quantité*," en matière de reproduction humaine; mais même dans les pays où la quantité est préconisée, rien n'empêche de chercher dès à présent à faire naître le plus grand nombre possible d'individus "*bien doués*"—Natalistes et eugénistes devraient être d'accord à ce point de vue.

3. La politique nataliste actuelle et la philanthropie mal comprise favorisent incontestablement la fécondité des individus les "*moins doués*" et augmentent le nombre des "*indésirables*."

4. Les sujets les mieux doués sont à l'heure actuelle ceux qui se reproduisent le moins. Cette constatation est inquiétante pour l'avenir de la race, car la valeur des individus appelés à devenir des dirigeants ne peut que diminuer.

Les eugénistes doivent réclamer des réformes économiques et sociales susceptibles de dissiper les hésitations que peuvent avoir les couples sains et bien doués lorsqu'ils envisagent la procréation d'un nombre suffisant d'enfants.

5. Les eugénistes doivent réagir contre la “*sélection viciée*” pratiquée à l’heure actuelle et obtenir la suppression, ou la réduction des secours et des appuis de toute nature accordés aux reproducteurs de mauvaise qualité.

6. Les eugénistes doivent, d’autre part, réclamer l’application d’une série de mesures pratiques de nature à favoriser la reproduction des mieux doués. Ils doivent demander :

(a) Que les appointements des jeunes gens bien doués, lorsqu’ils ont un salaire fixe, soient augmentés pour leur permettre de se *marier de bonne heure*, par exemple à 25 ans.

(b) Que des *surprimes de natalité*, des *surallocations* familiales et des *surréductions sur les chemins de fer* soient accordées aux parents qui mettent au monde de beaux enfants et que la “quantité” ne soit plus le seul criterium pour la distribution des primes, allocations et réductions consenties aux familles nombreuses.

(c) Que des *surpensions de vieillesse* soient accordées aux parents ayant donné naissance à de nombreux enfants bien doués.

(d) Que l’*école unique* soit généralisée ou que des *bourses scolaires* soient largement distribuées aux enfants sains et méritants.

(e) Qu’au point de vue *électoral* le *vote familial* soit institué en octroyant des voix supplémentaires aux parents dont les enfants sont sains et bien doués.

(f) Qu’au point de vue *fiscal* des *surdégrèvements* soient accordés aux parents ayant des enfants nombreux et reconnus “bien doués.”

(g) Qu’au point de vue successoral des réductions importantes de droits à verser soient consenties aux héritiers en ligne directe, lorsque ces héritiers sont reconnus “bien doués.”

7. Les membres de familles nombreuses désireuses de bénéficier des avantages spéciaux que nous envisageons devront se soumettre à des *examens d’aptitude physique et mentale* nécessaires pour reconnaître les sujets les “mieux doués.” Ces examens seront facilités par le développement des *Consultations sanitaires périodiques* et des *Centres de médecine préventive*.

8. Les fondations et les prix destinés aux familles nombreuses ne doivent pas tenir compte uniquement de la quantité des enfants. *Leur qualité* doit être une condition imposée pour que les parents puissent être récompensés et encouragés.

ARISTOGENICS

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It is first necessary to define the term Aristogenics.

DEFINITION

While Eugenics and Kakogenics are generally understood to refer respectively to considerations of good and evil in the sphere of Genetics, Aristogenics refers to the best.

OUTLINE

Its concern is first to define its field, second to identify the best, third to seek ways of progress, and to follow them. In those respects Aristogenics differs from Eugenics, as we understand it, in nothing but its ideal acuity of focus.

FIELD

Its field first is properly confined to human affairs, for the human race is the best in the sum total of various categories of merit, although by no means in all, for it is surpassed by others in longevity, fidelity, organization and in various minor abilities.

THE HUMAN RACE

On philosophical analysis, however, we have, I think, failed to demonstrate the superiority of the human race to any other. Perhaps because of three reasons—first, our ignorance of sound and conclusive criteria of racial superiority; second, the limitations of our cognitions; and third, our prejudices.

What, after all, has the human race done except for itself, and moreover, what is it for? Therefore we are thrown back upon the thesis that the human race is best because we belong to it.

Accepting this as axiom one, we must now define what is best among the several qualities and characteristics of man, and who is best among men, before we may proceed to study the qualities and the man, and go forward.

For the sake of brevity, we may omit the logical processes by which we may conclude that he is best who renders the best service to the human race.

Service to the human race is expressed in terms of that which favors first racial longevity, for without continuance there is no possibility of anything else; second, the health of the race, its efficiency; third, its serenity.

THE RACE-MAN

This is best understood by visioning the human race as an organism: its organs as the associations of men (nations or otherwise) which function in the general welfare; its cell units as men; its life, their actions; its thought, their individual and mass thinking and feeling; its memory, the folk ways, records of the past in voice, print and durable structure; its speech, the radio, the screen and the press; its history, dimly defined; its destiny unknown.

Races are born, sicken and die. Cities, states and nations of high organization have reached manhood, old age and death.

Our World Man has developed arteries, nerves, voice, consciousness and, as we have recently noted, a capacity for feeling pain, and a sense of need of centralized thought.

This is a concrete conception. It is more simple to think of the World Man's integration, his health, longevity, happiness, efficiency and service, and to conceive merit to be that which aids these excellent things. The greatest or the best are those who serve best to these ends.

This, I think, is the law and the gospel of every living religion, and the tendency of much of our physical and biological science. It provides the basis of a clear cut working program of Aristogenics, and gives clear point to all the strivings of mankind.

The task of Aristogenics is to seek and to study these men of greatest merit who best have served or who best are serving the human race.

GREATNESS

The elements of greatness of service include quality, extent, power and continuance of the effect of the life and work of the individual upon the World Man, and service is judged by these tokens.

In the past there have been men who have done great and durable good. They rose like mountains on the horizons of history: mountains made of our own earth, rooted upon it and pointing skyward.

There are men now still living who are recognizable as great in service to mankind. They are distinguished by the currently discernible effects of their works: their words, writings, messages, discoveries, leadership, inspiration and the like, diverse elements which go to make men happier, wiser, more biologically sound and continuing, and the World Man likewise.

THE GREATEST

These are the greatest, and in the biological sense, the best. We are, therefore, prepared to call them Aristoi, examples of the biological aristocracy of service, possessed greatly of those qualities of greatness which lie in a measure in all of us. Those of contrary qualities may perhaps be called Kakatoi.

What manner of man was Gautama Buddha, Confucius, Plato, Christ, Zoroaster, Shakespeare?—or our own more recent men of merit,—Washington, Franklin and Lincoln and the many others who have done so much to make America?

NEED OF RECORD

There is much of legend, more of common report, something of lay comment, but I know of no authenticated facts recorded by scientific men concerning any of the great men mentioned, yet they have given direction to the whole course of human destiny.

Let not the future look back upon us and wonder at the scientists of a generation that strove to define the outermost limits of the universe, and yet failed to make record of the greatest human influences of their time, and neglected to render a service that, if omitted, could never be repaired by all the scientists of all the centuries to come.

Let us, therefore, give to the philosophers, scientists and social leaders of the future, for what use they can make of it, the best record we, in our conscientious ignorance, can prepare, assured that we are dealing with some of the most important biological facts of our period,—facts which we, and only we, can possibly secure.

This is the reason for the beginning of the Aristogenic Record. This plan was conceived, an organization of men founded and incorporated to carry it forward. It proceeded as follows:

To select the great men for study was recognized to be the first duty. The basis of selection, including our interpretation of merit, was first laid down as we have indicated.

Recognizing the possible limitations of any special organization, we decided to enlist the aid of those who might add their service to ours, and appoint a jury to make the selection.

The jury was selected from among men who were qualified first by their own conspicuous service to the world, by their evident understanding of our purpose, and who had a wide knowledge of men and affairs, and whose record inspired confidence in their impartiality.

It was recognized that no man or group of men could be expected correctly to assay and determine the value of a man or his works to the future welfare of the human race. That is not expected.

It was expected, however, that these men should use the measuring rod of their own large experience and understanding, and report accordingly.

It must be strictly understood that all concerned insist upon the recognition of their ignorance;—their competence will be judged by the more competent future.

We attempt to do the best we can at this time, no more and certainly no less. We hope that the hurrying centuries will bring advance in skill and wisdom beyond our own, and our present effort is a pledge of our own desire to serve the advance.

The men who served on the 1931 jury are as follows:

James Rowland Angell, President, Yale University
 Elmer Ellsworth Brown, Chancellor, New York University
 Donald J. Cowling, President, Carleton College
 Robert A. Falconer, President, University of Toronto
 Livingston Farrand, President, Cornell University
 Franklin H. Giddings, Professor, Columbia University
 Vernon Lyman Kellogg, Permanent Secretary, National Research Council
 Rufus B. Von Kleinsmid, President, University of Southern California
 William L. McKenzie King, Ex-Premier of Canada
 Daniel A. Poling, President, International Society of Christian Endeavor
 David de Sola Pool, Rabbi, Shearith Israel Synagogue
 Ralph W. Sockman, Pastor, Christ Methodist Episcopal Church, New York
 Charles Franklin Thwing, Ex-President, Western Reserve University
 Ray Lyman Wilbur, Secretary of the Interior

The instructions to the Jury included a review of the fundamentals leading to the Aristogenic Record, and the following.

“SELECTION OF EXAMINEES”

A jury, appropriately chosen, will select ten persons of greatest merit each year (at first in the United States). Merit is to be interpreted as personal contribution toward the conservation and advancement of whatever is of value to the human race.

Merit is not to be confused with fame, wealth or prominence. Merit involves not only personal worth but also leadership, the good influence of the man upon others of this day and onward. (The light must not only burn, but guide.)

It may correct error, discover truth or make truth more generally followed. It may initiate a new era in human affairs. It may be found in

discovery, invention, organization, direction, statesmanship, inspiration, education, writing, example and interpretation.

Its criteria of worth lie in its importance, extent, advance, durability, power and truth. It may be found in the following fields:

- (1) *Pure Science*—Mathematics, Physics, Chemistry, Astronomy, Geology
- (2) *Biological Science*—Medicine, Anthropology, Biology, Psychology
- (3) *Government*—Diplomacy, Law
- (4) *Literature, Education*—Press, Religion, Ethics, Sociology, Philosophy
- (5) *Business, Invention, Transportation, Communication*
- (6) *Organization*
- (7) *Exploration*
- (8) *Other Categories*

* * * * *

The results of their labors were received and recorded, and there has been determined the consensus of opinion as to the ten men in America greatest in service in 1931.

This list will not be announced until it appears that some good service will be rendered thereby. The reticence which so commonly accompanies true greatness should be respected, and especially when these men, who in the main are still intensely occupied with their huge labors, view with extreme reluctance anything which even momentarily deflects them from their course of action.

To them it has seemed at first a very strange request, but when the magnitude of the issues involved is made clear,—and the fact that no one in the world except themselves can furnish the data which may be of such enormous service to mankind,—willingness to coöperate has become the natural and indeed a properly expected result.

All these factors have been taken into consideration in developing the pattern of the Aristogenic Record.

In examining the Byrd Antarctic Expedition from the medical and other scientific standpoints before they started for the South, the same basic idea was followed as an exploratory research, and prominent people have been examined from time to time during the last decade.

The first preliminary form of survey is given below. Since its original outline it has been under constant revision and development, and indeed this must always be the case. Therefore this survey form and its several methods are not at present set forth as typical or final.

THE ARISTOGENIC SURVEY

1. Record of Ancestry (family tree) with noteworthy data.
2. Eugenic record (Carnegie Institute form) including brothers, sisters, aunts, uncles and children.
3. Data on noteworthy relatives.

Anthropological:

1. Measurements of structure.
2. Interpretation of measurements with reference to race, environment, endocrinology, medicine.

Medical:

1. Heredity from medical standpoint—interpretation.
2. Previous illness—interpretation.
3. Present status.
4. Regimen.
5. Anatomical measurements.
6. Physiological survey.
7. Pathology and pre-clinical signs.
8. Psychological tests.
9. Current prescription (if requested by the examinee).
10. Continued annual record.

Historical:

1. Autobiography.
2. Examples of writing with original manuscripts.
3. Current estimate and comment by others.

Records by representation:

1. Photographs, films, phonofilms, phonograph records, x-rays.
2. Sculpture (Hand, face, bust, or other sculpture).
3. Finger impressions.
4. Handwriting.

Coördinate data—current setting of examination—daily newspapers; current estimate of the status of the times.

This, therefore, is briefly the outline of one feature of the work of the Aristogenic Association,—the Aristogenic Record, or, as it has been called by some, “The Biological Hall of Fame.”

This is only one part of the Association’s field of record. Most men become old before they become great. We should like the whole lifetime records of great men.

The only way to do this is to make records of men who may become great during their lifetime, and this will include a great many.

Steps are being taken, however, in this direction, mainly in coöperation with the health examination movement because of the distinctly great values of current periodical medical examinations to the prevention of disease, and the prolongation of the period of effective work, and length of life itself.

In fact, one of the greatest benefits that seems to be included among the immediate possibilities for good is the beneficial results that must accrue

to the valuable men who will receive the thorough examination which includes all essential medical features.

This report will, I trust, be regarded as purely preliminary and tentative in nature, indicating first principles, first efforts, all directed, however, steadfastly to a single goal which seems very much worthwhile.

BIRTH RATES OF COEDUCATIONAL GRADUATES

MRS. CAROLINE H. ROBINSON

Swarthmore, Pennsylvania

It has long been known that the college graduates' birth rate is unsatisfactory, at least in the Eastern United States.

Now, when a business is going regularly into the red, it becomes the duty of the owners or of the receiver to examine the leaks through which profits are draining away. Every abnormality in the figures is searched out with minutiae and determination. At Harvard, indeed, such determined attention has been bestowed on the birth rate by Dr. J. C. Phillips.

In the same spirit and with greater minutiae, the records of a leading coeducational college have been examined. As colleges of this type have not been greatly studied, one naturally hopes that here the record will be a little better. I find it is better, especially among the men.

This college was selected for intensive study also because the graduates were personally known to the Alumni Recorder. Thus in the 17 classes studied intensively, only 8 graduates had been completely lost track of, and of the remaining 765 graduates appearing in my tables, 95 per cent were more or less personally known to the Alumni Recorder. Thus we are able to say, for instance, about divorce or separation: we know of only 17 cases in the 545 marriages. This is in harmony with Dr. Popenoe's coeducational findings. At Harvard, however, Dr. Phillips is much concerned about divorce.

AMOUNT OF MARRIAGE

These men graduates are of a type much more given to marriage than Harvard men, one quarter of whom have remained single with great consistency over half a century of classes. Only one-seventh of these coeducational men graduates fail to marry. Moreover, death in their prime is often what has forestalled marriage. Of the 88 per cent¹ who survived to age 45 and older, only 11 per cent were single, which is the exact percentage of men in the United States census of 1920 who were single in the age class 45 to 64 years.

¹ Only 76 per cent of the men for whom no marriage is recorded survived till their 25th reunion, but 93 per cent of the married survived.

A superiority to Harvard, of equal proportion, is shown in the birth rate per marriage and a yet greater superiority in the birth rate per graduate. Harvard fails of replacing itself by 32 per cent but our men by only 18 per cent.²

TABLE 1

*Graduates, marriages, and children—Eastern Coeducational College, classes
1896–1912 inclusive*

Men, single, surviving	35	
Men, single, deceased	11	
Men, single, total		46
Men, been married, surviving	268	
Men, been married, deceased	21	
Men, been married, total		289
Men, fate unknown		8
Men, total		343
Women, single, surviving	136	
Women, single, deceased	16	
Women, single, total		152
Women, been married, surviving	256	
Women, been married, deceased	22	
Women, married, total		278
Women, total		430
Both sexes, total		773
Children born to men—known		575
Children born to men—estimated		24+
Children born to men—total		599+
Children born to men— <i>per capita</i>		1.75
Children born to women—known		548
Children born to women—estimated		9
Children born to women—total		557
Children born to women— <i>per capita</i>		1.3

I was surprised to find that half of the men who had graduated in engineering and other scientific courses, who often seem while at college to scoff at women and women's interests, eventually married a little more than the other half of the men, those in arts and humanities.

² J. C. Phillips, Harv. Grad. Mag., Mar. 1926, Table II. I have held a per capita of 2.2 necessary for replacement. Elsewhere I named these deficiencies as 36 per cent vs. 23 per cent—a discrepancy due to decimal places used.

This finding of normal marriage rates among men educated with women during the significant period near the age of twenty seems of the very greatest importance *provided* it is found also in western coeducational colleges. I doubt that it will be. Eastern coeducational colleges draw men with difficulty and those they get are perhaps of a selected type: namely, those only who have no antipathy to women. Naturally, such men marry freely. A study³ of this matter is urgently needed in western state universities. For in that region boys with antipathy to women or to marriage are yet obliged for reasons of convenience and economy to select a coeducational institution. Does marriage capture them too in large numbers, antipathy and all? *If* so, coeducation will become of interest to eugenicists as a constructive force.

Marriage among my coeducational women, while distinctly better than in women's colleges,⁴ compares poorly with the general population. In the United States 92 per cent of the women aged 45 to 65 are on a given day (1920) living in wedlock, while only 65 per cent of our surviving women (table 1) have been married *or* widowed *or* divorced.

EFFECT OF 1893 DEPRESSION

From 1873 on, the women (629 in number) taken decade by decade, have *one-third of them* remained single with the following exception: Among those graduating just before the crash of '92-'93 and for nine long years following, spinsterhood rose to about 40 per cent, which is the norm all the time at most women's colleges. And at Mount Holyoke and California a similar extra bulge followed the great depression of '93 and single blessedness rose to 48 per cent.⁵ It is also found that the men's marriages in the nine classes nearest the depression of the nineties produced only 1.9 children per marriage, while the eight later classes produced 2.2 although they are not yet complete. No such influence (from the crisis?) was observable in the women's marriages. This conforms to the observation that men marry anyhow and then economize on children, while college women marry only if everything appears really propitious.

³ Such a study will be difficult to make because state financed institutions may not keep life histories of their graduates with the care used by privately endowed institutions, to whom every graduate is a "prospect" of financial hope. My study of Stanford men, soon to be published, shows them highly married.

⁴ For the classes 1896 to 1919, 67 per cent as against only 56 per cent for the same Barnard classes in their 1930 Alumni Register. And see also Huntington and Whitney, *Builders of America* (1927), pp. 44, 334-5.

⁵ *Ibid.* My study of University of California.

BIRTH RATES AND OMISSIONS IN THE RECORDS

As regards the deficit in the figures for the latest classes caused by the fact that some births had not yet occurred when the records were taken, one may conclude from table 2 that this deficit does not exceed one or two tenths of a child per marriage and *in the latest classes only*.

In addition the questionnaires, drafted for other purposes, sound as if only children of school age were wanted. Thus what (few?) children there were who died young may some of them be omitted from per capita here given. Also late marriages not yet recorded and an estimate of 24 children from 17 men, of whom 12 were known to have married (but children not reported), and of 9 children from 9 married women whose families are not reported make it probable that the per capita per male graduate should be raised from 1.7 to 1.8 (table 1). But a similar rise is less likely for the

TABLE 2

Children

CLASSES	BORN TO MEN		BORN TO WOMEN	
	Number	Per marriage	Number	Per marriage
'96 to '04	216	1.9	207	2.1
'05 to '07	125	2.1	110	2.1
'08 to '10	139	2.3	113	1.9
'11 and '12	95	2.2	118	2.0

female per capita of 1.3. However, 1.8 and 1.3 are thus minimum per capitas.⁶ Alumni who had to be requested to get a reply turned out to have less children per marriage by 50 per cent (women) and 20 per cent (men).

BIRTHS TO WOMEN BY INTELLECTUAL RANK

Before proceeding with the general analysis of the births by age at marriage and so forth, let us note whether fertility was injured by female intellectuality.

Men who get into *Who's Who* have more children than their perhaps duller classmates.⁷ So a determined assault necessitating the handling of 20,000 items, chiefly class-room grades, has been made upon the question whether something similar holds for women too. For the lack of children

⁶ Inquiries additional to the first questionnaire had to be made in nearly one quarter of the cases.

⁷ *Ibid.*, p. 339. Also Frederick Adams Woods, *Science*, Nov. 4, 1927, p. 429.

discovered⁸ for women in *Who's Who* is not conclusive, inasmuch as many mothers are more interested in pushing their children than themselves into places of recognition such as *Who's Who*.

Grades in college were examined by five separate methods, all of which split up the women into smaller groups. In four groups out of five, and even in such small groupings, the same tendencies were shown: the most mating at an age to affect fertility was done by the dullest women, but the bright women who did marry early had so many children that they brought up to the average the per capita for clever women both married and single. In the two largest groupings studied they did yet better. Their per capita exceeds notably the general average. The only deficient per capita for the banner students is in the smallest, heterogeneous, non-significant grouping (table 3E) of all those who took no mathematics but are here graded in a science, usually physiology or botany.

Several minor divergences are seen (table 3D) in those who voluntarily took mathematics after the college no longer required it. The best of them are *very* deficient in marrying before 35 and the worst of them, perhaps studying mathematics merely for the sake of meeting the engineering students, have few children after all.

The women grading B had usually the lowest per capita. They seemed to be caught between two fires (tendencies). That is, the mediocre, like the best, did not marry greatly and when they did, they hesitated to plunge boldly as regards progeny.

Table 3A places every girl in the first 10 classes according to the average of all her course marks received during her stay at college. At this point in history the college changed its bookkeeping notation. By this, table 3B benefits, as it allows weight to be given to the quantity as well as the quality of mental work accomplished. As a result the range of difference is much greater than in table 3A where general averages almost never went below 70 nor above 96. In 3B, the range was from 200 to 591, won by a girl who was said to be a washerwoman's daughter and is now the mother of four.⁹

The impetus to construct the remaining tables (3C, 3D, 3E) arose from

⁸ Ibid. (Huntington and Whitney) p. 340. Also Persis M. Cope, *Jour. of Social Forces*, VII, 1928, p. 212-23.

⁹ Specifically, 3B places every girl in the latter seven classes according to the average of all her term marks, each mark weighted by the weekly "hours" consumed by each course, and the whole adjusted by the addition of "credits" brought on entering college. Thus if a girl earned 400 points in college and had brought 10 credits, her 400 was multiplied by 120 and divided by 110, increasing her mark to 436. A mark under 240 was considered to be D, but there were only 3 instances; 240 to 360 = C; over 480 = A.

TABLE 3
Women's college grades and children

	TOTAL WOMEN, GIVEN GRADE			NUMBER OF SINGLE WOMEN	WOMEN MARRIED AFTER 34		WOMEN MARRIED BEFORE AGE 35			
	Number	Children born to them	Per capita		Number	Children born to them	Number	Per cent of all, same grade	Children born to them	Per capita
A. Classes '96-'05, general grades:										
Below 80.....	29	46	1.6	11	1	0	17	59	46	2.8
80-89.....	111	127	1.1	40	10	8	61	55	119	2.0
90 and over.....	43	53	1.2	19	4	0	20	47	53	2.7
Total.....	183	226	1.2	70	15	8	98	54	218	2.2
B. Classes '06-'12, general grades weighted by amount of work taken:										
Below 80.....	124	205	1.7	30	3	1	91	73	204	2.2
80-89.....	103	96	.9	44	11	5	48	47	91	1.9
90 and over.....	15	23	1.5	6	1	2	8	53	21	2.6
Total.....	242	324	1.3	80	15	8	147	61	316	2.1
C. Classes '96-'07, grades in mathe- matics alone:*										
Below 60.....	36	53	1.5	10	4	1	22	61	52	2.4
60-69.....	51	71	1.4	19	3	5	29	57	66	2.3
70-79.....	47	51	1.1	23	4	1	20	43	50	2.5
80-89.....	45	47	1.0	18	2	1	25	51	46	1.8
90 and over.....	39	63	1.6	13	2	0	24	62	63	2.6
Total.....	218	285	1.3	83	15	8	120	55	277	2.3
D. Classes '08-'12, grades in non-com- pulsory mathematics:										
Below 70.....	17	20	1.2	7	0	0	10	59	20	2.0
70-79.....	36	29	.8	9	4	0	23	64	29	1.3
80-89.....	37	51	1.4	17	2	2	18	49	49	2.7
90 and over.....	16	17	1.1	8	2	2	6	37	15	2.5
Total.....	106	117	1.1	41	8	4	57	54	113	2.0

* Contains 8 cases where college mathematics was taken in high school and the grade here given is for the most difficult subject taken in college.

TABLE 3—*Concluded*

	TOTAL WOMEN, GIVEN GRADE			NUMBER OF SINGLE WOMEN	WOMEN MARRIED AFTER 34		WOMEN MARRIED BEFORE AGE 35			
	Number	Children born to them	Per capita		Number	Children born to them	Number	Per cent of all, same grade	Children born to them	Per capita
E. Classes '08-'12, grades in science (mostly first year):†										
Below 70†.....	29	45	1.6	9	1	0	19	66	45	2.4
70-79.....	35	50	1.4	10	2	0	23	66	50	2.2
80-89.....	30	51	1.7	6	2	2	22	73	49	2.2
90 and over.....	8	10	1.2	2	1	0	5	62	10	2.0
Total.....	102	156	1.5	27	6	2	69	68	154	2.2

† Contains 2 cases "graded below 70" where no mathematics *and* no science either was taken during college course.

the idea that in mathematics mere conscientiousness, memory and female verbal prowess are of less avail than in other courses, and that therefore good work in mathematics more closely measures pure intellect. A recent article in *School and Society* gives figures confirming this.¹⁰ It will be noted concerning the invariable height, fall, and rise again of births related to increasing grades that this curve both gets started and culminates at lower points in the mathematical than in the general tables. This corresponds to one's feeling that a girl who painstakingly acquires 80-some in most courses gets 70-some in mathematics.

One is encouraged to think that these conscientious collectors of fair grades might be influenced by proper exhortation to collect a less discreditable number of children than they now do.

Finally, there is no getting away from the fact that those happy souls who get a general average as low as the college will graduate them on, have a high birth rate per capita, as have also *all those of whatever ranking* (table 3E) who slide through college without any mathematics at all and with usually a minimum even of science.

One question remains about these much-married happy creatures and I cannot as yet answer it. Did they get quality as well as quantity of husbands? Or were they more willing to take an inferior article? If they

¹⁰ M. E. Haggerty, "Crux of the Teaching Prognosis Problem," *School and Society* Vol. 35, no. 904, April 23, 1932.

supplied themselves with superior as well as plentiful husbands, it appears that they were only seemingly dumb bunnies? Unless, alas! it is found that men prefer dumb bunnies? I suspect they do. Thus the studious college girl is brought face to face with that spiritual problem which all brainy people confront: namely, not to obtrude their brains and especially their linguistic bent to the discomfort of other people. Girls should remember that young men feel uncertain of winning their place in the world and it is a real need which they suffer: to be encouraged to feel *superior*, not merely adequate, by the women with whom they associate.

The unmarried woman may reply: Does not a woman have this need too? The answer, if any, is that superiority is a feeling gained within the conventional social frame and the facts of courtship and afterwards of home-making are supposed to confer kudos upon women, and since they are supposed to confer it, they do confer it. Actually women do usually rule the home, the chief social unit. It should be remembered that while men do not usually care to take the trouble of ruling it, they do insist on adherence to the convention that it is the man who leads the walks *and talks*.

I examined the subsequent careers of the 24 girls who received over 90 in mathematics or science but remained single. They were all teachers except 7. A similar large majority had specialized in modern languages as teacher or undergraduate or both, 3 being heads of very large high-school language departments. Shall one suspect that prowess with the tongue is unfavorable to matrimony?

One teacher and 1 political worker were the only ones winning much public recognition—both of them propagandists of world peace. Otherwise, these 24 women were pretty well hidden, either in the classroom or, one of them, as an “office” lawyer, one of them as “assistant” to the manager of a large dairy, 3 with no occupation reported, and one as investment expert in a big bank (but the public is not allowed to know that a woman selects the bonds).

NUMBER OF CHILDREN

The eugenist can never feel much interest at any time in the *number of children per marriage* (table 5). Whenever it is high, it *may* merely mean that a lot of the group preferred single life to late childless marriage, and if it is low it may merely mean the reverse. The “*per capita*” for the whole group married and single, and the “rates by different ages at marriage” (table 4) are the only summaries of significance.

The modal year of age for marriage is 25 for women¹¹ and 27–28 for men,

¹¹ Both mode and mean were about a year and a half later than similar figures for the professional classes in the Milbank Memorial Studies—our mean being 26+.

and consequently the largest groups of offspring result from such marriages. But the greatest fertility per marriage was for those made at 24 years by the men (2.7 per marriage) and at 23 years by the women (3.4 per marriage). The latter age, by the way, is supposed to be the age for child-birth of least mortality for mother and infant in the general population.

TABLE 4
Size of families according to wedding age

	WED											
	All ages		20-24		25-29		30-34		35-44		At 45 or over	
	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
Of men												
Total—details known	276	100	34	100	134	99	74	100	26	100	8	100
Childless	61	22	5	15	22	17	15	20	13	50	6	75
With 1 child	38	14	4	12	18	13	10	14	4	15	2	25
With 2 children	68	25	5	15	37	28	21	28	5	19		
With 3 children	56	20	10	29	29	22	15	20	2	8		
With 4 children	36	13	7	20	18	13	9	12	2	8		
With 5 or more children . . .	17	6	3	9	10	7	4	6				
Of women												
Total—details known	269	100	52	100	136	100	50	100	29	100	2	100
Childless	53	20	6	12	15	11	13	26	17	59	2	100
With 1 child	47	17	4	8	26	19	10	20	7	24		
With 2 children	74	28	9	17	46	34	14	28	5	17		
With 3 children	47	17	14	27	25	18	8	16				
With 4 children	34	13	11	21	19	14	4	8				
With 5 or more children . . .	14	5	8	15	5	4	1	2				

STERILITY

In reality, the next step in our search for the leaks which are draining the college birth rate is for sterility in marriage. Dr. Phillips¹² found a steady sinister trend at Harvard: the sterile marriages doubled between 1851 and 1900. Our marriages (table 4), taking place mostly in this century after the close of the period studied by Phillips, show a sterility similar to that of Harvard classes graduating around 1870. The 22 per cent for our men's marriages is about the sterility stated at present for marriages from leading women's colleges.

¹² *Harvard Graduates Magazine*, March 1926, Table II.

THIS NON-FECUNDITY COMPARED TO OTHERS'

Table 4 has been re-written, omitting 20 men and 21 women who were deceased by the time of the inquiry concerning their offspring. The object of this re-tabulation into table 6 is to get figures more comparable to the United States and British census figures of the Milbank Memorial studies¹³ and of the Fertility of Marriage,¹³ which both deal only with couples of which both partners survived. It is very interesting to see that the re-tabulation for survivors only, reduces the childlessness of those married at 20-24 years by one-fifth (men) and one-third (women), and the one-child families of men by one-fourth. A further reduction for widowhood

TABLE 5*

Children per marriage according to wedding age

	AT ALL AGES	20-24	25-29	30-34	35-44	AT 45 OR OVER
Married men	276	34	134	74	26	8
Men's children	575	90	302	153	28	2
Per marriage (men)	2.1	2.6	2.3	2.1	1.1	0.2
Married women	269	52	136	50	29	2
Women's children	548	153	295	83	17	—
Per marriage (women)	2.0	2.9	2.2	1.7	0.6	—

* Derived from Table 4, except as regards items "5 or more" children.

has been estimated in my article in the Eugenical News, November 1933 to which the reader is referred.¹⁴

¹³ References in table 6.

¹⁴ The operation of altering table 4 into table 6 hints at an answer to the following problem in census figures such as those of the Milbank Memorial and the Fertility of Marriage: *To what extent do they fail of representing what really happened to all the original members of the given generation which they appear to study* (by social classes)? The unheard witnesses are the dead and the widowed. [For, splitting the living married up into five-year age groups (for which birth rates are secured) does not solve the difficulty—for it does not summon a single dead or widowed person to the witness stand on census day.] Small families were very frequent among the unheard witnesses and the mortality factor is also of *greater* importance among the lower classes than among the upper. Does, then, the omission of all dead and widowed and their small families inflate to any serious extent the apparent birth rate of the lower classes? Comparison of table 4 with table 6 shows that the reality (table 4) was two (percentile) points less favorable to families of three and four as against families of one or none than was table 6 (survivors only). The contention is that in a tabulation for unskilled, for instance, the correction would have been yet more extensive, on account of greater mortality.

TABLE 6

Per cent distributions: sizes of families of survivors to age 35-53 and two somewhat similar distributions*

a. Wed at all ages

	WIVES SURVIVING TO 40-44, OF U. S. PROFESSIONAL MEN†	COEDUCA- TIONAL WIVES AND WIDOWS	WIVES OF GENERAL ENGLISH POPULATION SURVIVING TO 45 AND OVER‡	COEDUCA- TIONAL HUSBANDS AND WIDOWERS
Total	100	100	100	100
Childless	20	18	16	21
With 1 child	20	17	7	13
With 2 children	24	27	9	25
With 3 children	18	19	9	21
With 4 children	10	14	9	14
With 5 or more children	8	5	50	6

b. Wed at stated ages

	20-24			25-29			30-34			35-44		
	Coeducational wives and widows	English wives	Coeducational husbands and widowers	Coeducational wives and widows	English wives	Coeducational husbands and widowers	Coeducational wives and widows	English wives	Coeducational husbands and widowers	Coeducational wives and widows	English wives	Coeducational husbands and widowers
Total	100	100	99	101	100	100	100	100	100	100	100	100
Childless	8	6	12	11	12	15	20	23	22	63	53	50
1 child	8	7	9	17	12	13	22	18	12	25	20	17
2 children	17	10	16	34	16	28	30	19	29	12	13	17
3 children	29	11	31	20	16	22	17	15	20	0	7	8
4 children	23	11	22	15	13	14	9	11	13	0	4	8
5 or more children	15	55	9	4	31	8	2	14	4	0	3	0

* There were 7 individuals over 53 yrs.; only 2 aged 35.

† Figures from Frank W. Notestein, *Decrease in Size of Families from 1890 to 1910*, Quar. Bul. of the Milbank Memorial Fund, Vol. IX, No. 4, Oct. 1931.

‡ Census of England & Wales, 1911. Fertility of Marriage, Part II, Table XVI.

As matters stand in table 6, something may be got from it. The objection that the sterility of coeducational husbands in table 6 b, should not be compared with that of English *wives*, since any group of husbands is

married, as a whole, to wives somewhat younger, does not vitiate but intensifies the conclusion we draw from table 6, b, as follows: Childlessness is excessive for these college men married under 30. Also the one-child families are too numerous for the women wed at 25–34 years. The real dreadful weakness in these inferences is of course that the numbers are too few. It is, however, surprising to realize that the numbers surviving of *each* sex among these collegians are *each* one-fifth of the corresponding Milbank professional figures of similar date. If then I have only 176 surviving females wed at 20–30 years, the Milbank studies therefore had not more than about 880 thus wed. The notable point to me is that to get these 880 particular examples from the so scarce professional class it was necessary for Dr. Notestein's clerks at the Milbank foundation to examine about 300,000 census schedules. There are economies and conveniences in the study of college records, and there is perhaps this disadvantage—that one is tempted by the urgency of the issues at stake to draw conclusions from the small groups wed at given ages. For, as we have said it is here and in group per capita for both single and married together that one must truly analyze the leaks draining the professional birthrate.

It may be that Huntington and Whitney¹⁵ were too optimistic in concluding that college women if married young would not be more troubled with sterility than the average. College women unfortunately (?) would usually rather stay single than marry into the general population, where fertility appears perhaps better under 30 years of age, at least in England.

How shall we interpret the facts in table 4 that the women's sterility runs less than the men's (weddings under 35 years) but that women are as much or more liable to have only one child? Tentatively, it may be connected with the college woman's known reluctance to take poor bargains in wedlock. College women are more often able to spot and reject the essentially weak and sterile man than they are the man who will give but one child—shall we say? Table 5 does not lend much support to the idea that women, oftener than men, have a single child only because of dislike—for the women in that table are, far more than the men, unfitted physiologically by their age, yet they have nearly as many children.

An examination of 59 men and women whose marriages, though prompt, yielded no children or in the case of the men only one child, shows nothing either known or at least significant about 18. But in 21 cases the unsatisfactory fertility after prompt marriage was conjoined with premature death or known ill health, often specific. In at least half a dozen cases it

¹⁵ *Op. cit.*, p. 50.

was conjoined with character peculiarities. In addition it was notable that there was a third distinct group unduly represented among the men. Among all the 49 men who married promptly but had one child or none, 16 per cent were teachers, mostly in secondary schools, with, otherwise, no uncommon traits to be noted. As there is less than 11 per cent of men graduates in secondary *and* higher education among the whole body of graduates, I was led to examine the birth rate of all the 18 men, married and single, in secondary school work. It was 1.55 as against the general average 1.8.

In the total 545 marriages the rate of unsatisfactory fertility (one child or less) exceeds 27 per cent in every age-at-marriage group except women

TABLE 7

	WELL-TO-DO MEN		WELL-TO-DO WOMEN	
	Number	Per cent	Number	Per cent
<i>Total</i>	81		52	
<i>Single</i>	2		12	
<i>Total married</i>	79	100	40	100
<i>Childless</i>	12	15	5	12
<i>One child</i>	9	11	7	17
<i>2 children</i>	15	19	7	17
<i>3 children</i>	21	27	8	20
<i>4 children</i>	15	19	7	17
<i>5 or more children</i>	7	9	6	15
<i>Per capita</i>	2.4		2.1	
<i>Per marriage</i>	2.5		2.7	

wed under 25 years, and is nearly as bad for the prompt bridegrooms as for those delaying marriages. Exactly one-half of all women's marriages occurred between 25 and 30 and 30 per cent of them were one-child or childless.

As a practical suggestion concerning this problem, more attention should perhaps be bestowed on each young man's health as regards generative capacity. Female fertility is not so easily determined, and therefore it is not so clear what can be done. But the bookish (?) man attracted to the high school as a profession and the delicate man in general might do well to have a physician advise him as to how long after 20 he dare defer fatherhood. (One must not of course exclude the possibility that many people are not fertile even in their teens.) Then there is, no doubt, another group

of more unstable character who rush into marriage when diseased and thus also keep the sterility rates nearly as high in prompt as in delayed marriages.

REALLY LARGE FAMILIES; WEALTH

As to really large families we have the most startling difference from the general population (see table 6, a). Only two men, college professors both, had as many as 6 children. Five women had 6 or more, and they were all heiresses, except one who married a wealthy man. They were likewise all fine students, except one of them, who nevertheless was a wit and also got suspended for merely speculating on the new sex freedom twenty years too soon. But these 7 men and women ought to have numbered about 200 *instead*¹⁶ (can you believe it?) if our graduates had been as prolific of families over 5 as was the general population of England a little earlier.

Wealth was favorable to fertility in both men and women, as the 81 men on the "special contributors" list of the college had more children than necessary to replace themselves and the 52 women almost had. Both sexes married in greater proportion than any groups I have noted at this or any college. There were numerous large families, sterility was low, but the one-child family was as much a problem as ever among the women but not the men. But much weight should not be put on this paragraph as "the contributors" may really have been "interested in family life and hence in their coeducational college" rather than essentially "wealthy." That is, it is not known whether the wealthy graduates uninterested in coeducation got adequately represented in the list. (See table 7.)

SUMMARY

The 50 women who married under 25 are the only group who averaged nearly 3 children apiece. All other marriages contracted up to 35 years of age (except of males aged 20-24 = 2.6) were decimated by sterility and by the small-family philosophy, to average about 2 children. Only a dozen women had any children at all after marrying later than 34 and their men classmates who likewise became autumn bridegrooms *were very little better*. These marriages after 34 are the real merely companionate marriages, though they are not realized to be such by all the bridal assemblage on the great day.

The chief cause of offense and injury to the graduates' birth rate remains of course *late marriage*. The custom of having 6 and more children is not

¹⁶ Determined as per note‡ to table 6.

likely to continue much longer in any class of society, to cause a worrisome differential between class birth rates. But the failure of many college women to marry at all and the custom of both sexes to marry late are problems we will have with us for some time yet.

Many straws seen in this study suggest to me that deficient fertility in the married is often associated with such mental laziness and general physical debility as can be found among graduates (who, after all, cannot be really weaklings, at least in college years). Of course, however, one cannot rule out venereal disease and malformations entirely.

On the other hand, the highly intelligent women when they marry are really prolific and moderate wealth is perhaps favorable in both sexes to both matrimony and progeny.

It occurs to me that the most direct aid to eugenics open to a college for women would be for it to appoint a psychologist to labor with all the high ranking students. He should study and report on each individual as to the likelihood of her marrying, and if it is unlikely should recommend any corrective measures that may be developed.

Say not that there are no such measures. A college is in a position to arrange it that its girls should not spend their summers, as now they often do, in places containing ten girls to every young man, and also in places which suggest to both men and girls that a wife is an ornament to be supported rather than a hard-working partner. Since grain was first sown in ground by the women of the tribe, women have usually done the arduous work of this world, "from sun to sun . . . *never* done," while men were making many of the military, artistic and scientific advances. It is still the same old world, and girls had better make choice: will they reconcile themselves to working harder than men both before and after marriage, or will they weakly commit race suicide? A girl of hard-working economic views cheerfully held, with slight savings of her own earmarked to buy the furniture, might expect to increase the number of her suitors.

Honor students, if only they can be persuaded to marry sound men early, would, it seems, have very large families, as families run among the educated classes.

Finally, as regards the high birth rates found among these coeducational graduates as distinct from the segregated graduates of Harvard, Holyoke, Goucher, etc., the chief cause remains an open question. Is it coeducation? Is it that those who choose such a college are a selected body predisposed to family life, partly because they are less worldly than those who go to more famous institutions? For the "spirit of striving" has been justly convicted

as arch-villain in the fall of the birth rate.¹⁷ It is Milton's "ambition—last infirmity of noble minds."

Probably coeducation has conjoined with unworldliness and love of children to raise the birth rate in the group studied but the relative causal strength of each factor remains unknown.

¹⁷ First prize in contest on "Causes of the Decline in Birth-rate within the European Sphere of Civilization," given to Roderick von Ungern-Sternberg, Mono. IV, Eugenics Research Association, 1932, 202 pp.



EVIDENCE OF THE RAPIDLY DECREASING BIRTH RATE IN FAMILIES IN WHICH HIGHLY INTELLIGENT CHILDREN OCCUR

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Scattered studies of the birth rate in special groups show each year more clearly that, in general, the more intelligent the group, the more rapidly the birth rate is decreasing. I wish merely to bring to attention, in proper setting, the evidence from the group of children over 135 Stanford Binet I.Q. (135-190) who were gathered in P. S. 165 Manhattan in 1922.¹ Rarely, perhaps never, has so intelligent a group of human beings been drawn together; rarely, perhaps never, has so sharp a decrease in family size or so low a birth rate been reported from a healthy group. (It may be noted that the way in which this group was selected automatically excluded no-children families. The figures for this group are not thereby lowered as, for instance, figures as prepared for college graduates usually are. The low figures for this group are therefore all the more significant.) These figures have already been twice reported, incidentally, in studies whose titles point to other content. They were first mentioned in the *Journal of Educational Psychology* for January, 1925, in a report by Dr. Leta S. Hollingworth and myself, entitled "The Regression of Siblings of Children Who Test at or above 135 I.Q. (Stanford Binet);" and second, in a report by Miss Grace Allen in the *Eugenics Record Office Bulletin* No. 25, for May, 1926, entitled "The Families Whence High Intelligence Springs." The figures mentioned in the two studies differ a little because the families included in the two groups, while largely over-lapping, are not identical. In the first study, the number of children per family is slightly under 2; in the families of their fathers and mothers the number had been 6 to 7. In the second study, the decrease from the previous generation to the present is from 6.3 to 2.3 children per family. In the first group, 90 per cent of the families are Jewish; in the second, 70 per cent. The second group was made to include as many non-Jewish families outside the first group as could

¹ This group has been described previously, especially in the *Twenty-Third Yearbook of the National Society for the Study of Education*, Taylor and Cobb.

readily be added, and thereby includes more American-born parents and grandparents. The first report does not state the per cents foreign born; in the second group, 74 per cent of the grandparents were foreign-born, as

TABLE 1

DATE	PERIOD	NUMBER OF CHILDREN PER AMERICAN WIFE	DECREASE
1700-1750	50 years	6.83	
1750-1800	50 years	6.43	0.4
1800-1850	50 years	4.94	1.5
1850-1870	20 years	2.77	2.2

Group containing gifted children

About 1895		6.3	
About 1925	30 years	2.3	4

TABLE 2

FAMILIES OF	DATE		NUMBER OF CHILDREN		DECREASE	REFERENCE
	First generation	Second generation	First generation	Second generation		
Mt. Holyoke students	Grandparents of college students of 1921	Parents of college students of 1921	6.19	5.09	1.11	18 (Hewes)
Mt. Holyoke students	Parents of college students of 1921	College students of 1921	5.09	3.15	1.94	18 (Hewes)
University of Wisconsin students	1857-77	1892-1912	5.44	3.35	2.09	18
University of Ohio students	Parents of college students about 1930	College students about 1930	5.53	3.28	2.25	12 (Maxwell and Huestis)
Men of Science (families complete)			4.7	2.3	2.4	18 (Cattell)
Gifted children (families complete)	About 1895	About 1925	6.3	2.3	4	1 (Allen) 3 (Cobb and Hollingworth)

were 50 per cent of the fathers and 24 per cent of the mothers. As just stated, an even larger proportion of the parents and grandparents were foreign-born in the first group. Both generations may be regarded as "completed" families.

This drop, in course of a single generation, from 6 or 7 to less than 2 children per family, is the sharpest decrease I have seen mentioned anywhere. Neither decennial Census Reports nor the reports of the Division of Vital Statistics gives comparable figures for the general population, though such figures may be obtainable for single states. The best comparison I have found is with Crum's figures for the period 1700-1870, at intervals of fifty years (table 1). The only figures which would probably be directly comparable with ours would be those for the decrease over corresponding periods.

Table 2, taken from sources indicated in the bibliography, shows decreases in family size among families sending children to college or producing eminent scientists, two groups which are surely above the average in intelligence, but probably still below our group of New York City School children.

Very interesting would be records from a control group, similar in all respects save intelligence to our gifted group. The children of such a group were used in one or two of our studies, but no family data were collected.

I do not wish to imply that high intelligence is the sole cause of the decrease noted, nor that this decrease indicates any biological decrease in fertility associated with high intelligence. My own prediction would be that when we do obtain evidence on this point we shall find in intelligent groups a somewhat higher potential fertility, associated with the somewhat greater physical development and the somewhat better health which have more than once been demonstrated in highly intelligent children. Many conditions may be related to the sharp decrease in family size; among them, first, the recent shift from an European, on-the-whole lower-class, or at least despised, social status, to an American environment in which a highly regarded professional status is far from impossible, with a resulting shift in the attitude of their own social group towards large versus small families; and second, the much more general dissemination of knowledge of fairly dependable methods of birth control. As a matter of fact we know that many of the families in our group were voluntarily limited. In at least two cases, even further restriction than that attained had been intended.

The remedy for this differentiation of family size in relation to intelligence in what, from a social point of view, we must consider the wrong direction, so far as intelligence and correlated favorable traits are concerned, lies I believe almost entirely in the field of education (though not to the exclusion of sterilization of the obviously unfit); education that shall include a spread of knowledge of and skill in methods of birth control in the unfavored groups (motive is already there), and a development of a different social attitude toward size of family, probably aided by economic assistance, in the favored groups.

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SECTION VIII

HUMAN GENETICS

GENETICS OF THE HUMAN MIND

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Sixty-three years have passed since the appearance of Sir Francis Galton's pioneer work on Hereditary Genius. In that classic, Galton shows in numerous and diverse cases that natural ability and high mental capacities have in all probability been derived from parents and ancestors. Since then, Galton's conclusions have been confirmed and highly developed statistically by Professor Karl Pearson (1919) and others. In 1906 a remarkable survey of Mental and Moral Heredity in Royalty, carried out on Galtonian lines, was published by Dr. F. Adams Woods, which, dealing with the whole adult issue of the leading Royal families of Europe through several centuries, leaves no doubt that mental ability of different grades is inherited and transmitted to descendants in an "alternative" manner. Thus the accumulation of statistical evidence indicates that the influence of heredity is of primary and paramount importance in the determination of the human mind. Mankind's chief distinction from the other Primates and the rest of the Mammals, lies in his more recently developed conceptual mind or intellect, the first traces of which date back to the Cantalian Eoliths of the early Pliocene about ten million years ago, long before the appearance of the genus *Homo* and the modern species *Homo sapiens*. Since the dawn of civilisation about ten thousand years ago, the progress of the human race has in the main depended on the development of the intellectual capacities and in studying the genetics of the human mind it should be our first concern to investigate the genetics of intellect.

The statistical evidence of Galton, Pearson and Woods does not indicate the genetical mechanism whereby intellectual abilities are inherited and transmitted from generation to generation and at that early date both Pearson and Woods disclaimed a Mendelian interpretation of the evidence. Since then considerable progress has been made and Mendel's experiments have provided a key to the mechanism of heredity, segregation and "alternative" inheritance, while recent genetical experiments have with certainty demonstrated that the physical basis of this mechanism in plants and animals is found in the chromosomes and genes present in the nucleus of every living

cell. The next step therefore is to attempt to place the problem of the inheritance of intellectual abilities on a genetical basis.

To this end a personal investigation continued over a number of years, has been made of 194 families representing various occupations and conditions of life in my native district in Leicestershire. The same families were studied for the determination of the inheritance of Eye-Colour (1908), (1912), (1925), (1932 B) and for the inheritance of various physical characters and musical temperament (1912). Except for the five years of war 1914-1919, these families have been repeatedly studied for intellectual abilities since 1904, and are still being followed up. The research has involved detailed comparative studies of the intellectual activities and achievements of 388 parents and their 812 offspring (L. F. data). To these results have been added the definite data presented by Woods of 212 families of European Royalties and their relations. This research covers a period of several centuries and includes definite studies of 424 parents and their 558 offspring (R. F. data). The combined data thus cover a space-time population of 812 parents and their 1370 adult offspring, analysed in 406 separate families (Table 1).

Woods rates the intellectual abilities of individual Royalties and their relations in ten grades, from the lowest grade 1 to the highest grade 10. In his mental gradings, Woods, like Galton, relies on historical reputation, i.e., contemporary opinions critically revised by posterity. He takes the consensus of opinion among biographers and historians and systematically averages or modes these on the basis of the particular adjectives and characterisations used. For my modern data similar grades have been adopted but the ratings have been determined on the basis of an intimate personal knowledge of the intellectual activities and achievements of the individuals graded. In order however to bring the ratings into line with the genetical formula and the juvenile I.Q., an eleventh grade O was added, making a scale of equal grades, each equivalent to 20 I.Q. (table 1). It is interesting to find that the two sets of data derived from such radically different sources and conditions of life and rated by different methods, do not essentially differ from one another either statistically or genetically, the most striking feature common to both being the overwhelming excess of the numbers of the mediocre grade 5 over the adjacent and remaining grades and the extreme rarity of the highest and lowest grades (table 1). In the Leicestershire families, as might be expected in a small sample of a rural population, the two highest grades 9 and 10 are absent and it is significant that the 4 individuals of grade 8 found in the district have all left for a wider sphere of work.

It is difficult to conceive two sets of material more widely different than

the L. F. and R. F. data and hence so suitable for constructing a general genetic formula applicable to a wide range of families. The Leicestershire data represent a relatively constant and narrow range of heredity associated

TABLE 1
Grades of intellect

GRADES	AVERAGE IQ	CLASS	L. F. DATA		R. F. DATA		TOTAL (PER CENT)	NORMAL FREQUENCY (PER CENT)
			Parents (per cent)	Offspring (per cent)	Parents (per cent)	Offspring (per cent)		
0	0	Idiot	0(0.0)	0(0.0)	0(0.0)	1(0.2)	1(0.0)	0.0
1	20	Imbecile	0(0.0)	2(0.2)	2(0.4)	8(1.4)	12(0.5)	0.9
2	40	Moron	0(0.0)	2(0.2)	12(2.8)	22(3.9)	36(1.6)	4.3
3	60	Subnormal	5(1.2)	13(1.6)	21(4.9)	33(5.9)	72(3.2)	11.7
4	80	Dull	41(10.5)	71(8.7)	28(6.6)	44(7.8)	184(8.4)	20.5
5	100	Mediocre	275(70.8)	590(72.6)	221(52.1)	268(48.0)	1,354(62.0)	24.6
6	120	Able	57(14.6)	115(14.1)	43(10.1)	65(11.6)	280(12.8)	20.5
7	140	Talented	8(2.0)	15(1.8)	44(10.3)	57(10.2)	124(5.6)	11.7
8	160	Brilliant	2(0.5)	4(0.4)	32(7.5)	30(5.3)	68(3.1)	4.3
9	180	Eminent	0(0.0)	0(0.0)	11(2.5)	22(3.9)	33(1.5)	0.9
10	200	Illustrious	0(0.0)	0(0.0)	10(2.3)	8(1.4)	18(0.8)	0.0
11			388	812	424	558	2,182	

Summary

GRADES	IQ	L. F. DATA		R. F. DATA		TOTAL (PER CENT)	APPROX. NORMAL FRE- QUENCY (PER CENT)
		Parents (per cent)	Offspring (per cent)	Parents (per cent)	Offspring (per cent)		
Low	0-89	46(11.8)	88(10.8)	63(14.8)	108(19.3)	305(13.9)	37.5
Mediocre	90-109	275(70.8)	590(72.6)	221(52.1)	268(48.0)	1,354(62.0)	25.0
High	110-209	67(17.2)	134(16.5)	140(33.0)	182(32.6)	523(23.9)	37.5
		388	812	424	558	2,182	

Intelligence index (percentage of high grades)

Offspring, L. F. data	16.5
Offspring, R. F. data	32.6
Expected general population	9.4

with a variable social environment with extremes of poverty and wealth, while the Royal families represent an inconstant and extremely wide range of heredity associated with a more uniform social environment. Further,

the one is typically English and modern, while the other includes eleven different nationalities and is spread over a period of several centuries.

DEFINITION OF INTELLECT

Throughout this investigation the concept "intellect" is taken to represent natural mental ability as expressed in general mental activities and achievements, on the lines and definitions laid down by Galton (1869), Woods (1906) and Spearman (1927). The concept therefore corresponds with Galton's "natural ability," Woods' "intellect" and Spearman's "general factor *g*."

Spearman's remarkable psychological discovery of a statistical factor "*g*" representing the general mental ability which enters into every act of cognition, has cleared the way for a genetical investigation of the inheritance of intellect. Experimental tests show that Spearman's "*g*" is generally constant for any normal individual from the age of puberty up to the onset of senility, while it is greatly variable in degree or power in different individuals. In grading intellect we are measuring Spearman's "*g*."

RELIABILITY OF THE GRADINGS

Woods' historical material was rated and graded by histriometric methods originally devised by himself. Numerous careful tests made with different controls and criteria showed clearly that his subjective consensus rating by adjectives was a more delicate and accurate method of grading intellect than other methods which were more mechanical and objective. Tested by Mendel's Laws of Heredity, Woods' gradings of intellect in Royalties have a reliability of 94.7 per cent. The reliability of the ratings and gradings of intellect in my own investigation of the Leicestershire families was checked and tested in various ways. In the course of the twenty-five years research several repetition re-ratings have been made and where possible all individuals have been re-graded after a few years' interval.

In numerous cases the same individuals have been independently rated by parents, teachers and colleagues. There is a remarkable conformity of the intellect gradings of individuals with their occupations and vocations in accordance with the scales laid down by Barr, Taussig and the American Army Reports. Tested by Mendel's Laws of Heredity, the gradings of intellect in the Leicestershire families have a reliability of 99.8 per cent. So far as achievement can be regarded as a test or measure of ability, the ratings and gradings made are probably as approximately accurate as those obtained by standardised tests. Owing to personal objections and other serious difficulties it was found impracticable to apply the conventional batteries

of intelligence tests to adults in general. It is to be hoped that more refined and accurate methods of grading adult intellect will be devised by psychologists which are based on achievements in life rather than on the scores obtained in set mental tests. It is evident that neither "Alpha" nor "Beta" tests can be effectively applied to adults in times of Peace.

Still less can these experimental tests be applied to historical persons like Woods' Royalties and the three hundred geniuses of Dr. Catherine Cox (1926). Cox's remarkable work in estimating the I.Q.'s of 300 geniuses from the evidence of their Juvenilia, leads one to hope that she may be persuaded to attempt to grade their intellects on the evidence of their achievements in adult life.

The great value of a battery of standardised mental tests for estimating the I.Q.'s of juveniles and adolescents is beyond all doubt, and for the benefit of posterity such standardised tests should be made compulsory in all schools, so that in course of time the I.Q.'s of all the adults in future populations would be approximately known.

GENETICAL FORMULA FOR INTELLECT

For many years the data obtained from the Leicestershire families and those of Woods from the Royal families were studied and restudied but no satisfactory genetical formula could be devised that would cover the whole of the data. In 1931, however, an English translation of a Russian paper on Wheat was made by Dr. Hudson of the Imperial Bureau of Plant Genetics Cambridge and accidentally came into my hands, which gave a clue to the solution of the human problem. This paper was a report by the Russian geneticist Philiptschenko, dated 1927, giving the results of a complete genetical analysis of the characteristic broad grains and glumes of the famous "*Marquis*" Wheat. After many years of experimental breeding Philiptschenko succeeded in identifying the six pairs of genes which in combination produce this super-variety of Wheat. An application of this hexagenic formula for Wheat to the human family data for intellect showed that it covered the data sufficiently well to warrant its being used as a working hypothesis for the genetics of intellect.

Table 2 explains the genetical formula and its application and adjustment to the human data. It consists of a basic pair of genes with five pairs of modifiers. Although superficially complex it is fundamentally simple in its working.

On the basis of this formula it is possible to predict the grades of offspring that each grade will produce when mated with its own or any other grade, except that the matings of the mediocre grade 5 will give a different result whether they are nn, NN, or Nn.

On the basis of these predictions the present L. F. and R. F. data show 31 offspring of unexpected grades out of a total number of 1370 offspring, or 2.2 per cent exceptions.

In the Leicestershire families there is only one exception in 812 offspring, where a grade 2 appeared instead of the grade 3 expected. In the Royal

TABLE 2

Genetical formula for intellect

$Nn + (Aa + Bb + Cc + Dd + Ee)$ with 729 genotypes

N and n are a *major* pair of genes for *typical* and *atypical* intellect.

Dominant N (NN or Nn) determines *typical mediocre* intellect of *grade* 5.

Recessive nn determines *atypical* intellect of *various* grades 0-10.

$Aa \dots Ee$ are *minor* pairs of *modifying* genes which produce *grades* 0-10.

Dominant modifiers $A \dots E$ act as *equal* and *cumulative increasers* of *grades*.

Recessive modifiers $a \dots e$ act as *decreasers*.

With nn the modifiers are *fully active*.

With NN the modifiers are *totally inactive*.

With Nn the modifiers are *inactive* or only *partially active*.

Thus the 729 genotypes produce *seven* kinds of *effective gametes*.

GRADE	CLASS	EXAMPLE OF SOMATIC FORMULA	DOMINANT IN-CREASES	GENOTYPES	GAMETES
0	Idiot	$nn(aabbccdde)$	0	1	$n(0)$
1	Imbecile	$nn(Aabbccdde)$	1	5	$n(0 \dots 1)$
2	Moron	$nn(AaBbccdde)$	2	15	$n(0 \dots 2)$
3	Subnormal	$nn(AaBbCcdee)$	3	30	$n(0 \dots 3)$
4	Dull	$nn(AaBbCcDdee)$	4	45	$n(0 \dots 4)$
5	Mediocre(DD)	$NN(AaBbCcDdEe)$	5*	243	$N(0 \dots 5)^*$
5	Mediocre(DR)	$Nn(AaBbCcDdEe)$	5*	243	$N(0 \dots 5)^*,$ $n(0 \dots 5)$
5	Mediocre(RR)	$nn(AaBbCcDdEe)$	5	51	$n(0 \dots 5)$
6	Able	$nn(AABbCcDdEe)$	6	45	$n(0 \dots 5)$
7	Talented	$nn(AABBcCdEe)$	7	30	$n(2 \dots 5)$
8	Brilliant	$nn(AABBCCDdEe)$	8	15	$n(3 \dots 5)$
9	Eminent	$nn(AABBCCDDEe)$	9	5	$n(4 \dots 5)$
10	Illustrious	$nn(AABBCCDDEE)$	10	1	$n(5)$

* Inactive.

families there are 30 exceptions in 558 offspring, or 5.3 per cent of unexpected grades. Since these occur in batches in a very few families it is highly probable that they are due to errors in parental gradings. Woods' gradings are adopted as they stand and no attempt has been made to examine them critically, so that the independent value of the data has been preserved.

Space will not allow the publication of full details here, but complete tables of the individuals of the 406 families will be found in Hurst (1932A), genetical proofs of the formula in Hurst (1934), and it is hoped that it will be possible to publish a large number of the case studies in the form of a book.

EUGENICS

From the point of view of Eugenics, the novel and manifold implications of the genetical formula are important and far-reaching. The presence and frequency of the dominant N gene in a population, giving rise automatically to an excessive number of mediocre individuals of grade 5, no matter how many increaser genes for intellect they may be carrying and with no prospect of their coming to expression except by a loss or mutation of N genes, raises a vital eugenic problem. The more NN and Nn individuals in a population the higher the frequency of mediocre intelligence and the lower the Intelligence Index (i.e., the percentage of high grades). The lower the Intelligence Index the less progressive the nation and the less likelihood of the preservation of advanced civilisation. The lower average of intellect in certain backward races may be due to an excess of dominant N genes in the population. It may be that here we have an explanation of the sudden fall of Greece and Rome and other dominant Empires and Civilisations owing to the introduction and rapid spread of N genes through intermarriages with mediocre races. For this reason the reproduction of families with nn parents should be encouraged in every possible way, but even here safeguards will be necessary since both low and high grades are associated with the nn pair of genes and it may be expected that in certain families genius will be associated with decadent and degenerate members with a low grade of intelligence. Fortunately the high and low grades of intellect, though frequently associated are not inseparable, and it is possible by selection to decrease the low grades and increase the high grades by encouraging the reproduction of large families by parents of grade 6 and over.

Professor Terman's (1930) studies of a thousand gifted children show clearly that children of grade 7 and over, are in general and on the whole, superior in the more desirable qualities of temperament, health and physique to the average child of grade 5.

In another place (1934), I have suggested a scheme of Family Bounties in which high grade parents of grades 6 and over would receive Bounties for the education and maintenance of each of their high grade children. As a practical scheme of positive eugenics, the effects of the Family Bounties would soon be evident and in the course of a generation they would be in-

creasing by geometrical progression and ultimately would become far-reaching. In a few generations an aristocracy of intellect, superior in other qualities, would be established, which would ensure the preservation and progress of modern civilisation.

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HEREDITY IN PSYCHOSES

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I should like to demonstrate the following case from my material.

Chart 1, generation IV, individual 51, the probandus suffers from dementia praecox. There are six brothers and sisters. IV.45, a sister, was treated in a hospital for mental diseases two or three times on account of mania. IV.47, has the manic-depressive constitution. IV.49, a sister, suffered for a year and a half from the manic-depressive psychosis, beginning with an attack of mania which was succeeded by a long series of depression. IV.53, a brother, was treated for a short time for psychasthenia; he is a paranoid personality. IV.55, a sister, suffers from schizophrenia, was repeatedly admitted and is now for the sixth time in the psychiatric clinic.

Of these six brothers and sisters there were, therefore, five who were psychotic. Both manic-depressive psychosis and dementia praecox are present. Neither is the psychosis in some of them pure, the dementia praecox of the probandus has shown some periodicity; the schizophrenia of the sister was also diagnosed in the beginning as manic-depressive psychosis. One might speak of degenerative psychoses.

The question is, what does heredity teach us for consideration of the psychosis of the probandus.

There is consanguinity in the family to begin with; both grandmothers of the probandus were sisters. The father of the probandus suffered from manic-depressive psychosis, passed a great part of his life in the mental hospital and died there. The mother of the probandus was mentally normal. Of the brothers and sisters of the father, a sister, III.49; suffered from melancholia and committed suicide. A brother III.46, was a somewhat peculiar personality, two other brothers III.52 and III.55, led an irregular life and drank too much alcohol. In the father and the brothers and sisters we find the manic-depressive psychosis and there are peculiar characteristics.

Of the brothers and sisters of the mother a brother III.35, suffered from melancholia and seriously tried to commit suicide; he died psychotic of furunculosis with diabetes. Another brother III.32, suffered from severe neurasthenia accompanied with obsessions. The youngest brother also suffered from nervousness.



Of the grandparents on the father's side, the grandfather II.37, was a strange man, fussy, exacting and tyrannical; in his later life he was addicted to alcohol. Towards the end of his life he was treated in a mental hospital. The diagnosis was *vecordia* (paranoia).

A brother of the grandfather II.32, was an exceptional man with peculiar ideas; a sister II.35, was considered as very eccentric; she remained unmarried all her life, suffered from shyness, avoided people, had strong pride of family.

It is not difficult to recognize in this family the constitutional family characteristics of *dementia praecox*.

The grandmother on father's side II.18, was treated for *melancholia*. She was, as mentioned, the sister of the grandmother on the mother's side. Two other sisters II.19, and II.21, showed the manic-depressive constitution. Going still further back,—thus from the great-grandparents of probandus—also the father, I.5, the grandfather on the parents' side was treated in a mental hospital; he suffered from *melancholia*.

In the family of the grandmother on the father's (and thus also on the mother's side) manic-depressive psychoses appear, and other members of the family show the manic-depressive constitution.

The grandfather on mother's side II.16, was mentally normal. Among his brothers and sisters and their children psychoses also occur; the family relationships, however, are not fully known here.

Also the collateral lines of the father's and of the mother's family, uncles and aunts, brothers and sisters yield data for heredity, which correspond to those which we found in the case of direct descendants.

The heredity in the family of the probandus gives complete explanation for the appearance of the various psychoses in the probandus and his brothers and sisters and of the complex construction of the psychoses in the case of some of them.

On the side of the grandfather on the father's side, the schizophrenic element, the *dementia praecox*, and on the side of the grandmother, both on the father's as well as on the mother's side, the manic-depressive element appears. By their complex construction we have to understand the psychoses as combined psychoses.

We do not find a proper detrimental influence of any consanguinity. We have to deal with a combination of hereditary factors for disease.

Of a second case of consanguinity in the same family, the psychosis of one of the family members is likewise to be explained by means of our knowledge of the heredity in the family.

III.46, the brother of the father of probandus, is married to his niece

III.64. They are brother's children; their fathers, II.37 and II.32 are brothers.

Of the children of III.46 and III.64 the three youngest died at an early age. Of the three children who grew to be adults the second IV.39 suffered from manic-depressive psychosis, was treated many times in a clinic, and finally committed suicide; the third, IV.41, has the manic-depressive constitution.

IV.39 is thus the probandus in our second case. Her psychosis is also not the pure manic-depressive psychosis, but shows also characteristics of dementia praecox. The study of heredity also here enables us to understand the psychosis as a combined psychosis.

The father, III.46, is a brother of the father of probandus; thus the grandmother on the father's side was II.18, who suffered from the manic-depressive psychosis, and the grandfather was II.37, who suffered from vecordia (paranoia).

The mother, III.64, is a nervous, proud, more or less narrow-minded woman. Her brother and sisters, III.70; III.64, and III.67, show schizoid features. The grandfather II.32, on the mother's side of IV.39 is, as stated, a brother of the grandfather on the father's side (of IV.39).

On the father's side we find among the ancestors of IV.39 the manic-depressive psychosis, the schizoid personality and vecordia (paranoia), on the mother's side a second time schizoid features and vecordia.

Both cases of psychoses quoted here show in the first place the significance of heredity in general; we see in four successive generations the manic-depressive psychosis appear; we see also the heredity of dementia praecox.

In the second place, and that was the subject of my paper, the significance is proved of the study of heredity for an insight into the construction of psychoses; hence we see the quoted cases as examples of combined psychoses.

REMARKS ON THE EXPLANATION OF HETEROSIS

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It is well known that the phenomenon of heterosis, or luxuriance, of hybrids, which occurs more especially in hybrids of the first generation, is generally explained by the Mendelian theory, and by the hypothesis that the factors of the favorable characters (or merely the more energetic factors) are more or less completely dominant, and the factors of the unfavorable characters (or the less energetic factors) recessive. Considering that, as far as the factors determining the differential characters of the parents are concerned, the hybrids of the first generation are heterozygous, it follows that in the hybrids of the first generation we shall have for each character the manifestation of the more favorable or more energetic factors. The consequent heterosis will therefore be attenuated in the second generation to an extent in keeping with the reduction of the percentage of the heterozygous individuals.

So far the theory is consistent. But it ceases to be so when it goes on to assert that the attenuation of heterosis should be progressively intensified in the successive generations.

An example will serve to illustrate this point. In the example taken I will suppose that the character is determined by several factors, of which some at least are contained in the same chromosome, and are therefore linked together in heredity, in conformity with the hypothesis to which it has been considered advisable to have recourse in the latest statement of the theory under examination. For the sake of simplicity I will only consider the case in which the character factors are two, and both contained in a single chromosome, but the argument holds good if the factors considered are more numerous and if, instead of being contained in one chromosome, they are distributed over several chromosomes, which, according to the Mendelian theory, segregate one independently from the other.

Let us, then, take an individual containing in the chromosome under consideration, two factors which we will designate by the figures 1 and 3, in a homozygous state; and let us suppose that it crossed with another individual whose chromosome, also in a homozygous state, contains, instead, the factors 2 and 4. Let us further suppose that factors 1 and 2 determine in the

character an intensity equal to 2 and the factors 2 and 4 determine an intensity equal to 3. And let factor 1 be more energetic than factor 2, and therefore dominant, and factor 4 be more energetic than factor 3 and therefore dominant.

The hybrid of the first generation, which will contain in its chromosome, in a heterozygous condition, factors 1, 2, 3, and 4, will therefore present an intensity of character superior to that of each of its homozygous parents; equal, for instance, to 5 instead of to 2 or 3. Of the hybrids of the second generation, one-half will have the same genetic formula as the hybrids of the first generation, and therefore an intensity of character equal to 5, and the other half will be divided in equal parts between homozygous individuals belonging to the type of the other having an intensity of character equal to 3.

It follows that, in hybrids of the second generation, the superiority possessed by the hybrids of the first generation in the matter of intensity of characters will necessarily be reduced 50 per cent.

And here let me quote the words of Dr. East and Dr. Jones, to the latter of whom, if I am not mistaken, we owe the theory in question in the form above set forth, which is generally accepted; "The extra growth derived by crossing the two different types has diminished 50 per cent. In the third generation, from a representative sample of the second generation, it can be shown that this excess again diminishes 50 per cent, so that the effect in the average is only 25 per cent as great in this generation as in the first, and so on in subsequent generations, until the effect diminishes to a negligible quantity in about the eighth generation. This is in fair agreement with the actual results obtained by inbreeding maize, as it ought to be, because the development attained by each individual varies directly with the number of heterozygous factors."¹

Now, as I have already had occasion to remark,² the progressive diminution, after the second generation of hybrids, of the heterosis noted in the first generation is not really at all in keeping with the theory above set forth. It seems indeed quite likely that this assertion is due to some misunderstanding or to an arithmetical error.

It is, indeed, easy to see that, if in the second generation we have 50 per cent of heterozygous individuals, and 25 per cent of homozygous individuals

¹ E. M. East and D. F. Jones: *Inbreeding and outbreeding—Their genetic and sociological significance.* (J. B. Lippincott, Philadelphia and London, 1919.)

² Cfr. Corrado Gini: *Nascita, Evoluzione e Morte delle Nazioni* (Libreria del Littorio, Rome, 1930). Pp. 101–102, and Corrado Gini, Shiroshi Nasu, Oliver E. Baker and Robert R. Kuczynsky: *Population* (The University of Chicago Press, Chicago, Ill., 1932).

or the type of each of the parent, these ratios will persist in all the successive generations if the matings of the individuals are left to chance, and do not differ systematically as regards fertility.

If, instead, the matings were not left to chance, naturally the results would be different. In the above example, according to the way in which couples are mated, proportions of heterozygous varying between 75 and 25 per cent can be obtained in the third generation, it being always understood that the different matings do not differ systematically as to fertility. In the case of self-fertilization, just the lowest proportion of 25 per cent of heterozygous would be obtained in the third generation, and the percentages in the successive generations would diminish, in that case, in geometrical progression at the ratio 1:2, exactly as it is admitted in the above illustration of the theory of East and Jones.³

It is scarcely necessary to point out that the hypothesis of self-fertilization can materialize only in a limited number of cases (bisexual species which are not self-sterile). On the other hand, the point of particular interest to explain is the progressive diminution of heterosis when hybrids reproduce by chance mating to which natural conditions approach.

We are therefore forced to the conclusion that the above stated theory, while affording an excellent explanation of the heterosis of the first generation of hybrids, and leading us to expect a 50 per cent reduction from the first to the second generation, would lead us to expect that, by chance mating, there would be no further reduction in the following generations. Then, granted that on the contrary this reduction does occur, we must conclude that the above explanation is insufficient, and that it must either be completed by an additional explanation or replaced by another more in keeping with the facts.

It would appear also, that a 50 per cent reduction of heterosis from the first to the second generation of hybrids is not always in keeping with experience, so that also from this side, the theory is not always confirmed by facts.

In order to explain the discrepancies referred to, between theory and experience, one might turn to the hypothesis of multiple factors. In that connection it should be clearly distinguished, between the hypothesis of

³ It is possible that, in the illustration of their theory, East and Jones had just this particular case in mind as regards the reproduction of the generations following the second one, whereas, concerning the second generation (for which it makes no difference whether it be obtained by self-fertilization or by chance mating), they considered that it was obtained "by selfing or by interbreeding individuals of the first generation."

polymeria and that of *polyploidy*.⁴ It is easy to convince oneself that the hypothesis of *polymeria* could explain a somewhat less important diminution than 50 per cent, from the first to the second generation, but it could not explain, in the case of chance mating, a diminution of heterosis beyond the second generation. *Polyploidy* is, instead, a fit hypothesis to explain satisfactorily the fact that, from the first to the second generation, the diminution of heterosis is less than 50 per cent as well as the progressive diminution, in the case of chance mating, of heterosis in the generations following the second one.

I think that these considerations deserve the particular attention of eugenists, as it is well known that numerous human characters are determined by multiple factors. Moreover, it is not improbable that the human species is still at present, or was originally, *polyploid*.⁵

It will be worth while to revert with greater details to this subject.⁶

⁴ Concerning the correct distinction between these two hypotheses, I may refer to my paper: "Considerazioni sull'eredità mendeliana nelle forme poliploidi," which was submitted to the Second Italian Congress of Genetics and Eugenics, held in Rome from September 30, to October 2, 1929.

⁵ Cfr. the paper mentioned in the preceding note.

⁶ I will revert to it in an article entitled: *Considerazioni sul Poliploidismo*, written in collaboration with Dr. Castellano, to be published shortly in "Genus," the Journal of the Italian Committee for the study of Population Problems.

SOME RESULTS OF A FAMILY HISTORY STUDY

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One branch of Eugenics concerns human heredity. The author has studied his relatives with a view of collecting measurable traits which could be analyzed genetically. These traits, which include height, weight, arm and leg dimensions, eye and hair color, finger and palm prints and various other characteristics have been described and the descriptive sheets bound as one unit. This collection will serve as the data for several future studies, e.g., the heredity of body dimensions, of head and face measurements, of finger, palm and sole print patterns. These studies will commence as soon as additional standards are prepared for comparison.

At present several small studies have been completed, some of which have already been published. The completed studies are described briefly as follows:

Physical Measurements on Dutch Men and Women. *American Journal of Physical Anthropology*, vol. 16, no. 3, pp 309-337. In this study appear the distributions, means, and statistical analysis of 40 physical measurements for 70 adult males and 60 adult females. Some of the essential measurements on the males are given in table 1 along with some comparable material. These data show that the stature of the Dutch measured is equal statistically to the statures of Old Americans, Fehmaraners, and Icelanders. Sitting height, likewise, is about equal for those mentioned. For some of the other measurements differences occur which may be racial or possibly due to differences in technique. These Dutch are mesocephalic, the cephalic index being 79.30 for the males. The relative sitting height for males was 52.28 which was approximately 1 per cent more than that found for Jamaica Negroes and 1 per cent less than that found for Maya Indians. These differences are statistically significant. Attention is called to the other comparisons shown in the data listed above.

A smaller, and perhaps less significant, study made from data found in the family history deals with the size of the families, sex ratio in the various branches of the family and birthweights in 12 families.

There were 115 families in this study from which no more children could be expected, judging from the age of the mother. The figures are given in

table 2. Thus the average number of offspring per family equals 5.1, the males exceeding the females by 36, which if expressed on the basis of 100, equals 113 males to 100 females.

TABLE 1

	DUTCH MALES, PRESENT STUDY	OLD AMERICANS, HRDLICKA	FEHMAR- ANERS, SALLER	ICELANDERS, HANNESSON
Measurement.....	Mean and P.E.	Mean	Mean	Mean
Stature.....	173.15 \pm .58	174.32	173.60	173.48
Sitting height.....	91.27 \pm .31	91.80	90.10	91.57
Span.....	178.89 \pm .62	179.20	182.00	180.68
Head length.....	192.64 \pm .56	197.60	188.90	197.30
Head breadth.....	152.50 \pm .54	154.50	161.80	154.10
Cephalic index.....	79.30 \pm .31	77.95	83.60	78.13

Dutch males compared with Negroes and Indians

	DUTCH WHITES	JAMAICA NEGROES	MAYA INDIANS
Relative sitting height.....	52.28 \pm .10	51.46 \pm .14	53.02 \pm .11
Relative span.....	103.28 \pm .21	106.16 \pm .26	104.65 \pm .18
Relative chest girth.....	53.40 \pm .30	49.95 \pm .27	56.06 \pm .18
Cephalic index.....	79.30 \pm .31	77.38 \pm .35	85.01 \pm .22

TABLE 2

BRANCH OF FAMILY	NUMBER OF FRATERNITIES	NUMBER OF OFFSPRING			AVERAGE PER FRATERNITY
		Male	Female	Total	
S	20	40	46	86	4.3
R	25	55	47	102	4.1
T	5	19	11	30	6.0
V	38	113	101	214	5.6
D	16	49	32	81	5.1
K	11	33	36	69	6.3
Total.....	115	309	273	582	5.1

Excess of males: 113 males to 100 females.

The average birthweight of 48 children, representing 12 families was found to be 8.3 pounds (see table 3). The males considered by themselves were found to average 8.6 pounds and the females 7.3 pounds. The aver-

age weight for each family is given. Note family No. 4 in which the average weight of 5 children was 11.3 pounds. Family No. 3 likewise has very heavy children at birth, inasmuch as these 7 children averaged 9 pounds each. The value of these data lies in the fact that average birth-weight of brothers and sisters is given in addition to the more common weighted average for all the individuals. This weighted average is of more interest, however, than those generally found, since all of these 48 individuals are from a homogenous stock.

The inheritance of various traits is shown in a series of pedigree studies. (See fig. 1.) First, one pertaining to the inheritance of eye color. The eye color was determined by comparison with Martin's Augenfarbentafel. The

TABLE 3

NUMBER	NUMBER IN FRATERNITY	RANGE IN BIRTH WEIGHT	AVERAGE BIRTH WEIGHT
		<i>pounds</i>	
1	6	5 -10	7.8
2	4	6 - 7	6.4
3	7	7 -11	9.0
4	5	9 -13	11.3
5	3	3 -10	7.0
6	5	8 -10	8.6
7	2	5 - 6	5.5
8	5	5 - 9	7.4
9	4	5 -10.5	8.5
10	2	8 - 9	8.5
11	2	9 -10	9.5
12	3	5 $\frac{3}{4}$ - 9 $\frac{3}{4}$	7.8
Average	4	6.3- 9.6	Weighted 8.3

pedigree bears out the fact that children of blue-eyed parents generally have blue eyes, and children of dark-eyed parents have, as a rule, dark eyes. If one parent is heterozygous for dark eyes and the other parent has blue eyes, of the offspring some may have blue eyes and some brown eyes. This study was published in the Eugenic News, vol. 15, 1930, p. 175.

In the pedigree in figure 2 is shown a family in which a definite bronchial weakness exists. Note that individual I₂ suffered often from bronchitis. Two of her children are troubled in a similar manner (II₃ and II₅); one (II₁) has asthma and the fourth (II₇) is normal. Two of the descendants of II₁ have asthma, the oldest was always in poor health because of it and died from pneumonia, after a long siege of asthma. Sensitivity to grain dust and

may fever characterize two descendants of II₃. Note also that all of the 7 children of II₇ are normal. This article appeared in the *Eugenical News*, vol. 16, 1931, p. 26-28.

That a certain tendency toward craftsmanship is carried in one line of this family is shown on the pedigree in figure 3. For 4 generations from 1720 to

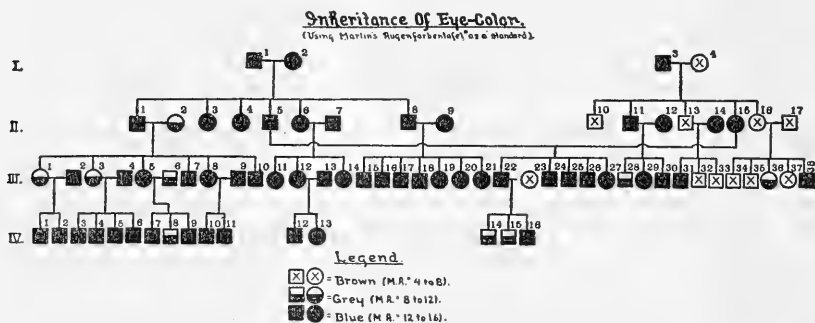


FIG. 1

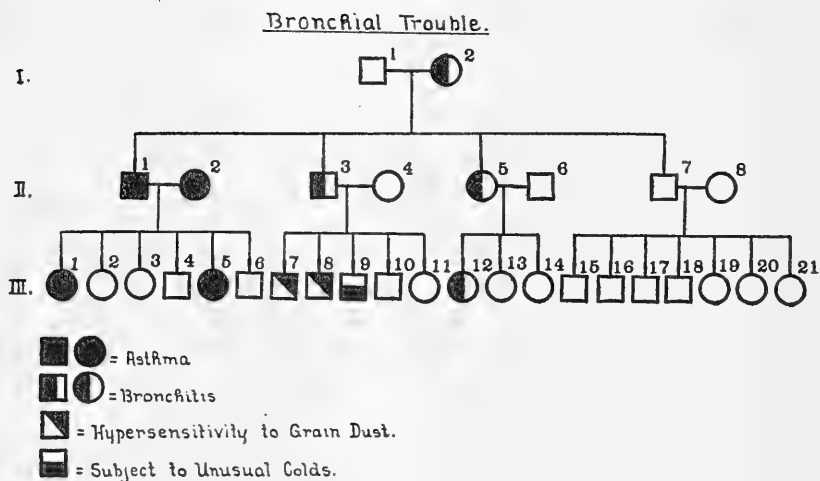


FIG. 2

1802 at least one son carried on the trade of his father, namely that of a house decorator and glass fitter. In the fifth generation there were 2 sons who worked at this trade and the third was a stone mason and a bricklayer. Of the descendants of this individual, two were skilled furniture workers and the other a mason contractor. Of the last generation many are not yet settled in their vocation but of the 12, 2 are bricklayers and 2 are tailors.

Another pedigree pertains to a family of mechanics (fig. 4). Individual I₁ constructed a flour mill which ran by water power. His son (II₃) moved

A FAMILY OF CRAFTSMEN

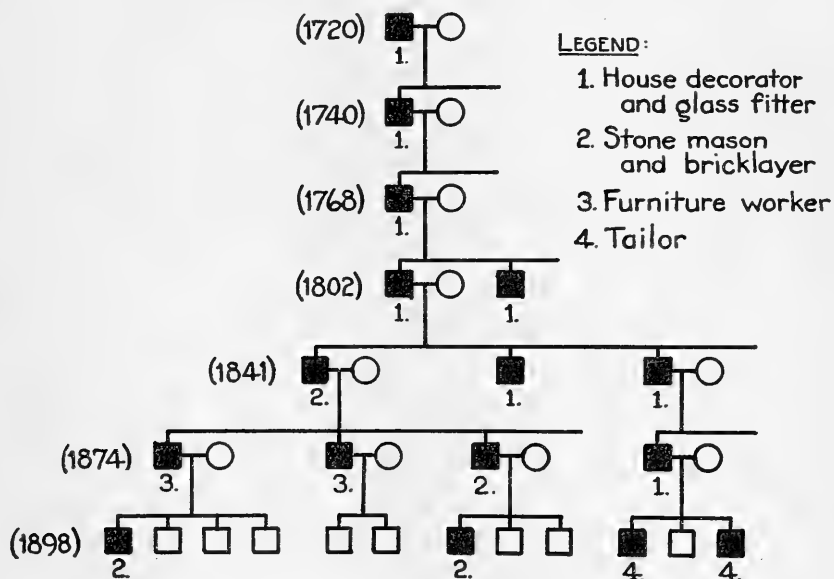


FIG. 3

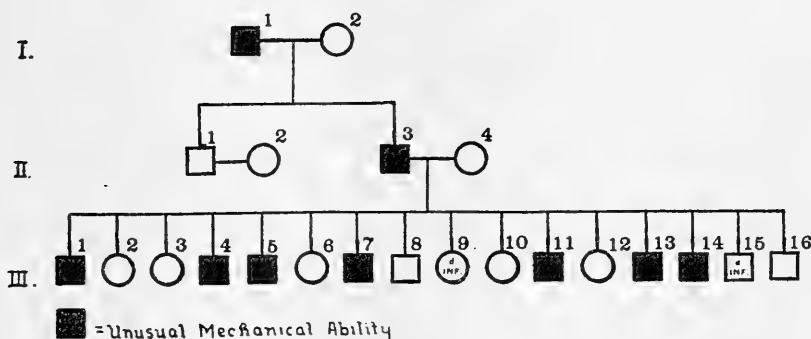


FIG. 4

to a Kansas wheat farm where he, in addition to his farm duties, carried on as a blacksmith. Of his 9 living sons, 7 have owned and operated large threshing machines. It is obvious that to operate such machinery success-

fully one must have unusual mechanical ability. See *Eugenical News*, vol. 16, No. 4, p. 58.

Another study made from these data has just been completed and is called "Finger Prints in a Dutch Family Series," written by Dr. Harold Cummins of Tulane University. There were 1130 finger prints upon each of which 3 determinations were made, e.g., pattern type, pattern size, and pattern form. The type of pattern is designated by the following terms: whorls, loops, and arches. It may be said briefly that there was a low incidence of whorls (thus increasing the percentage of loops) and a high frequency of arches. Pattern size is determined by ridge counting. Each print is then grouped into a class depending upon the number of ridges counting from a definite fixed point. This study is compared with various races. The mean ridge count is 12.23 ± 0.15 , which is slightly lower than that found for Norwegians and Hungarians. Pattern form has reference to the shape or the ratio of the breadth to the height of the pattern. It may be said that the mean form index is 67.51 ± 0.59 and that the mean form indices of the separate digits range from 85.78 ± 1.33 to 58.10 ± 0.87 . Each of these determinations is discussed at length in a paper which will be published in the *American Journal of Physiological Anthropology*.

Thus from these completed studies one learns the value of family histories, provided the data are gathered with scientific problems in mind. However, their greatest value will appear in 50 or 100 years when more generations will have been similarly studied, thus making it possible to analyze the data over a longer period of time.

SEX-RATIO OF NEW-BORN INFANTS, AS AN INDEX OF VITALITY

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1. Starting point in the analysis of the various Sex-Ratios of new-born infants (SRi) is the thesis formulated in its clear form, firstly by Rauber (1900): the greater the number of abortions and stillbirths in a given group, the lesser the predominance of boys among new-born infants.

2. This thesis is based on the well known fact of greater mortality of boys in the intrauterine period, the younger the foetus the greater the mortality. The true SR (SR of all embryos at an early period) must therefore be much higher than it is at birth (104–106).

3. The exact value of the true SR can only be determined approximately. According to a detailed table by G. von Mayr the SR of stillborn infants which undoubtedly include a great number of immature foetuses from seven to nine months varies in different countries from 120 to 140 and gives an average of about 130. In miscarriages of from four to seven months which except in rare cases are undoubtedly involuntary and must be considered as cases of mortality, the SR averages $160 \div 156$ according to Budapest (Auerbach) statistics, 162 in accordance with a compilation from all available sources drawn up by Prinzing. For the younger embryos no reliable data is at hand because during the first seven weeks the sex of an embryo is undetermined. At the age of eight to eleven weeks sex may be determined microscopically and from the twelfth week macroscopically, although only in especially favourable cases, most embryos being seriously damaged by the abortive operation. My own, as yet insufficient material concerning the embryos of third months obtained from voluntary abortions which are the only ones able to give an idea concerning the true SR does not coincide with the high SR given by Berthillon (400) and Tshuprov (700). But the figure of Auerbach (124) is perhaps too low. The estimation of the SR being so uncertain we can hardly lay much stress upon the various theories concerning the numerical inequality of sexes (the theory of selective fertilization, etc.), the more so as there are many mammals where the male sex does not predominate at birth, or is even less numerous.

4. The knowledge of the true SR is of great significance for the whole

problem. But whatever the true SR may be in view of the above stated male overmortality an increase of the per cent of stillbirths and abortions in a given group must inevitably decrease the SRi. Simple calculation shows that if the per cent abortions increase from 0 to 8 and to 16 or if the per cent of dead male foetuses increase from 0 to 4.9 and 8.9 the SR of the remaining foetuses in a given group must decrease the initial value (let it equal 125) by 3 units in the first case and by 6 units in the second case. The variation of about 6 units is large enough to explain the fluctuations of the SRi with which we are dealing. If the true SR were exactly known we could decide whether the variations of the SRi are a mere consequence of a single cause of varying prenatal mortality or whether in addition we ought to give consideration to the variability of the male overmortality itself which may diminish the SRi from 115 to 102 when the per cent of overmortality increases from 2 to 5. At the present time I see no objection to the assumption that the first principle, the variation of the prenatal mortality in general, is of far greater importance.

5. But are the variations of early mortality in reality great enough to justify this assumption? An examination of statistical works in this field confirms this fully. The per cent of stillborn infants varies in different countries from 2 to 6 (G. v. Mayr). The percentage of abortions ranges from 9 to 17 (Prinzing) but this number is undoubtedly much greater in the early period when the abortions remain unregistered and are even frequently not noticed by women.

6. Thus as percentage variations of abortions and stillbirths are really very great and as they perhaps together with the variations of the male overmortality must inevitably lead to variations in the SRi all other factors which have any connection with the SRi have it only indirectly thereby influencing the prenatal mortality. If the SRi is lower in groups of greater natality, among illegitimate children, older mothers, in urban districts (as compared with rural districts), among the poor classes (as compared with the well-to-do groups), in the period of peace (as compared with after-war and famine times), in certain epochs and nations,—we may conclude that all these factors increase the percentage of prenatal deaths and therefore decrease the SRi. The presumption of a higher mortality in all the above mentioned groups is fully confirmed by statistical investigations made by Lehnhossek, Firks, Manschke, Heape, Tshuprov, Holmes, Hartmann and others.

7. However it would be a mistake to attempt to generalize on the meaning of the above enumerated factors. As the conditions influencing prenatal mortality are not the same in different analogous groups it is utterly fruitless to discuss whether it be rural or urban population, race crossing or normal

matings, etc., which give the higher SRi. In the Russian population for example many rural districts show a lower SRi than the urban population does, contrary to what is known in Western Europe:¹ The northern region: rural district 106, urban 110; Black Soil Region 106 and 108; the Viatka Section 105 and 108; Republic of White Russia 106 and 109. Many regions register no difference in SRi between urban and rural populations. This fact is fully comprehensible if we bear in mind that the percentage of natural abortions is higher in many rural communities than in the urban ones. Perhaps this is due to the unfavourable influence of the frequent pregnancies of women and lack of care. Bogaslovsky's statistics confirm this supposition.

8. All these facts enable us to understand the SRi as a suitable measure of prenatal mortality, perhaps not very exact, but nevertheless very useful, since all direct research in this field is inevitably very unsatisfactory. In other words we may use the SRi as an index of prenatal vitality: the greater the SRi the lower the prenatal mortality.

9. A given value of SRi may have an entirely different meaning. An index below the average (104-106) can be provoked: (1) by the *reproductive system*, such for instance as frequent pregnancies and therefore numerous abortions which are very characteristic for many groups of high natality; (2) by *pathological conditions* such as syphilis which increases prenatal mortality; (3) by *physiological predisposition*, which we may confirm when the two former factors are excluded. Analogous types can be established among groups of high SRi.

A constitutional type of lower prenatal vitality seems to me to be characteristic of many North-Siberian native tribes although there are certain tribes which register a very high SR. In general a low SRi is characteristic of tribes which show no increase in number of recent years. Although the data are not extensive, they embrace the greater part of the given tribe² (table 1).

10. The relation between prenatal and postnatal infant mortality is not always the same. Since this involves many complex factors, a calculation of the coefficient of correlation between the SRi and the index of infant mortality is useless. Combining the extreme values of the indices we may distinguish two types: if a low SRi is accompanied by a low index of infant mortality we may conclude that the prenatal mortality is especially selective and by eliminating weaker foetuses it decreases later infant mortality. But I was unable to find an example of this kind in the available statistics.

¹ Administration Centrale de Statistique de l'U. R. S. S. Mouvement de la Population en 1926.

² Administration Statistique Centrale. Recensement des Menages du Nord Polaire de l'URSS 1926-27.

In many cases the low SRi is accompanied by a high infant mortality and in such cases we have to do with a general predisposition (of an endo or exogene nature) manifesting itself more or less equally in both prenatal and early postnatal periods. Tendencies of this kind may be found in many Finn groups of the U. S. S. R. Md = the number of infants dead under one year per 100 born in this year (1927), SRd = SR of dead infants (data of Statistical Administration of the U. S. S. R., calculated by me) (table 2).

TABLE 1

TRIBES	NUMBER OF BIRTHS IN 1925-26	SRi
Chukchee.....	432	96.4
Koryaks.....	249	96.0
Lamuts.....	114	91.0
Yakuts.....	249	99.4
Tungus.....	548	125.0
Samoyedes.....	1,089	111.4
Voguls.....	512	91.8
Ostyaks.....	1,096	102.2

TABLE 2

TRIBES	SRi	Md	SRd
Komi-Zyzyans.....	104.4	34.7	111.4
Permyaks.....	99.2	36.4	109.7
Votyaks.....	105.0	21.9	109.7
Mari.....	104.0	38.8	109.0
Mordva.....	104.0	27.2	113.0
Chuvash.....	104.8	21.2	109.7
Russians in general.....	105.4	21.9	111.5
Ukrainians.....	106.4	15.0	121.0
White Russians.....	106.1	10.0	122.0
Jews.....	108.4	5.4	118.0

11. A low SR if accompanied by high infant mortality is in most cases also accompanied by a low SR of infants dying under one year for the lesser vigor of the male sex manifests itself most clearly when the general level of mortality is not high (Holmes, Schirmer) and the SR decreases when infant mortality rises.

12. These facts permit us to consider the SRi as an index of vitality not only in the prenatal period but also to a certain degree in the early period

of life in general. Owing to the complexity of factors here involved the average values of SR_i are of little value but every instance of a low or high SR_i merits our attention. The aim of the present contribution is not to generalise but on the contrary to differentiate the important data furnished by a study of SR_i which enables us to deepen the study of the important phenomena in the biology of man.

BLOODGROUPS AND INBREEDING

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The nearly 8 millions populating the small country of the Netherlands are for the greater part of mixed origin. It is generally accepted that since the last arctic period invasions from the south and the north, in much later time from the east, intermixed in this small area of western Europe. The rare types of pure nordic race are still to be found in the northwestern part of the country (province of Friesland) and along the western coast, the purest alpine types in the southern provinces (especially in the east part of the province of Zeeland and the western part of the province of Brabant). Taking into account that already in prehistoric time, the original settlers themselves have been partially of mixed race and adding these chances of intercrossing in the invaded country—one understands that the Netherlands population is for the greater part of mixed alpine and nordic type. By later invasions Saxons and Franks came from the side of Germany, the former importing new mixed elements among which possibly the East-baltic type. The mixture with east-asiatic elements (Malayan from the colonies) in the last three centuries is not to be neglected, neither the increasing mixture with Jews during the last century, though these numbers are very small, compared with the entire population.

In 1925 an anthropological commission of the Royal Academy of Science resolved to collect anthropological data and promote the anthropological knowledge about the Dutch population. A section for bloodgroup research forming part of this Commission intended to investigate the mean percentage of the four known blood groups in the Netherlands and to test by local research if there were to be found correlations between the distribution of bloodgroups and other anthropological traits; especially testing if the percentage of groups *A* and *B* showed difference in groups of nordic and alpine dominance.

The work has been centralised during 5 years in our laboratory. All the agglutination tests have been performed in duplicate by the same two experts. The blood drops have been collected by physicians and medical students. The results of the agglutination proofs were noted independently from the other anthropological data. The data are copied on individual

cards for each person investigated. In several rural places we met in the population a certain resistance on religious or other grounds to sacrifice a simple drop of blood. Moreover the collaboration of the authorities is often insufficient. This is the reason why many interesting places had to be abandoned and why we need years of work for the same material which can be collected in our Dutch Indian Colonies during a couple of months.

Figure 1 gives an idea of the bloodgroup distribution of two groups of persons resorting from the entire country. The difference in the percentage of bloodgroup *B*, the group which especially calls our attention, has to be attributed to a greater intermingling in the student material with foreign elements. Not less than 50 per cent of these students from the different universities had one or more ascendants in foreign countries; most of them in France (*émigrés* and *refugiés*) and in Germany.¹ In the more sessile population, to which the greater part of the investigated prisoners belongs, such international relations fail.

It never will be possible, as shall appear afterwards, to establish the exact mean percentage of bloodgroup *B* in the Netherland population as a whole. Still one may say that 9.6 per cent of bloodgroup *B* would be rather high, taking into consideration the rough result of more than 30,000 persons tested in the whole country.

Considering the results obtained in different provinces, it can be established that the mean percentage of bloodgroup *B* in the southern part of the province of Limburg, the province of Zeeland and the western part of Brabant—thus, generally speaking, in the southern provinces—is slightly higher than in the northern provinces, where more nordic mixture prevails. Still it has to be kept in mind, that the nordic race spread from Friesland along the sea-coast to the Zeeland-isles. It would be an easy hypothesis to attribute the relative high percentage of *B* in the province of Zeeland together with the dark pigmentation to a Mediterranean influence (Spanish war 16th–17th century), if this hypothesis had not been rejected by anthropologists of high standing. One has to keep in mind that already in prehistorical times a southern stream of darkhaired alpine and mixed type may have invaded this part of our country.²

Particularly the results of our rural local investigations give me reason

¹ In the bloodgroup investigations amongst students (Proc. Royal Acad. Sc., vol. 33, 1930), it has been stated that there exists no correlation between bloodgroups and other anthropological traits (head index, eye colour, hair colour), when taking into account the probable error. The same has recently been stated in one of our local investigations (Proc. Acad. Sc., vol. 35, 1932).

² W. Scheidt, 1930, *Zeitschr. f. Morph. und Anthr.*, vol. 28.

to bring bloodgroups in relation to eugenics. A phenomenon, which one might expect in isolated valleys of a mountainland proves to exist in a country like the Netherlands where country villages are only separated by meadows and ditches. This is the phenomenon of inbreeding continuing during centuries, which will be disturbed ere long by the modern traffic and by modern ideas. There still actually exist quite neighbouring places where people never intermix outside the community. We find some places scattered in different provinces, known by Dutchmen as well as by strangers on

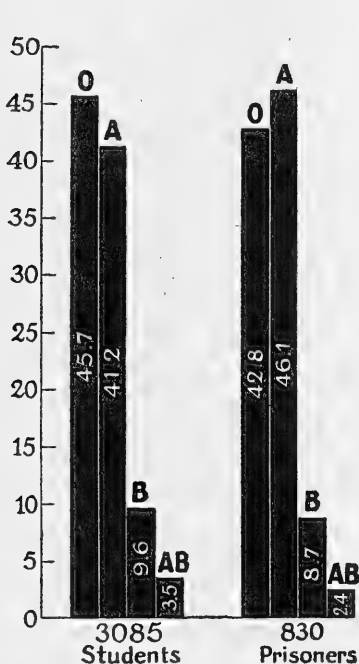


FIG. 1

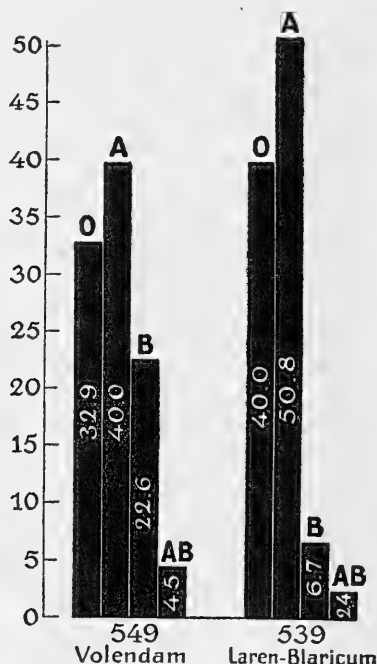


FIG. 2

account of their extremely original character.³ There are other ones where this process of inbreeding has been hardly noted by outsiders, till suddenly it comes to light by the bloodgroup investigations.

When a small group of people belonging to the same race or mixture of races settles in a colony, never intermarrying with the neighbourhood, it will partly depend upon the original distribution of the bloodgroup percentages which result we find on a given moment, might it be centuries later. A set

³ Local difference in stature, physiognomy, in behaviour; sometimes even in dress.

of people settling with an extreme low percentage of *B* might still manifest this phenomenon now-a-days. Theoretically it is even possible that complete extinction of the few carriers of group *B* finally gives rise to a population where only group *A* and group *O* are found. On the other side, selection might also go into the opposite direction and by frequent marriages of group *B* with *O* mutually it would be possible to surpass neighbouring places as to the percentage of *B*. Still another possibility is the immigration of a

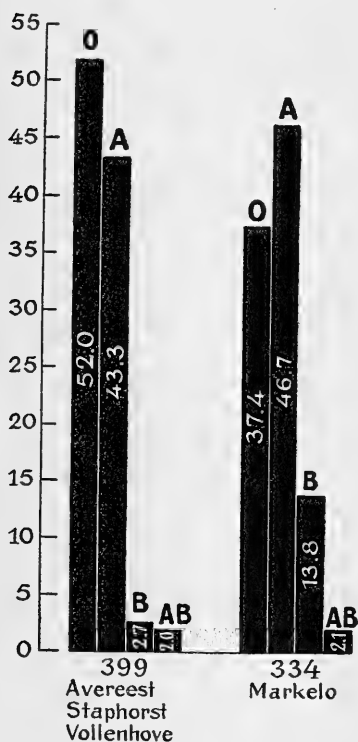


FIG. 3



FIG. 4

foreigner belonging to group *B* in a farther inbreeding population nearly lacking *B*. In one case we have been able to trace such an immigrant, who had brought two centuries ago this hereditary biochemical trait of the blood into a village, spreading it in all directions on the following generations.

It is interesting to consider from these points of view the following columns representing the different distribution of bloodgroups in quite neighbouring rural places. We are wont to consider a high percentage of group

B as a sign of east-European and Asiatic origin. But in our small fishertown of Volendam (fig. 2) situated at the Zuiderzee, so well known to strangers by its typical population, not less than 22 per cent of the inhabitants belong to bloodgroup *B* (random population). Another small inbreeding place in the province of Zeeland, Westkapelle has 18 per cent *B*, percentages as we really find them in the east-European population. Compare herewith the low percentage *B* of many other inbreeding communities.

The columns next to Volendam (fig. 2) represent the distribution of blood-groups in neighbouring communities in the same province, the percentage of group *B* amounting only to 6.7 per cent. Figure 3 gives an idea of the different percentage of group *B* in inbreeding communities in one of our eastern provinces (province of Overijssel). Figure 4 represents the bloodgroup distribution in a rural community of the province of South Holland compared with its surrounding places.

It will be seen by further publications that our entire material collected in the last 5 years points to the existence of considerable local variations as to the bloodgroup distribution in our rural districts. Inter-marriage during centuries has created local populations, genetically different as a whole from neighbouring populations. This is often reflected in the bloodgroups. *Haemagglutinogenes* are hereditary factors. When testing the bloodgroups of inbreeding communities one may draw the conclusion that an unequal distribution of other normal and abnormal traits exists in such neighbouring rural places. It is not only tradition, but also hereditary difference which gives a typical stamp to each of these small populations.

IS EUGENICS HALF-BAKED?

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The idea which I am attempting to present, under this perhaps questionable title, has proved hard to formulate. Nevertheless, it seems important enough to make the attempt. I trust that I may succeed in delivering it, intangible as it is, in a form that will prove convincing to others. Dr. Muller has ably discussed some of the economic difficulties that lie in the way of a eugenic program. The point that I hope to make clear is that other elements much more intangible than the economic factors are of at least as great importance.

The title was suggested by the expressed and implied view encountered rather often in semi-, quasi-, and non-scientific discussions of eugenics that the whole idea of modifying the inborn qualities of the race is, or borders on being, "half-baked." Where there is so much smoke, there must be a modicum of combustible material, and I have tried to formulate some of the reasons for this. My reasons for considering the present situation of eugenics unsatisfactory are based on the following facts:

(1) To afford the slightest hope of an effective program of eugenic reform in a democracy, eugenics must number its enthusiastic disciples at least by the tens, and perhaps by the hundreds of thousands.

(2) The enrollment of the Third International Eugenics Congress is less than one thousand. (391 Editor's note.) The total enrollment of all the existing societies devoted to furthering a eugenic program is probably less than ten thousand. This is certainly not one tenth of one per cent of the enrollment necessary to make really effective progress even a remote possibility.

(3) This situation exists in spite of the fact that general acceptance of existing theological creeds is much less enthusiastic today than at any time in history, and that whether scientists like it or not, science is being drafted as a new theology.

(4) It will be agreed, I believe, that man is essentially a religious creature who has a deep-seated craving for "causes" that are intellectually and emotionally satisfying. He is not being given a theological diet containing the necessary intellectual vitamins by the existing creeds. He is hungry for

such a diet and some of the most important elements of it are an essential part of a sound eugenic program.

(5) The unsatisfactory nature of the existing credal pabulum is reflected in the amazing growth of various religious and semi-religious cults. It is not intended either to bracket eugenics with these cults or to imply that we would find a very large proportion of desirable eugenic converts among their membership. We may, nevertheless, give serious thought to the disconcerting fact that in the face of the obvious absurdity of most of their tenets, many of these cults flourish luxuriously in an alleged "age of science." Their amazing popularity opens to them both free and paid means of publicity so that they are able to take an active hand in moulding public opinion.

In contrast with this, we have the picture of World eugenics so inadequately supported and financed that it cannot, at present, be considered to be a significant element in human affairs.

The easiest way to dispose of this paradox is to shrug one's shoulders and to say "What of it? Since Barnum's day the rate of reproduction of those who delight to be fooled has risen to *several* per minute."

If we are certain that this view correctly summarizes the situation, nothing more need be said, but I am by no means sure that this is the whole story.

That brilliant expositor of a certain kind of ideas, the late Elbert Hubbard, dramatized with his pen, an incident in the Spanish-American War—the carrying of the Message to Garcia. Is it possible that the fine points of message-carrying are an art that has special significance to us?

Whether Garcia is a general hidden in the jungles of Cuba or a judge in his library after dinner, the delivery of an effective message to him has certain indispensable elements. First, we must know what we want to tell him; second, we must discover where Garcia is; third, the message must be in a language that he can understand; fourth, the message must be delivered to him; fifth, it must be presented with tact and courtesy; and sixth, the message must be, or seem to him to be, so important that he will get emotional satisfaction out of doing something about it.

There are all kinds of Garcias and all kinds of messages. Also there is an almost endless variety of ways of getting the message garbeled. Of the six elements of a successfully delivered message, some items are of much more importance than others. The cults before mentioned teach us, if they teach nothing else, that if properly presented, the message itself may be the most arrant absurdity. If it is presented in a convincing jargon and coated with the right kind of emotional sugar, an amazing number of Garcias can be found willing to expend much blood and treasure in acting on the message

they receive. On the other hand, though the message we bear may be of the utmost interest and importance, if the messenger introduces himself by slapping Mr. Garcia in the face, both the message and the messenger may very well find themselves in the street. Furthermore, if Mr. Garcia happens to be a Spanish gentleman, it is quite likely that he will not get much inspiration out of a dispatch delivered to him in impeccable Chinese.

This does not, by any means represent a complete résumé of the possibilities of garbling in transit the messages of men and of angels. It gives us, however, ample food for thought in the time available. What in the way of message-deliverers have we eugenicists proved ourselves to be?

In the matter of intelligibility of our language, in lucidity of interpretation, I question whether eugenics and eugenists have even come within hailing distance of Mr. Garcia. People do not get very much stirred up about something they have no comprehension of. Eugenics differs from the cults in being rather over-burdened with an array of facts that, due to a number of causes, are often made to appear somewhat conflicting. It is a consolation that eugenics does not need to stoop to "propaganda," the building up of a half-truth or no truth at all, by ballyhoo and suggestion, until it looks like an Eleventh Commandment. Nevertheless this does not absolve us from giving most earnest thought to an intelligent presentation of the facts on which we base our views. At the present time, more than it needs additional research, eugenics needs lucid interpretation, even in words of one syllable. The whole basis of genetic research and of eugenic application is, after all, contained in the simple scriptural adage, "By their fruits shall ye know them." It was the more or less unconscious application of this principle, that gave us our domesticated plants and animals long before Mendel was born. There is nothing especially complicated in the concept of the progeny test. It is only a step beyond this to the basic concepts of genes, segregation, etc. I submit that as far as these basic facts are concerned, there is essential unity of mind on the part of all geneticists and eugenists. Speculation on such matters as the ultimate philosophical implications of the structure of genes and of the possibility of altering them at some future time does not enter. If we ever do reach the point where we can make defective genes over, there will be plenty of them to work on. To borrow experience from another field, typhoid and diphtheria immunization have been widely and successfully adopted. Our ignorance regarding the mechanism of immunization is almost as profound as our ignorance of gene structure. The use of sera and antitoxins is purely a pragmatic affair: they work. Physicians let them work while they fight about *how*. We must do the same with genes if eugenics is not to prove a tragic might-have-been.

In a moment, I wish to comment on questionable features of the stock-breeding analogy, but in one respect it is excellent. The differences in existing breeds were brought about long before Mendel was born. They could be maintained if every genetic text were burned. Is there any sense at all in giving lay writers and the lay public the absurd idea that present genetic concepts have gotten so complicated that eugenic progress is impossible? Present genetic concepts have had absolutely no effect in producing the existing breeds and varieties of plants and animals. To say that their increasing complexity has any serious bearing on the possibility of improving the inborn qualities of the human race is just as sensible as to say that the increasingly muddled state of the science of immunology has any connection with the problem of whether diphtheria antitoxin should be given to a child exposed to that dread disease.

The basic elements of Mendelism, unit characters, segregation, etc., do make faster progress possible. But this message is still undelivered. A man recently complained to me that he could not understand why the full-brother of an outstanding racehorse was not just as good as his distinguished sib. If the man had been a barber, playing the races occasionally, the incident would not have been significant. Rather disconcertingly, he was a man of more than average intelligence and he had been breeding race horses for years! Something seems to have gone wrong with the first sentence of our message to Garcia.

Eugenics, as suggested before, will remain a futile fad until it has its hundreds of thousands of convinced and enthusiastic supporters. When those who are actually engaged in breeding, though only as a hobby, have not received even the first paragraph of the message, how can we even dare hope that the necessary popular support will ever be forthcoming?

Another most important factor is the emotional effect of our message upon the recipient. It is here that the technique of cultists and of eugenists differs most greatly. Dr. Hukum, the apostle of a nothing-in-particular drones out meaningless phrases sonorously, and if we don't look too closely, convincingly. They have an extremely comforting sound, and before he knows it our friend Garcia is convinced, or thinks he is convinced, which is all the same thing. Nothing is brought up that would put him in a "mental state." Not so, alas, the eugenist. A case in point is the stock breeding concept of human racial improvement as it has been used as a text more than once. There is not the slightest question that this analogy can and does produce very violent counter-reactions on the part of a great many people. Furthermore, is it even passable as an analogy? The purposes in the two fields are *so very* different! The breeder's ideal of a uniform type

is not the eugenisists' ideal. The breeder's technique is utterly impossible as a eugenic program, which depends on "forces under social control" for the improvement of the race. On account of the psychological reactions it engenders and on account of its doubtful analogy, I submit that one of the most effective ways to carry the eugenic message to Garcia would be to bury the "stock breeding" analogy a good six feet deep.

Similar disastrous reactions often are induced by our rather too frequent use of certain words. A recent but by no means unique example of what I have in mind, has to do with two ugly words, "stigmata" and "degeneracy." When we get the two together as the cover-title of an article on the statistical relation between shape of shoulder-blades and survival, we have, I suspect, added a number of enthusiastic adherents to the fold of the anti-eugenists. This unfortunate concatenation of words appeared quite recently on the cover of a journal whole-heartedly devoted to advancing the cause of eugenics. I happen to have a pair of "stigmatically degenerate" incurved scapulae, but fortunately I am also blessed with some fairly able, and unusually long-lived ancestors. Being grounded in the elements of statistics, I found the title merely absurd. To many outside the eugenic fold, I am very certain that such a discovery of their stigmatically degenerate nature would appear in a far-from-amusing light. Human beings are emotional creatures, and it is not easy to deliver our message after so unfortunate an introduction.

It is, perhaps, cruel to cite a specific example, especially when it is by no means unique. Immured in the minutiae of our fascinating discipline we all too frequently are prone to this kind of mistake. We cannot be too careful in the use of such words as "abnormal," "degenerate," "affliction," etc. "What is one man's meat, is another man's poison," and we may well emphasize the *differences* that make humanity interesting and that are the hope of eugenic progress. The "Taster"—"non-Taster" reaction is a case in point. People have the greatest difficulty in seeing that neither group is "abnormal." They are simply different. It would be abnormal for a "non-taster" to taste P.T.C. It is not abnormal for a non-taster not to be able to. If this is a mere play upon words it may be a very important one when we are attempting to preach a new evangel.

Eugenics is one of two things: it is either the most important factor in the progress of our race, or it is an idle dream. I am sure we all agree that it *should* be the former, but until eugenics takes an effective part in human affairs it remains for all practical purposes nothing but a dream. We are at a very critical point in the history of our race. In so many ways the welfare of our race demands a new, a eugenic, outlook. Without it, all the

magic cures and palliatives suggested for the Body Social are simply chimeras—dunes of drifting words. That the truths we are trying to promulgate will inevitably prevail is a form of blind optimism that can hardly be considered. They will not prevail unless we can manage to get our message to Garcia's ear. I submit that the followers of Barnum know a thing or two about the delivery of messages to Garcia. Wish fulfillment will not get us anywhere. Eugenics, if it is to have the slightest influence on human affairs must leave the cloistered laboratory and take its place in the minds and hearts of many people. Whether we like it or not, must we not study the technique of moving people to action? That an artist has an inspiring concept to present to his fellow men does not absolve him from mastering the technique of the medium in which he works. The dilettante who is "some-day going to paint a great picture" may have much more beautiful cloud-castles before his mind's eye than Leonardo ever dreamed. Leonardo is remembered because he could dream and because he could *apply paint to canvas*. That we have fundamental truths to convey to our fellow beings, does not give us the privilege of administering them as though they were a dose of castor oil. Demosthenes is said to have chided a rival in the following words: "When you deliver an oration men say 'how beautifully he speaks.' When I speak, men say, 'Let us march against Philip'." The art of Demosthenes deserves the whole-hearted-study of eugenicists.

Until a Eugenics Congress is at least as well attended as a political convention, we have failed of our mission. If, with all the compelling arguments and really fascinating facts at our command, we cannot bring this about we must, I fear, concede that the popular writers are right, and that we rightly deserve the approbrious title "half-baked"!

SEX DIFFERENCES IN THE EXPRESSION OF AUTOSOMAL GENES AFFECTING HUMAN DENTITION

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During the past three years the writer has studied the genetic basis for the occurrence of a gap between the upper central incisor teeth of man. This condition is known to arise from an abnormal enlargement and attachment of the *frenum labium*, a fold of mucous membrane which normally runs from the centre of the upper lip to the gum, where it is attached about five millimetres above the gingiva. In persons exhibiting a gap between the upper central incisors, it is usually found that this fold is enlarged to form a sort of fibrous ligament which, instead of stopping above the teeth, runs right between the central incisors and is attached behind them.

In this study there were encountered a number of persons in which such a space had arisen from some other cause and in whose pedigrees there was no history of a similar condition. The majority of cases, however, present a definite family history; and in the six pedigrees studied by the writer (and to be published later) the peculiarity has behaved as a unifactorial autosomal dominant character.

However, in two of these pedigrees, and in two others not yet completed, there occurred apparent exceptions to the rule in that parents reported to have no space between the incisors had children in which such a space is quite marked. In all four cases the apparently unaffected transmitter was a mother with a family history of spaced central incisors. Two of these could not be examined, one had incisors close together and the fourth was found on examination to have a gap of about 1 mm. in width. In two other cases girls reported not to show the peculiarity were later found to have small gaps between the upper central teeth. Furthermore, in these six pedigrees slightly fewer females than males had the gap; the figures for sibships completely traced are given in table 1.

This difference is not in itself significant, but all the findings together suggested that the character was less common in women than in men. In order to get data on the incidence of the condition in the general population an arrangement was made whereby determination of its presence or absence was made by competent dentists during their routine examination of 3,368

first-year students who entered the University of Minnesota in the fall of 1931. Among these the frequency of spaced upper central incisors was found to be:

	<i>per cent</i>
In 1842 men.....	11.5 \pm 0.72
In 1526 women.....	8.7 \pm 0.72
Difference.....	2.8 \pm 1.01

This difference is 2.78 times its (standard) error and therefore indicates a significantly greater frequency of the condition in males than in females. The figures given must include a number of cases in which the gap was not

TABLE 1
Sex distribution of spaced incisors in six pedigrees

SEX	NUMBER	AFFECTED	
		Number	Per cent
Male.....	25	15	60.0
Female.....	31	17	54.8

TABLE 2
Distribution of spaced incisors in relatives of affected students

CLASS	NUMBER OF REPLIES
Father affected.....	27
Mother affected.....	13
Both parents affected.....	5
Space in sibs or near relatives but not in either parent.....	25
No known family history.....	28

hereditary, and from other data it would seem that if these could have been eliminated the difference might have been still greater.

To those in whom the spaced incisors were noted a questionnaire was sent asking for information about its occurrence in relatives. Out of 112 replies, 12 were discarded because of inadequate data and two because the condition arose from missing lateral incisors. The remaining 98 were distributed as shown in table 2.

There was thus a family history of the condition in 71.4 per cent of the affected persons. Downs (1927) has reported that of eleven cases of "spaced uppers" in which the family history could be traced, only one was negative.

The general findings from the students' replies, as presented in table 3,

confirm the other evidence that the gap is less common in women than in men.

If there were no sex difference in the expression of this character, the numbers and percentages in these four classes should be approximately equal in the two sexes. That they are not so in the 95 students who replied to the questionnaire can hardly be considered more indicative of a sex difference than of a tendency for college boys to answer their professors' questionnaires more faithfully than do college girls. However, the fact that among 50

TABLE 3
Sex distribution of spaced incisors

	MALES	FEMALES
(A) Sex distribution in affected persons:		
1. In 50 affected parents	32	18
2. In 95 affected students of known sex	63	32
(B) Percentages of each sex affected:		
3. In 70 sibships with family history:*		
(a) in 86 males	46.5%	
(b) in 83 females		38.5%
4. In 45 sibships from affected parents*	61.9%	40.0%

* Excluding the propositus in every sibship.

TABLE 4
Width of gap between spaced incisors

SEX	NUMBER MEASURED	RANGE	AVERAGE
		<i>mm.</i>	<i>mm.</i>
Male	6	1.8-4.4	3.00
Female	6	1.0-4.5	2.25

affected parents nearly twice as many fathers had the condition as did mothers corroborates the other evidence that the character is sometimes suppressed in females.

Since the sex ratio of replying students is so abnormal (63:32) these students cannot be used in any determination of the incidence of spaced incisors in their sibships. Accordingly in class B₃ of table 3 there have been included *only the brothers and sisters* of those students who reported the condition in either parent or in some near relative. This is an adaptation of the "brother and sister" method introduced by Weinberg (cited from Baur, Fischer and

Lenz, 1931). The elimination of the propositus does not entail any great error since the chance of the character appearing in any brother or sister was as great as that of its appearing in the discarded propositus. The method does reduce the frequency of the condition because in many families the numbers were too small to obtain a representative ratio after the elimination of the propositus. This is to some extent compensated for when a considerable number of sibships are considered.

In this case the sibships yielded, as was expected, a normal sex ratio of 86♂♂ to 83♀♀, but only 38.5 per cent of the females were affected in contrast to the figure of 46.5 per cent for males. Since this group may possibly have included some cases of non-genetic spaced teeth, there are considered in class B₄ the sibships of these students having definite evidence of a hereditary gap in the form of an affected parent. In this group the sex difference is much more pronounced.

Actual measurements of the gap have as yet been made on only a small number of persons but in these the space is somewhat smaller in males than in females. (See table 4.)

DISCUSSION

In consideration of the evidence from these several angles it is consistent with the data to conclude that the space between the upper central incisors caused by hereditary abnormality of the *frenum labium* is sometimes suppressed in whole or in part in females.

On this basis one can account for the pedigrees in which the character appears to have skipped a generation, *i.e.*, to be a recessive. On the other hand one must recognize that such suppression or modification is not found in every case. This is attested by the fact that the widest gap thus far encountered, 4.5 mm., was in a girl. Presumably there are modifiers for this gene as for others. The degree of expression of the character must depend upon the interaction of the causative gene with its modifiers and its environment. The sex difference in its expression may be considered the result of differential responses of the causative gene and its modifiers to the different endocrine environments found in the two sexes.

In this connection the findings of Downs (1927) are of special interest. In studying the occurrence of various abnormalities of dentition in combination with sixteen different pathological conditions indicative of endocrine dyscrasias, no association was found between any specific dental anomaly and any specific endocrine disorder but abnormalities in dentition were approximately three times as frequent in those with endocrine dyscrasia as in normal persons. From these data the present writer has com-

puted the following frequencies of the condition which Downs designates as "spaced uppers" and which is probably wholly or partly the same as that considered in this paper:

	<i>per cent</i>
In 375 persons with endocrine disorders	12.27 \pm 1.68
In 271 normal persons	2.58 \pm 1.04
Difference	9.69 \pm 1.97

Since this difference is nearly five times its standard error, it indicates that the greater frequency of spaced uppers in persons with endocrine disorders is significant. Unfortunately Downs did not give the distribution of these cases in the two sexes.

It is probably a coincidence that an endocrine basis for sex-limitation of an autosomal gene is found in two other characters affecting the dentition of man. One of these is found in the pedigree of female-sex-limited premature decay and loss of teeth reported by Sedgwick (cited by Gates, 1929) in which 10 of 11 daughters in two generations were affected while none of four sons showed the character. A similar tendency is evident in a pedigree of female-sex-limited missing lateral incisors given by Schultz (1932). This last is of particular interest because the character has been found in other pedigrees to be very irregular in its expression. Adequate data on its sex distribution are not available but the influence of sex on its expression is definitely shown in Schultz's pedigree and it may well be a factor in causing the other irregularities.

It is desirable to point out that while a male-sex-limited character, such as is found in Schofield's (1921) pedigree of webbed toes, can be accounted for apart from endocrines by postulating a gene in the Y-chromosome, a female-sex-limited character such as the two just cited can not be adequately accounted for by sex-linked genes, since in the offspring of an affected female the character would appear in both males and females were it not for the modifying influence of the endocrine secretions.

The hereditary basis for spaced upper incisors is apparently intermediate between that of a simple dominant character appearing equally in both sexes and that for such a character as pattern baldness which, from the studies of Osborn (1916), would appear to be manifested in males when they are heterozygous for it, but in females only when they are homozygous. In the latter case a single gene can be fully expressed in males but not in females, where the duplex condition is necessary to overcome the inhibiting forces of the endocrine environment.

These data on spaced incisors are presented to show that sex differences in the expression of an autosomal character may obscure its genetic basis un-

less such differences are recognized. It is suggested that a more widespread recognition of the fact that such differences exist may help to account for some of the frequent cases of apparently irregular genetic behaviour of inherited characters in man.

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THE INHERITANCE OF MENTAL TEST ABILITIES

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For twelve years the Committee on Exceptionally Able Youths of the Civic Club of Allegheny County, Pennsylvania, has been assembling the outstanding students of those about to graduate from high school for testing. The students invited are those who are selected as having been highest scholastically, in mental tests or in teachers' estimates. Those selected are then given mental tests and sometimes scholastic tests of which some norms are known. The number of students tested this past June was 188. Awards were given to 64 of these as being in the highest 1/20 of the freshman class of an average American college.

The results of these Civic Club tests has given an opportunity to observe whether the abilities thus discovered are wholly sporadic, are directly proportional to educational advantages, or whether in some degree they "run in families."

At nearly every recent test there were two or more siblings or cousins of previous awardees, although this would be much rarer if due to chance alone. The graduates from the high schools of Pittsburgh alone were 2163 at this commencement. However, where three or more siblings have graduated it is uncommon for all three to receive an award.

A report on these experiences was prepared in 1928 by Mary C. Warmbier, in a thesis on file in the University of Pittsburgh Library entitled "The Eugenic Aspect of the Pittsburgh Exceptionally Able Youth Movement" who found twelve pairs of sibling awardees. She reported one remarkable pedigree in which three interrelated families contributed cousin awardees but all siblings in each family were not of awardee rank. Since then additional sibling pairs have been discovered.

This year, for the first time, a third successive sibling in one family won the award. Inquiry revealed that these three were the three eldest siblings in the K family and that there was a fourth sibling just finishing the junior year in high school who was estimated to be equally capable. A special test consisting of the Detroit Advanced Intelligence Test Form V and the Moss-Hunt-Omake Intelligence Test (First Revised Edition) was therefore given simultaneously to the two parents and the four siblings. These two

tests were chosen because some age and educational norms¹ were available for them and none of the six persons have taken any form of these two tests. Tests affected less by information and education would have been preferred, but did not otherwise comply with the requirements.

The result confirmed the previous findings. All four sibs tested with very high scores though the scores were in general less high. The father also had a high score and the mother, though less high yet showed a superior score. The scores were in general less high in the elements of the "social intelligence" test as of course the environmental factor is so much more potent relatively in these tests than in the Detroit test which is a more typical mental test.

The work of the Civic Club Committee turns up additional siblings and cousins of previous awardees at each test and it is planned to test additional families of three or more sibling awardees with their parents as they are discovered.

The results of every mental test are in part determined by innate capacity and in part by environmental factors. The relative proportion of the two sets of factors is known to differ to a great degree in the various tests. In this instance the environmental factors operate against the mother more than the others as she did not attend college and has lived the life of the house-wife rearing four children without a servant. The work of the husband is that of Lecturer on Health Teaching in a University and a practicing physician. The sibs, at the time of these tests were: (1) a son, graduated from college one year before (2) a son who had finished three years in college (3) a daughter, who had just finished her senior year in high school.

The results of the test are given in table 1 which differ as to the Detroit test from the mimeographed abstract of this paper because of the receipt of later norms based on larger series from Dr. Baker the author of the test.

It is clearly seen that the sibs are almost uniformly very high, being slightly higher than the father, more noticeably in tests where the more recent schooling would be a factor, and higher than the mother who was somewhat handicapped.

Since age allowances and norms are necessary for comparison of the sibs and these involve a considerable probable error (even though extrapolated or other less applicable ones were not used) no stress is laid on the thirteen items separately. The high scores on "logical relations" in contrast to the "visual imagery" test make it desirable to test further as to these items.

The real names of this family are available to anyone who might wish to

¹ Mainly from authors of test, some from School and Society, XXXII, 268, 1930.

TABLE 1
Detroit advanced norm and index

NAME	AGE	TOTAL	1	2	3	4	5	6	7*	8*
Father.....	51 y. 1 m.	221.5/140 = 1.58	38	30	18	33	15.5	40	26	21
Mother.....	48 y. 6 m.	171/140 = 1.22	33	23	26	24	24.75	19	12	10
Elder son....	21 y. 2 m.	261/140 = 1.86	36	38	27	40	22.5	39	37	22
Younger son..	19 y. 4 m.	236/140 = 1.69	34	40	23	41	26	30	25	17
Elder daughter.	16 y. 11 m.	222/140 = 1.59	34/17 = 2.00	34/21 = 1.62	23/17 = 1.35	30/19 = 1.58	23.75/19 = 1.25	35/20 = 1.75	27/11 = 2.45	16/8 = 2.00
Younger daughter....	15 y. 1 m.	181/140 = 1.29	17/14.5 = 1.17	28/17 = 1.65	22/14 = 1.57	20/15 = 1.33	23.5/15 = 1.57	33/16 = 2.06	19/9 = 2.11	19/7 = 2.71
Mid-parent....	49 y. 6 m.	196/140 = 1.40	35.5	26.5	22	28.5	20	29.5	19	1.55
Mid-sibling....	18 y. 1 m.	225/131 = 1.72	30	35	34	33	24	32	27	1.85

The ratio is to the 92 percentile in the age-education group available.

Social intelligence

NAME	AGE	TOTAL	1	2	3	4	5
Father.....	51 y. 1 m.	128 = 1.13	24	32	46	7	19
Mother.....	48 y. 6 m.	113	25	30	38	11	19
Elder son....	21 y. 2 m.	141 = 1.25	25	36	40	20	20
Younger son....	19 y. 4 m.	113	26	36	50	12	18
Elder daughter.....	16 y. 11 m.	142 = 1.27	26	36	44	19	15
Younger daughter.....	15 y. 1 m.	112	21	34	34	12	17
Mid-parent.....	49 y. 9 m.	138 = 1.55	24.5	31	42	9	19
Mid-sibling.....	18 y. 1 m.	89	24.5	35	42	16	17.5

The ratio is to the mean for the age-education group available.

* Logical relations.

further test them, but it is suggested that some time be allowed before additional testing in order to avoid or lessen age allowances.

What was it that made the test scores of these siblings all so unusually high? We infer it was not the college or high school attended because the boys tested very high in the eighth grade regular public school mental tests and were then recognized as very high by the Civic Club with its preliminary award. Further we have tested very many from each of the high schools of the county and the particular high school attended by all four does not produce an unusually large number of awardees. It was not the grammar school because no one grammar school or class within the grammar school furnishes us a disproportion of awardees except such as one would expect from the socio-intellectual levels from certain localities. The second son was able to read before he was four years old and both skipped the first grade. Furthermore more than one grammar school was attended.

Was it a particularly stimulating home environment? This is apparently a minor factor for homes where the educational level of parents was higher than in this family have furnished us families showing some merely modal youths with superior siblings.

The main factor, therefore, in these very high scores is inheritance. One must not conclude, however, that it is common for all four children, even where the inheritance is very good, to have uniformly high scores. On the contrary, that is an unusual feature of this case. Ordinarily more variation is found. In this case the parents were apparently homozygous in respect to some important determining genes, not of course in all the genes involved.

A NOTE ON INHERITED VARIATIONS AND FITNESS PROBLEMS

I. THE TYPES OF SCAPULAE

WILLIAM WASHINGTON GRAVES

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“Wollen wir weiter kommen so müssen wir genauer untersuchen.”—VIRCHOW.

Inherited variations are everywhere apparent in the world of life, and nowhere more so than in the differences and inequalities of structure and function common to human beings. Such variations are the raw materials for classification, evaluation and correlation in the complex problems of individual, family and racial fitness. Fitness is a convenient term to express variability in inherited capacities for adaptation and survival. Human beings are innately unequal in fitness for health, disease, education and duration of life.

Present-day knowledge of heredity and of the relation of heredity to environment and to longevity shows that the evaluation of individual fitness is today, and must forever remain a fundamental and universal problem. Each individual is unique, he is the first and last of his particular kind, and he is only one link in his endless chain of hereditary ascent and possible descent; therefore fitness problems deal *first* with the individual, *second* with his family and *third* with his stock.

Fitness cannot be measured in millimeters, nor can it be evaluated by the use of frequency curves, norms, statistical constants and correlation coefficients, derived from measuring man in the mass. If we would evaluate the fitness of a given individual, we must compare, as far as possible, his inheritance with that of his ascendants, fraternity, descendants and stock; we must investigate his history in relation to nutrition, health, disease, injury, education, occupation, opportunities in life and other environmental influences; and as a part of the physical and mental examination, we must recognize and correlate his inherited variations of structure and function.

Further progress in fitness problems depends upon intensive studies of individuals, families and stocks in relation to inherited differences and inequalities—variations of structure and function. Since structure and function are inseparable, and since the recognition of inherited variations of structure enables one to distinguish one *individual*, one family, one stock

SCAPULAR CLASSIFICATION

CONVEX STRAIGHT CONCAVE

IS BASED PRIMARILY ON THE RELATION
OF A STRAIGHT LINE TO THE GREATER
PORTION OF THE VERTEBRAL BORDER
BELOW THE SCAPULAR SPINE.

A Cv3
W. ♂ 25 YRS.



THE CONVEX TYPE: MAY BE
REGULARLY OR IRREGULARLY,
SLIGHTLY: Cv1, MODERATELY: Cv2,
OR MARKEDLY: Cv3 CONVEX.

B ST
W. ♂ 33 YRS.



THE STRAIGHT-ST-TYPE:
STRAIGHT OR NEARLY SO, NEITHER
CONVEX NOR CONCAVE, TENDING
RATHER TO CONCAVITY THAN TO
CONVEXITY.

C Cc3
W. ♂ 37 YRS.



THE CONCAVE TYPE: MAY BE
REGULARLY OR IRREGULARLY,
SLIGHTLY: Cc1, MODERATELY: Cc2,
OR MARKEDLY: Cc3 CONCAVE.

THE SCAPHOID (St AND Cc) TYPES
COMBINE 12 OR MORE COMMON

ANATOMICAL AND ARCHITECTURAL CHARACTERS
WHICH CONTRAST WITH SIMILAR CHARACTERS
IN THE CONVEX. W.W. GRAVES: AM. J. PHYS. ANTHRO.
VOL. IV. NO. 2, 1921.

FIG. 1. PICTURES AND DESCRIBES THE PRIMARY BASIS OF SCAPULAR CLASSIFICATION AND SUGGESTS USEFUL SYMBOLS FOR RECORDING THE *Straight* AND THE VARYING DEGREES OF *Convexity* AND *Concavity*

Note the relation of the greater portion of the vertebral border below spine to the adjacent line in A, B and C. For comparison each scapula is posed with its long axis resting on a vertical line.

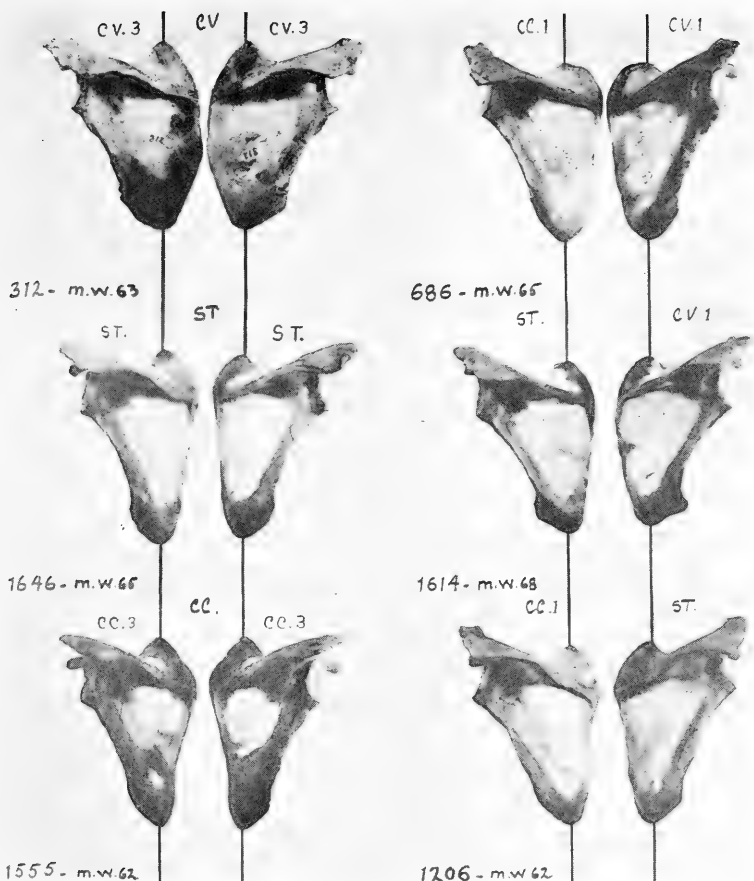


FIG. 2. PHOTOGRAPHS OF SIX PAIRS OF SCAPULAE FROM WHITE MALES IN THE AGE PERIOD SIXTY TO SIXTY-NINE, DERIVED FROM DISSECTING-ROOM MATERIAL, LABORATORY OF ANATOMY, WESTERN RESERVE UNIVERSITY MEDICAL SCHOOL, CLEVELAND, OHIO

The three pairs on the left (Convex, Straight and Concave types) in the order named from top to bottom are typical "pure" types, i.e., each bone of each pair is of the same type. The three pairs on the right are "mixed" (scaphoid) types (Concave + Convex, Straight + Convex, Concave + Straight) in the order named from top to bottom. In classifying relatively large numbers of paired scapulae of skeletal and living material, 80 to 90 per cent are found to be similar in type, both being convex, straight or concave, although one frequently finds marked differences in degree of *convexness* and *concaveness*. In paired scapulae, 10 to 20 per cent of such are found to be dissimilar types, i.e., 10 to 15 per cent are convex on one side and straight on the other; 3 to 5 per cent straight on one side and concave on the other; and 1 to 2 per cent convex on one side and concave on the other. Dissimilar types (Cv + St, St + Cc, Cv + Cc) are called mixed (scaphoid) types for the reasons: (1) mixed types have scaphoid components; (2) the general characteristics of the bearers of mixed (scaphoid) types are often similar to those of the bearers of the straight and concave (scaphoid) types; and (3) the age incidence of mixed (scaphoid) types is similar to that of straight and concave (scaphoid) types, as indicated in tables 1 and 2; therefore classification of paired scapulae is as follows:

Convex types		Scaphoid types	
Pure		Pure	Mixed
Cv + Cv		St + St	Cv + St
		Cc + Cc	St + Cc
			Cv + Cc

In paired scapulae, differences in degree of convexness or concaveness and dissimilarity in types are independent of sex, handedness and occupation or environmental influences.

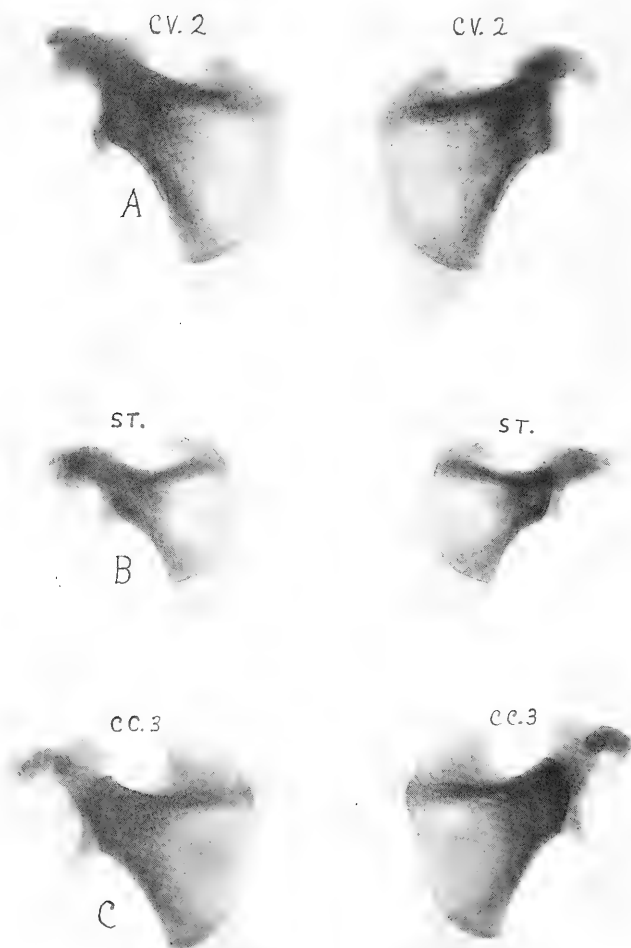


FIG. 3. Roentgenograms (P. F. Titterington): *A*—Full term, convex “Cv2” type; *B*—7 months gestation; straight (scaphoid) “St” type; *C*—full term concave (scaphoid) Cc3. Note the relation of the ossifying plate to the still cartilaginous superior border and angle, the inferior border and angle and the entire vertebral-border regions.

from another, such variations are primary and dependable approaches to fitness problems.

THE TYPES OF SCAPULAE

Among the types of inherited variations of structure, common to ancient and modern man and other mammals (gorilla, orang, chimpanzee, armadillo, bat, etc., etc.) are those of scapulae. Finding certain variations of scapular vertebral borders in a family study in 1906, I was led to investigate scapular variations of man and other mammals, to classify them into types and to apply the classification to family studies and to statistical studies of living, skeletal and foetal human material. The classification is *convex* and *scaphoid* (straight, concave and mixed) *types*, and it is based primarily upon the character of the greater portion of the vertebral-border contour below the scapular spine (figs. 1, 2 and 3). If the upper, middle or lower two-thirds of this part of the bone be convex, straight or concave, it is so classified. With proper methods and with but few exceptions, scapular types are easily accessible, readily recognizable and accurately classifiable in the living. Scapular types are primal in origin. They are found in varying percentages in all social levels from the 12th foetal week onward in the life cycle. Regardless of environmental influences and the processes of growth, development and senescence, they remain permanent in type, and they are unusually constant in transmission from generation to generation: the scaphoid types, in man, as dominants.

THE AGE INCIDENCE OF SCAPULAR TYPES: THEIR RELATION TO INHERITED CAPACITIES FOR HEALTH, DISEASE AND DURATION OF LIFE

The application of scapular classification to comparable numbers of the young and the old disclosed the age incidence of scapular types—a heretofore unknown finding in connection with inherited variations, whether of structure or function. *Scaphoid* types *predominate* in the young, and *convex* types *predominate* in the old in approximately the following percentages:

Six to 15 years:

	<i>per cent</i>
Scaphoid types.....	65
Convex types.....	35

Sixty years and over:

Scaphoid types.....	35
Convex types.....	65

In all age periods in well-adaptable groups, there are *more* convex types and *fewer* scaphoid types than in poorly-adaptable groups (table 2).

TABLE 1
The age incidence principle of investigation; scapular classification—results (normal groups)

THE YOUNG 3 MOS.-25 YEARS																
EXAMINER, MATERIAL, YEAR		AGE	Convex		Straight		Concave		Cv. + St.		St. + Cc.		Cv. + Cc.		Total	
			Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1?	Graves (W. W.) Orphan Home ♂ 1909	5-14	35	11.8?	105	35.7?	160	54.0?							300	100
2?	Cunningham (R.) University Students 1912 ♂ ♀	16-25	296	28.0?	159	15.0?	602	57.0?							1,057	100
3?	Warburg (F.) German School 1913 ♂ ♀	6- 7	126	12.6?	623?	62.3?	251	25.1?							1,000	100
4?	Weiss (W.) Am. School (White) 1920 ♂ ♀	5-14	985	18.5?	1,582	29.7?	2,758	51.8?							5,325	100
5?	Graves (W. W.) Health Show 1922 ♂ ♀ mos.	3-67	76	18.0?	237	57.0?	109	26.0							422	100
6	Graves (W. W.) Am. Wh. School (Mud.) 1930 ♂ ♀	6-10	72	35.4	63	31.0	43	21.1	17	8.2	6	2.9	2	1.4	203	100
	Graves (W. W.) Am. Wh. School (Mad.) 1930 ♂ ♀	6-10	75	37.3	58	28.7	39	19.3	19	9.2	8	3.9	3	1.4	202	100
	Graves (W. W.) Am. Wh. School (Bud.) 1930 ♂ ♀	6-10	86	42.7	54	26.8	34	16.9	18	8.9	8	3.5	1	0.5	201	100
	Totals.....	6-10	233	38.4	175	28.9	116	19.2	54	8.9	22	3.0	6	0.8	606	100
7	Graves (W. W.) Am. Negro School (Sim.) 1930 ♂ ♀	6-10	59	29.3	68	33.2	35	17.4	25	12.4	11	5.4	3	2.3	201	100
	Graves (W. W.) Am. Negro School (Mar.) 1930 ♂ ♀	6-10	70	34.4	55	27.0	38	18.2	9	9.3	17	8.3	4	2.8	203	100
	Graves (W. W.) Am. Negro School (Ben.) 1930	6-10	71	34.9	67	32.9	36	17.7	18	8.3	11	5.3	1	0.5	204	100
	Totals.....	6-10	200	32.8	190	31.2	109	17.9	62	10.1	39	6.4	8	1.6	608	100

8	Graves (W. W.) Orphan Home ♂ 1929	5-9 10-14	48 24	27 21	39 11	14 8	8 5	2 0	138 69
	Totals.....		7234.8	48	5024.1	22	10.6	6.2	207
9	Graves (W. W.) Boy Scouts ♂ 1929	12-18	19933.5	136	16527.7?	57	9.5	4.5	594
10	Graves (W. W.) C. M. T. Camp (J. B.) 1930 ♂	17-20	11926.9	146	8519.3	55	12.6	7.2	441
11	Graves (W. W.) Rolla, Mo. Public Schools ♂ & ♀ 1930	6-15	18531.8	166	14024.0	55	9.4	5.1	581
12	Graves (W. W.) Rolla, Mo. High Schools ♂ & ♀ 1930	13-18	7334.1	73	2913.5	28	13.0	4.6	214
	Totals Wh—♂ & ♀ 6-8-9-10-11-12...	5-19	88133.3	744	58522.1	271	10.2	5.5	2,643
13	Graves (W. W.) Mo. School Mines 1, 2, 3, 4 Yr. Men 1930	17-25	17944.2	113	4912.1	48	11.8	2.8	405
14	Graves (W. W.) St. L. U. Medics 1, 2, 3, 4 Yr. Men 1930	19-26	14740.1	106	3710.1	57	15.5	4.6	366
	Totals 13 + 14.....	17-26	32642.2	219	8611.1	105	13.6	3.7	771

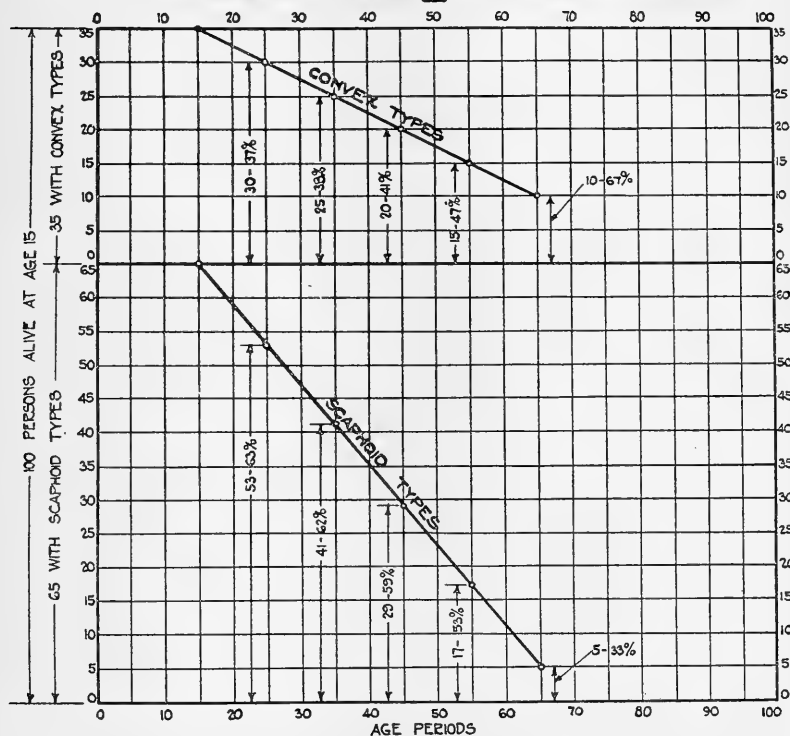
Additional figures on the young (6-24) are shown in table 3.

TABLE 1—*Concluded*

THE OLD 50-80 + YEARS																	
	EXAMINER, MATERIAL, YEAR	AGE	Convex		Straight		Concave		Cv. + St.		St. + Cv.		Cv. + Cc.		Total		
			Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	
15	Graves (W. W.) Infirmary, Masonic Home, City Hosp. 1909 ♂ ♀ 1927	40-50	90	54.1	46	27.4	31	18.5							167	100	
		50-60	107	61.6	42	24.1	25	14.3							174	100	
		60-70	193	70.0	55	20.0	27	9.7							275	100	
		70-80	218	81.4	34	12.7	16	5.9							268	100	
		80-90+	103	88.6	10	8.3	3	3.1							116	100	
	Totals.....		711	71.1	187	18.7	102	10.2							1,000	100	
16	Graves (W. W.) Infirmary ♂ ♀ 1929	60-69	117	65.3	28	15.6	8	4.4	16	8.9	8	4.4	2	1.4	179	100	
		70-79	192	70.0	33	12.0	20	7.2	20	7.2	7	2.5	2	1.1	274	100	
		80-89+	88	74.5	17	14.4	4	3.3	5	4.2	2	1.6	2	2.0	118	100	
		Totals.....		397	69.5	78	13.7	32	5.6	41	7.1	17	3.2	6	0.9	571	100
17		Graves (W. W.) Infirmary ♂ 1930	60-69	52	49.0	28	26.4	10	9.4	12	11.5	4	3.7	0	0.0	106	100
	70-79		95	62.5	26	17.1	4	2.6	19	12.5	5	3.2	3	2.1	152	100	
	80-89+		40	76.5	8	15.3	1	1.9	3	6.3	0	0.0	0	0.0	52	100	
	Totals.....			187	61.3	62	20.0	15	4.8	34	10.9	9	2.9	3	1.1	310	100
18	Graves (W. W.) Homes For Aged ♂ ♀ 1929-30		40-49	76	45.0	31	18.4	27	16.1	25	14.3	7	4.2	3	2.0	169	100
		50-59	96	55.2	26	15.0	20	11.5	21	12.1	9	5.1	2	1.1	174	100	
		60-69	373	62.6	95	16.0	39	6.5	61	10.2	23	3.8	5	0.9	596	100	
		70-79	438	67.0	86	13.1	38	5.1	68	10.4	16	2.4	8	1.3	654	100	
		80-89+	249	78.8	38	12.0	7	2.3	15	4.2	4	1.2	3	1.0	316	100	
	Totals.....		1,232	64.5	276	13.4	131	6.8	190	10.0	59	3.9	21	1.4	1,909	100	

THE AGE-INCIDENCE PRINCIPLE OF INVESTIGATION

The age-incidence finding revealed a new and useful principle in evaluating inherited variations, which I have called *the age-incidence principle of investigation*. This principle is firmly grounded in the relation of heredity

 THE AGE INCIDENCE OF SCAPULAR TYPES
 APPROXIMATE RELATIVE PERCENTAGES


W. W. GRAVES

GRAPH 1. INDICATING THE MAGNITUDE OF THE RELATION OF INHERITED VARIATIONS IN GENERAL AND SCAPULAR TYPES IN PARTICULAR TO LONGEVITY

It portrays the approximate *relative* percentages of *convex* and *scaphoid* types in successive age periods from fifteen to sixty-five years. It serves to explain the age incidence of these types by the selective death rate expressed in the relation of heredity to longevity.

to longevity . . . a relation long recognized by physicians, biologists, actuaries and biometricians. It was Oliver Wendell Holmes who said to live to be old, one should be circumspect in the choice of one's ancestors. The investigations of Beeton and Pearson (41), Bell (42), Ploetz (43), Forsyth (44),

TABLE 2
The age incidence principle of investigation; scapular classification—results

NORMAL GROUPS 6-40 YEARS																
	EXAMINER, MATERIAL, YEAR	AGE	Convex		Straight		Concave		Cv. + St.		St. + Cc.		Cv. + Cc.		Total	
			Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
A	Butts (H.) M. C. U. S. N. Officers & Men U. S. N., M. C. 1913	20-30	336	67.2	72	14.4?	92	15.4?							500	100
B	Ball (J. D.) MC. U. S. A. Officers in Training 1919	20-30 30-40	465 259	47.6 54.9	226 83	23.2? 17.6?	285 130	29.2? 27.5?							976 472	100 100
	Totals.....		724	50.0	309	21.3?	415	28.7?							1,448	100
C	Ball (J. D.) MC. U. S. A. Returned O. S. Men 1920	20-30 30-40	1,355 524	49.5 67.3	1,021 192	37.3 24.6	362 63	13.2 8.1							2,738 779	100 100
	Totals.....		1,879	53.5	1,213	34.4	425	12.1							3,517	100
D	Weaver (A. C.) MC. U. S. A. Hospitalized O. S. Men 1920	20-30	434	46.2	175	18.6?	330	35.2?							939	100
E	Mackey (D. E.) MC. U. S. A. X Ray Army Med. Schl. 1920	18-30	406	40.6	356	35.6	238	23.8							1,000	100
F	Kramer (F.) MC. U. S. A. Army Applicants N. Y. C. 1924-25	16-24 25-29+	1,107 403	35.4 46.7	751 230	24.1? 26.6?	1,176 203	37.7? 23.5?	23	0.7	16	0.8	43	1.3	3,116 862	100 100
	Totals.....		1,510	37.9	981	24.6?	1,379	34.6?	30	0.7	27	0.6	51	1.6	3,978	100

G?	Col. Cowey MC. N. M. A. Army Applicants London 1925	16-24 25-29+	2,154 861	51.4? 60.8?	706 236	16.9? 16.6?	1,190 284	26.0? 20.0?	69 14	1.6 0.9	40 9	0.9 0.6	30 10	0.44, 0.71	189 414	100 100
	Totals.....		3,015	53.8	942	16.8?	1,474	26.3?	83	1.4	49	0.8	40	0.75,	603	100
H	Loughlin (E. O.) Medical Students 1924	20-24	110	47.2	100	43.0	23	9.8							233	100
I	Graves (W. W.) ♂ Mo. School of Mines 1, 2, 3, 4 Yr. Men 1930	17-25	179	44.2	113	27.9	49	12.1	48	11.8	12	2.8	4	1.2	405	100
J	Graves (W. W.) St. Louis U. Medics 1, 2, 3 Yr. Men 1930 ♂	19-26	147	40.1	106	28.9	37	10.1	57	15.5	17	4.6	2	0.8	366	100
	Totals R.s. Mines and Medics.....	17-26	326	42.2	219	28.1	86	11.1	105	13.6	29	3.7	6	1.3	771	100
K	Graves (W. W.) Rolla Mo. Public Schools ♂ ♀ 1930	6-15	185	31.8	166	28.5	140	24.0	55	9.4	30	5.1	5	1.2	581	100
L	Graves (W. W.) Rolla Mo. High School ♂ ♀ 1930	13-18	73	34.1	73	34.1	29	13.5	28	13.1	10	4.6	1	0.7	214	100
M	Graves (W. W.) Am. Public Schools white ♂ ♀ 1910	6-10	233	38.4	175	28.9	116	19.2	54	8.9	22	3.0	6	0.8	606	100
N	Graves (W. W.) Am. Public Schools Negro ♂ ♀ 1930	6-10	200	32.8	190	31.2	109	17.9	62	10.1	39	6.4	8	1.6	608	100
O	Graves (W. W.) Boy Scouts 1929	12-18	199	33.5	136	22.8	165	27.7?	57	9.5	27	4.5	10	2.0	594	100
P	Graves (W. W.) C. M. T. Camp (J. B.) 1930	17-20	119	26.9	146	33.1	85	19.3	55	12.6	32	7.2	4	1.0	441	100

See page 470 for explanation of table 2.

TABLE 2—*Concluded*

SEGREGATED (SICK) GROUPS 5-44 YEARS																
	EXAMINER, MATERIAL, YEAR	AGE	Convex		Straight		Concave		Cv. + St.		St. + Cv.		Cv. + Cc.		Total	
			Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
1	Maurer (L. L.) MC. U. S. A., U. S. V. B. Hosp. No. 41 ♂ Tubercular 1924	25-34 35-44	199 62	25.4 28.1	123 40	15.7? 18.1?	292 68	37.3? 30.0?	32 14	4.0 6.3	117 31	14.9 14.0	19 5	2.7 3.5	782 220	100 100
	Totals.....		261	26.0	163	16.2?	360	35.9?	46	4.5	148	14.7	24	2.7	1,002	100
2	Martin (C. P.) MC. U. S. A. Fitzsimons Gen. Hosp. Tubercular 1926 ♂	18-29 30-39 40+	58 86 60	21.2 28.9 44.7	98 91 37	25.9 30.9 38.3	56 43 17	20.6 14.6 12.8	26 36 10	9.5 12.2 7.4	29 33 9	10.6 11.2 6.7	6 5 1	2.2 2.2 0.1	273 294 134	100 100 100
	Totals.....		204	29.1	226	32.2	116	16.5	72	10.2	71	10.1	12	1.1	701	100
3	Graves (W. W.) Fitzsimons Gen. Hosp. 1929-31 ♂	20-29 30-39	121 210	44.6 58.8	69 71	25.4 19.8	31 19	11.4 5.3	36 45	13.2 12.6	10 10	3.6 2.7	4 2	1.8 0.8	271 357	100 100
	Totals.....		331	52.7	140	22.2	50	7.9	81	12.8	20	3.1	6	1.3	628	100
4	Graves (W. W.) Nat. Jew. San. 1929 State Hosp. Mt. Ver.	5-14	16	14.7	45	40.2	34	30.9	6	5.6	8	7.3	1	1.3	110	100
5	Koch Hosp. 1930 Tubercular ♂ ♀	15-19 20-29 30-39	6 84 43	10.0 31.4 35.2	26 81 31	43.3 30.2 25.4	17 44 13	28.3 16.4 10.6	4 42 26	6.6 15.5 21.3	5 14 7	8.3 5.3 5.7	2 2 2	3.5 1.4 1.8	60 267 122	100 100 100
	Totals.....		149	26.6	183	32.7	108	19.3	78	13.9	34	6.0	7	1.5	559	100

To replace pages 469 and 470

6	Graves (W. W.) Combined J. N. Adam M. H. Trudeau San and Ray Brook St. H. White ♂ ♀ Tubercular 1930	10-19	53 21.1	72	28.6	61 24.3	32	12.7	30	11.9	3	1.4	251	100
	Totals.....		194 30.0	197	30.5	101 15.6	90	13.7	55	8.5	8	1.3	645	100
7	Brunner (E. E.) Feeble Minded Colony 1924 ♂ ♀	21-30	61 26.1	80	34.5?	92 39.4?							233	100
8	Graves (W. W.) Feeble Minded Colony 1930 ♂ ♀	5-14 15-19 20-29	34 17.1 47 40.0 34 31.7	76 38.5 25 21.3 29 27.1		41 20.7 18 15.3 14 13.0	21 15 19	10.6 12.8 17.7	23 12 11	16.6 10.5 10.5	3 0 0	1.5 0.0 0.0	198 117 107	100
	Totals.....		115 27.5	130	30.8	73 17.2	55	13.0	46	10.9	3	0.6	422	100
9	Graves (W. W.) State Reform School 1930 White ♂	12-21	84 21.0	152	38.0	80 20.0	44	12.0	31	7.7	3	1.3	399	100
10	Graves (W. W.) St. Ind. Schl. for Wh. Girls 1930	12-21 15-19	33 23.6 83 28.0	60 42.8 87 29.3		26 18.6 55 18.5	18 40	12.6 13.5	3 23	2.4 7.7	0 8	0.0 3.0	140 296	100
11	Krause & Howard State Prison ♂ 1923	20-40	80 21.2	173 45.4		128 33.6							381	100
12	Graves (W. W.) State Prison 1931 ♂	20-24 25-34	119 33.0 80 41.2	117 32.5 51 26.2		52 14.4 21 10.8	55 37	15.2 19.0	12 4	3.3 2.0	5 1	1.6 0.8	350 194	100
	Totals.....		199 35.9	168 30.3		73 13.1	92	16.6	16	2.8	6	1.3	554	100
13	Graves & Vickrey Hosp. for Insane ♂ 1919	20-30	56 20.4	94 37.5?		100 40.1?							250	100
14	Biggs (M. O.) Hospital for Insane ♂ ♀ 1923	20-29 30-39	20 16.3 70 30.7	70 46.7 96 42.4		32 37.0 62 26.9							122 228	100
	Totals.....		90 25.7	166 50.3		94 24.0							350	100
15	Ball & Thomas Prostitutes ♀ 1917	20-34+	49 18.0?	54 20.0?		167 62.0?							270	100

Explanation of tables 1 and 2

These tabulations represent 42,413 white persons. They show the results of scapular classification derived by applying "The Age-Incidence Principle" to so-called "normal" and to known to be sick groups in several age periods. Table 1, "normal" groups in age periods 3 mos.-80+ years: in table 2, "normal" groups 6-40 years, and "sick" groups 5-44 years are shown. It will be noted that the results of classification are tabulated in 5 "sick" groups, viz., Tuberculous, 1, 2, 3, 4, 5 and 6; Feeble-minded, 7 and 8; Prison, 9, 11 and 12; Sex-delinquent females, 10 and 15 and Insane, 13 and 14. On comparing the percentages of convex types in these groups with the "normal" groups, in similar age periods, it will be noted that there are approximately from $1\frac{1}{4}$ to $2\frac{1}{4}$ times as many convex types in the "normal" as in the "sick" groups.

The results of investigations are *queried* in Groups 1, 2, 3 and 4, Table 1 and in Groups A, 13 and 15, Table 2, because classification in these groups was made prior to the development of dependable methods. Moreover, mixed scaphoid types (Cv + St, St + Cc and Cv + Cc) were not noted by examiners of Groups 2 and 3, Table 1. "Normal" Group 9, Table 1 and "normal" Groups A, B, D, F, G and O and sick Groups 1, 13 and 15, Table 2 are *queried* because of the disturbed type ratios. Regardless of the error in classification in Tables 1 and 2, the age incidence is clearly demonstrated even in all groups showing 2 or more successive age periods. *Mixed* scaphoid types in the columns headed: Cv + St, St + Cc and Cv + Cc in Groups 1, 4, 5 and 15, Table 1 and in Groups A, B, C, D, E, 13, 14 and 15, Table 2 were apportioned among, and combined with, the pure types (Cv + Cv, St + St, Cc + Cc) as suggested in reference numbers 9 and 10). While recent personal investigations on material of known age show that *mixed* scaphoid types (Cv + St, St + Cc and Cv + Cc), like *pure* scaphoid types (St + St and Cc + Cc), decrease in frequency in successive age periods, it is, nevertheless, here suggested that in all future work *pure* and *mixed* scaphoid types be tabulated separately, as for example in Groups 6 and 18, table 1, for the reason that many more data on mixed scaphoid types are desired. Moreover, regardless of the nature of the material (excellently, well or poorly adaptable) when adequate numbers are examined, the variable ratios of scapular types become dependable controls of accuracy in classification. If classification be reasonably accurate, one seldom, if ever, finds as many Cc + Cc as St + St; *never* as many St + Cc as Cv + St and never as many Cv + Cc as St + Cc types. Finding such disturbance in the ratios, as in some of the groups *queried*, serves as a reliable control on one's accuracy in classification, and I have used this check in *querying* the accuracy in classification in some of the groups in tables 1 and 2. To determine the *relative* fitness values of one group in comparison with another in similar age periods, when classification has been reasonably accurate in both groups, it is only necessary to know the percentages of *convex* types in both groups. That group which shows the largest percentage of *convex* types has the *highest* fitness value, as measured by scapular classification.

Crum (45), Pearl (46) and others in studying the possible relation of heredity to longevity in man and the investigations of Hyde (47) and of Pearl (48) (49) and others in *Drosophila*, have demonstrated beyond question a definite relation of heredity to longevity.

By the application of the age-incidence principle to statistical studies of

healthy and sick groups, representing the young (six to fifteen years) and the old (sixty years and over), the fitness value of the types of discernible structural and functional characters which remain permanent after type differentiation, fixation or maturity, can be determined. It has been possible to show a definite relation of the inheritance of scapular types to longevity and to morbidity by the application of the age-incidence principle to statistical studies of healthy and sick groups. The results of such studies, some of which are shown in tables 1 and 2, point unerringly to the existence of 2 groups in any people: *Group A—The bearers of the convex types, among whom will be found a larger number of the more adaptable, the more disease resistant, the plus-potentially healthy, the longer lived; Group B—The bearers of the scaphoid types, among whom will be found a larger number of the less adaptable, the less disease resistant, the plus-potentially sick, the shorter lived.* Consideration of table 2 shows that in similar age periods there are approximately from $1\frac{1}{4}$ to $2\frac{1}{4}$ times as many convex types in healthy as in sick groups.

THE RELATION OF SCAPULAR TYPES TO INHERITED CAPACITIES FOR EDUCATION

Problems of inherited capacities for health, disease and duration of life are inseparable from those of inherited capacities for education. Do scapular types show relation to the varying capacities for education? The percentage increase of convex types in well-adaptable groups and in comparable numbers and in similar age periods over feeble-minded groups, as indicated in table 2, led to the investigation of the possible relation of scapular types to the varying capacities for education, as measured by grades in American schools and universities. These investigations have been in progress on White and Negro stocks for the past three years. The results derived from these stocks are similar, but a larger number of persons in White stocks have been examined; hence only the results from White stocks are shown in table 3.

The singular finding of the age incidence of scapular types and the results of all investigations leading to its explanation on the relation of heredity to longevity; the percentage increase of *convex* types in healthy over sick groups, and the percentage increase of *convex* types in *higher* over *lower* school grades, have disclosed definite relations of scapular types to problems of fitness for health, disease, education, duration of life and adaptation in general.

THE USEFULNESS OF SCAPULAR TYPES

The usefulness of scapular types in fitness problems is based upon the following findings: (1) that scapular types are inherited variations common

to ancient and modern human stocks; (2) that they are unusually constant in transmission from generation to generation; (3) that they are readily

TABLE 3

*Relative percentages of convex (CV + CV) and scaphoid (ST + ST), CC + CC, CV + ST, ST + CC, CV + CC) types; American schools and universities (white stocks)**

GRADE AGE	TOTAL NUMBER	CONVEX Cv + Cv		STRAIGHT St + St		CONCAVE Cc + Cc		Cv + St		St + Cc		Cv + Cc	
		Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent	Number	Per cent
(1-8)	2,352	849	36.0	644	27.3	429	18.2	284	12.7	117	4.9	29	0.9
6-14													
♂ + ♀													
9th	603	198	32.8	174	28.8	129	21.3	69	11.3	27	4.4	6	1.4
12-15													
♂ + ♀													
12th	643	264	41.5	203	31.5	71	11.0	79	12.7	19	2.9	7	0.9
16-19													
♂ + ♀													
Honor Roll	184	94	51.0	47	22.5	18	9.7	18	9.7	5	2.7	2	1.0
16-19													
♂ + ♀													
University	310	119	38.4	87	28.0	47	15.1	46	14.8	7	2.2	4	1.5
Freshmen													
♂													
University	263	128	48.6	73	27.7	29	11.0	22	8.3	6	2.4	5	2.0
Sophomores													
♂													
Total.....	4,355	1,652	38.0	1,228	28.1	723	16.6	518	11.8	181	4.1	53	1.4

This table shows the *higher* the grade, the *larger* the percentage of *convex* types, except in grammar school over 9th grade, as follows:

1. Twelfth grade over graded schools (1-8)..... 15.2
2. Twelfth grade over ninth grade..... 26.0
3. Honor Roll over graded schools (1-8)..... 41.4
4. Honor Roll over ninth grade..... 55.0
5. Honor Roll over twelfth grade..... 22.0
6. University sophomores over freshmen..... 26.8

*Classified by W. W. Graves

accessible features for recognition and accurate classification in the living; (4) that each type remains permanent throughout the life cycle, and (5) that

each type discloses an age incidence firmly grounded in the relation of heredity to longevity. Therefore, scapular types are useful: (1) in studies of human inheritance; (2) as permanent morphological *bases* or "constants" for correlating coexistent inherited variations, anthropometric measurements and indices; (3) as conditional indices of inherited constitution in relation to health, disease, education, duration of life and adaptation in general; and (4) as dependable measures of fitness (excellent, good or poor) of any group, of any community or of any people.

MODERN CIVILIZATION AND HUMAN FITNESS

The question is often asked: Do the benefits of modern civilization tend to preserve the unfit and the relatively unfit? This question could be definitely and decisively answered by securing an accurate scapular classification on the young (six to fifteen years) or the old (sixty to seventy years), representing an adequate cross-section of any civilized people at this time and again one or more generations hence. A definite increase of *convex* types in the young or the old would be a positive indication of racial improvement; whereas, a definite increase of scaphoid types in the young or the old would a positive indication of racial deterioration.

CAUTION IN INTERPRETATION

In interpreting the results derived from scapular classification, one *must never forget that scapular types are among the many inherited features* comprising the total make-up of human beings. The part, either mathematically or biologically, can never be equal to the whole, nor can the whole be greater than the sum of all of its parts; therefore whether the individual possesses a *convex* or a *scaphoid*, it should never be interpreted other than in connection with his total physical and mental make-up (excellent, good or poor).

Even a few observations will show that many poorly-adaptable persons are possessors of convex types, and many excellently-adaptable persons are possessors of scaphoid types. Who they are, and how many among the bearers of the *convex* are the poorly-adaptable; who they are, and how many among the bearers of the *scaphoid* are the excellently-adaptable, can only be determined by considering the factors of inheritance and environment and by evaluating the inherited variations coexistent with a particular scapular type in each person. The age incidence of scapular types and its explanation on the known relation of heredity to longevity shows that inherited variations in general, and scapular types in particular, are dependable indications of fitness (excellent, good or poor) of any group, of any community,

of any people, but it cannot be too strongly emphasized that a particular scapular type is not an equally dependable indication of fitness (excellent, good or poor) in any person. Since each person is a new combination of inherited variations and environmental acquisitions, if one would properly interpret the fitness value of a particular scapular type or of the type of any other inherited variation, the factors of inheritance and environment must be evaluated in the study of each person.

THE PROMISE OF CONTINUOUS RESEARCH ON FITNESS PROBLEMS

Consideration of present-day knowledge of heredity and of the relation of heredity to longevity, and further consideration of the investigations, based upon the types of scapulae, clearly show that scapular classification and the age-incidence principle of investigation are two never-before-recognized approaches to the vital and enduring problems of individual, family and racial fitness.

The results of studies, based upon the types of scapulae given in this note, lead to the reasonable inference that like studies of other inherited variations will yield similar results. Thus far my studies of other inherited variations show that the types of general development, nose, chest and stature *do* yield similar results. Moreover, my studies indicate that the types of other inherited variations (ear lobule and helix, face front and profile, dental occlusion, skull, neck, larynx, shoulder slant and biacromial and bicristal width) *may* yield results similar to those derived from scapular classification. Continuous search for those discernible structural inherited variations, coexistent with scapular types, which are rather frequent in occurrence; which are permanent in type; and which disclose age incidences, gives promise of finding the excellent, the good and the poor combinations of inherited variations, which will serve as additional approaches to the problems of individual, family and racial fitness.

To determine who are the unfit, fit or fittest, equal consideration must be given the ever-present variables—inheritance and environment—and the discernible structural inherited variations peculiar to the individual, his family and stock must be recognized, classified, evaluated and correlated. The results of investigations, based upon the types of scapulae, justify the inferences: (1) that the ideals of the Physician, Eugenist, Educator, Sociologist and Jurist, expressed in *social and racial improvement*, will be nearer realization through continuous research on the relation of inherited variations to individual, family and racial fitness; and (2) that such research will lead to more accurate appraisal of individual fitness for health, disease, education, duration of life, mating and parenthood.

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MERGING OF ANCESTRAL LINES

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All human beings who have lived in the ages since man first appeared on earth may be divided into two groups, viz., those who are ancestors of the people living today, and those who are not. In any long-distance view of heredity, this distinction is fundamental.

The study of which this paper is a small part is an attempt to throw some light on the relative number and character of the first class, which I call "permanent ancestors." It is based on a very extensive, but connected, genealogical study running into all parts of Europe and in some lines for more than forty generations. I remark in passing that such work is worthless unless one is a natural doubter and constantly remembers the principles of historical criticism, applied especially to original sources. Some genealogy is pure fiction, particularly in Europe, but if that is carefully weeded out, much of real value to science remains.

The ancestors of each and every living person fall naturally into three groups; the men who are in his all-male line; the women who are in his corresponding all-female line; and the rest in the mixed ancestral lines containing both males and females which lie between the other two in a chart. The male line, from its legal importance and in recent centuries its carrying of the surname, has in the minds of the public, and even of some biologists, a greatly exaggerated value. Its counterpart, the female line, is ignored by all, but every person had a mother, and she a mother, on back in unbroken line to the beginning of humanity, and still on to the beginning of sexual reproduction, this line being at least of equal biological value with the male line. Of course, the vast majority of any one's ancestors of either sex lie in the mixed lines.

Every one knows that although the number of one's ancestors necessarily doubles with each ascending generation, after a time there appears in any ancestral chart some individuals who are ancestors twice, thrice, or many times over. This is caused by what I call the "merging of ancestral lines."

The closest merging is that produced by successive matings of sibs (meaning "Geschwister") as was known in ancient Egypt. This, and any other close merging, is obviously the same as inbreeding *viewed from the opposite*

direction, but merging is a far more general term. Because you and I had some ancestors in common a thousand years ago, it seems to me a misuse of the word to say that we are "inbred." But some of our ancestral lines have certainly "merged."

Merging occurs whenever sibs appear among one's ancestors. When two sibs appear in the same generation their parents have a double ancestral value, and the number of different persons in the earlier generation is reduced by two. "Once merged always merged," hence the gap in a chart produced by this so-called "ancestor-loss" doubles with every preceding generation and correspondingly reduces the number of ancestral persons.

Two half sibs in the same generation produce half the effect of two whole sibs; three sibs give their parents a three-fold ancestral value and create a gap twice as big as that from two sibs. Four sibs create three times the gap that two sibs do. In other words, the appearance in a chart of two children of any ancestral couple causes a "loss" of two persons in the preceding generation, but four children in one generation cause a loss of six persons.

The further back one goes, the more often do sibs occur in different generations, and also in more widely separated ones. This appearance of sibs in different generations is due to the difference in age of the children in one family and also to the difference in age of the parents caused by the different generation-length of the sexes. Because the period of fertility of women begins and ends earlier than that of men, the average length of a human female generation is shorter, hence distinctly different from the male generation-length. [I stress this because I have not found any writer on this subject who recognized this distinction, so essential to correct calculation.] This does not mean that we have more ancestors of one sex than of the other, for each couple represents both sexes. It does mean that persons in or near the male line were born earlier than those in the same generation who are near the female line, the difference increasing as we go back.

The "spreading" of ancestral lines is what occurs in the absence of merging. The relative frequency of the two conditions depends on the existence of natural geographic limits or, among humans, on artificial restrictions on marriage; tribal, national, social or religious. Merging is greatest among small groups, such as the inhabitants of an island, or rank-maintaining European royalty. If, and when, any group becomes entirely isolated, the permanent ancestors in its first generation must in time become ancestors of the whole group. So far as recorded genealogies go (looking backward), the beginning of this process of merging is clearly shown, but it is always interrupted by a break-down of the isolation and introduction of foreign

blood. But through the five hundred thousand or million years of human existence one can imagine cycles in which mergings alternate with spreads; as populations have "increased" and "diminished," when viewed in descending direction.

In order that the number of ancestors of a person, or a group, may actually decrease from generation to generation, so many sibs must appear in some one generation that the next preceding generation will have a loss of over half the number it would have had without merging, and this must happen not only in one generation, but be a frequent or continuous process. The condition under which this must usually have occurred is when a small group separated from its kin, went as pioneers to a completely isolated and favorable area, and there increased so rapidly that couples often had several fertile children. The later generations, however numerous they may be, will all be descended from the few pioneers but from none of the contemporaries of the latter. In the earlier hundreds of thousands of years of human existence there must have been many times when small groups migrated to another habitat in which they thrived, thus giving to the pioneers a high value as multiple ancestors.

An increasing population means larger families, and that means (when looking backward) the merging of ancestral lines. This is an essential part of the evolution of life on the earth, but the question to us is; did the descendants of a particular pioneer group survive? If not, then the pioneers were not permanent ancestors and cease to interest us.

Was there ever a time when the ancestors of all mankind were reduced to a single couple? If so, these two alone must have been the fertile pioneers of a surviving group while all their kin, and all other contemporary human groups—if such existed—died out. All our mixed lines of ancestry must have merged into the two unbreakable lines of all male and all female, each running back to this single pair. But even if this has happened, with the four parents of this couple the process of ancestral spread appears again: one cycle has ended and a new one has started.

PART II. THE EXHIBIT

The Third International Exhibit of Eugenics, which was held in the Education Hall of the American Museum of Natural History, was formally opened with a reception on the evening of August 21st, 1932. The president and officers of the Congress, with the Museum authorities who were the hosts of the Congress, received the guests who included several hundred persons most interested in the development of eugenics, both as a pure and as an applied science. The guests thus included many men of science as well as persons concerned with aiding research.

In all there were 267 exhibits which covered approximately 10,000 square feet of wall space, besides occupying numerous cases and tables. The exhibit remained open until October 1st, 1932, during which time the attendant registered over 15,000 visitors.

CLASSIFICATION OF EXHIBITS

This classification, which was followed by the present exhibit, gives in logical relationship the main subjects of investigation in the field of eugenics.

Class 1. Human Traits or Qualities—their nature and measurement.

Sub-class 1: Physical Anthropometry.

Sub-class 2: Physiological qualities.

Sub-class 3: Sensory measurements.

Sub-class 4: Mental tests and measures.

Class 2. Human Genetics.

Class 3. Heredity and Environment.

Class 4. Heredity and Development.

Class 5. Human Migration.

Class 6. Mate Selection.

Class 7. Differential Fecundity.

Class 8. Population Study.

Class 9. Eugenical Forces.

Class 10. Other Sciences in Relation to Eugenics.

Class 11. The Races of Man.

Class 12. Human Family Stocks.

Sub-class 1: Aristogenic families.

Sub-class 2: Cacogenic families.

Class 13. Parallel Between Improvement by Better Breeding of Plants and Animals and of Human Family-stocks.

Class 14. Applied Eugenics.

Sub-class 1: Constructive or positive eugenics.

Sub-class 2: Negative eugenics.

Sub-class 3: National eugenics.

Sub-class 4: Marriage laws.

Sub-class 5: Selective migration.

Class 15. Eugenical Organizations and Publications.

(For a more detailed classification see "Eugenical News," November, 1931, pages 186 and 187.)

The following list reviews the exhibits, classified in logical relationship, as actually shown in the Exhibits Hall.

In Entrance Hall

1. Wall drawing showing definition and scientific relations of eugenics as a pure and as an applied science.

2. Wall chart showing the classification of exhibits.

3. Wall chart showing special collection of Darwin family pictures, including a hitherto unpublished picture of Charles Darwin exhibited by his son Leonard.

4. Pedigree showing the distribution of natural traits of the Galton-Darwin-Wedgwood family.

5. Bust of Francis Galton presented to the Galton Society by Dr. and Mrs. Alexander E. Kohts.

6. Bust of Thomas Edison and pedigree chart of the Edison family. For this occasion the American Institute of Electrical Engineers loaned a bust of Thomas Edison which had been presented by William S. Barstow.

7. Graph showing Inventiveness by Racial Stock in the U. S.: 1927.

8. Panel showing "Race Descent: American Statesmen."

9. Table showing Race Descent of the Population of the U. S.

10. A Proposed Census Card showing model set-up for birth registration, personal identification and continuous census records.

In the Main Hall

1. West wall. Wall charts and pictures showing the inheritance of natural physical, mental and spiritual qualities in the families of (a) Abraham Lincoln, (b) George Washington, and (c) Theodore Roosevelt. Case of Roosevelt pedigree-data exhibited by Mrs. Theodore Roosevelt and Mrs. Richard Derby.

2. At each of the several pillars. Demonstration devices for genetics. Machines, instruments for illustrating the mechanics and mathematics of genetic phenomena.

- (a) Mendelian ratios. Shot machine showing the Mendelian segregations and ratios in successive generations.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (b) The pure sire method. Bead machine showing the elimination of mongrel chromosomes by the pure sire method.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (c) Machine with bent rattan and pegs to illustrate the interaction of heredity and environment.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (d) Shot machine to illustrate the reduction and segregation in gamete formation.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (e) Shot machine showing the 10 modifications of the 9:3:3:1 ratio.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (f) The Mendelian shovel—showing Mendelian ratios by random samplings of dried peas.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (g) Dice-casting and pedigree selection.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (h) Machine using colored cylinders and glass tubes to illustrate the mechanism of Mendelian heredity showing segregation of chromosomes.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (i) Spool machine and abacus showing chromosomal combinations in man.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (j) Spindle machine showing intra-chromosomal segregation and crossing-over.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
- (k) Trihybrid blocks.
Exhibited by: Professor H. E. Walter, Brown University, Providence, R. I.
- (l) Belt machine showing action of heredity and environment in determining percentage-incidence of goiter in the population.
Exhibited by: Dr. Charles B. Davenport, Cold Spring Harbor, N. Y.
- (m) Cord and roller machine showing maturation of sperm cells.
Exhibited by: W. L. Wachter, Lafayette College, Easton, Pa.
- (n) Herediscope. A new device for demonstrating Mendelian heredity in plants, animals and man.
Exhibited by: The American Genetic Association, Victor Building, Washington, D. C.

3. At the entrance to the Hall. Bust of Professor Henry Fairfield Osborn, President of the Second and Honorary President of the Third International Congress of Eugenics. Bust of Dr. Charles B. Davenport, President of the Third International Congress of Eugenics.

4. The Average Man. A 22-inch statue by Mrs. R. G. Harris, based on

average proportions of 100,000 white soldiers at demobilization as determined by the United States War Department.

5. Table with announcements of books and magazines on eugenics, with pedigree charts and blank schedules issued by the Eugenics Record Office. The latter were provided on application to the attendant.

6. Wall Panel. Protestant Episcopal Marriage Ceremony—with suggested eugenical revision.

7. Stereomotorgraph (constantly in operation) showing selection of human pedigrees and other eugenical and genetical subjects.

Exhibited by: Kodascope Editing and Titling Service, 350 Madison Ave., New York, N. Y.

8. Pictures (20) showing fundamental principles of heredity.

Exhibited by: Buffalo Academy of Natural Science, Buffalo, N. Y.

IN THE HALL OF EDUCATION. MAIN FLOOR. BOOTHS 1 TO 14.

BOOTH 1—ANTHROPOLOGY

Theme-sign.

(a) Races are distinguished by groups of hereditary characters.

(b) Eugenics is applied anthropology.

Exhibits:

1. Chart with radiographs of gorilla's hand. Dorsal aspect. Growth of a young female gorilla in the New York Zoological Park.

Exhibited by: Dr. Charles V. Noback, N. Y. Zoological Park, Bronx, New York.

2. Enlarged photographs (24) showing evolution of facial musculature for lower primates to man; embryological development of facial musculature in man; and racial differences in facial musculature.

Exhibited by: Dr. Ernst Huber, Associate Professor of Anatomy, Johns Hopkins Medical School, Baltimore, Md.

3. Statistical charts (9) with pictures of Kenya natives, describing preliminary inquiry into the causation of racial backwardness in natives of East Africa.

Exhibited by: H. L. Gordon, M.D., P. O. Box 950, Nairobi, Kenya Colony, East Africa.

4. Life masks (14) showing African racial types prepared by a new and accurate process.

Exhibited by: Hans Lichtennecker, Roststrasse 3, Gotha, Germany.

5. Facial masks of South African Negroes—30.

Exhibited by: Dr. Lidio Cipriani, Museo Nazionale di Antropologia, University of Firenze, Florence, Italy.

6. Photographs of racial types—8.

Exhibited by: Ilford, Ltd., Ilford, London, England.

“Experiments in the photography of different racial types by light of various wave-lengths, etc. The most striking result is the distinctly Mongolian type which has become manifest in the photograph of the Negro by infra-red light. The skin pigmentation is also of interest, the photograph on the pan-chromatic plate gaining the appearance of a white man. These experiments are being continued in the hope that an additional process in race study may be evolved.”

7. Photographs showing Asiatic traits in American Indians.

Exhibited by: Dr. Pospisil, Museum Moravia, Brno, Czechoslovakia.

8. Photographs of British Columbia Indian tribes and their blood groups.

Exhibited by: Professor R. Ruggles Gates, University of London, King's College, Strand, W.C.2, London, England.

9. Photographs (13) of First Century sculptures showing racial physiognomy of Near-East nations.

Exhibited by: Fahim Kouchakji, 5 East 57th St., New York, N. Y.

10. Case of skulls and bones, also skiagraph, showing specialized skeletal adaptations to such arts as dancing and piano playing.

Exhibited by: Dr. Horace Evans, L. I. College of Medicine, 300 Henry St., Brooklyn, N. Y.

11. Case of scapulae, charts, tables and graphs accompanied by 100 mounted photographs showing heredity and developmental variations in scapular form with interpretation as to their physical significance.

Exhibited by: Dr. William W. Graves, Metropolitan Bldg., St. Louis, Missouri.

“The application of scapular classification to healthy and sick groups representing successive age periods in the life cycle of man revealed the age incidence principle of investigation—a new and useful principle in fitness problems. By the aid of this principle the fitness values of the type of discernible inherited variations of structure, future type differentiation, fixation, or maturity, can be determined.”

BOOTH 2—PHYSICAL ANTHROPOMETRY

Theme-sign.

- (a) Measurement is necessary to the study of inheritance of qualitative characters. Genetics of twins.

Please substitute attached sheet for pages 469–470 in *A Decade of Progress in Eugenics*. On page 490, line 33, read “types” for “type;” and in line 34 read “after” for “future.”

- (b) Personal identification. Even the minutiae of finger tip patterns are controlled by heredity. Ultimately our whole population should be fingerprinted as a matter of course. Try getting your fingers printed.

Exhibits:

1. Cases (2) of anthropometric apparatus.
Exhibited by: Prof. Dr. Adolf Basler, Sun Yat Sen University, Canton, China, and Hauptpostlagernd, Tuebingen, Wuerttemberg, Germany. Narragansett Machine Co., Pawtucket, R. I. C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill. Siebe, Gorman & Co., 187 Westminster Bridge Road, London England. P. Herman Rickenbach, Scheuchzerstrasse 71, Zurich, Switzerland.
2. Wet Spirometer.
Exhibited by: Narragansett Machine Co., Pawtucket, R. I.
3. Foot measure.
Exhibited by: Prof. Dr. Basler, China and Germany.
4. Stadiometers—2.
Exhibited by: Prof. Dr. Basler, China and Germany, and the Narragansett Machine Co., Pawtucket, R. I.
5. Colored posters (9) with photographs showing the methods used in taking physical measurements.
Exhibited by: Physical Growth Section, Iowa Child Welfare Research Station.
6. Photographs showing types of body build.
Exhibited by: Dr. Charles B. Davenport, Cold Spring Harbor, N. Y.
7. Three-dimension graph showing distribution of relative chest girth.
Exhibited by: Dr. Charles B. Davenport, Cold Spring Harbor, N. Y.
8. Table summarizing material pertaining to mental disorders in twins.
Exhibited by: Aaron J. Rosanoff, M.D., 2007 Wilshire Blvd., Los Angeles, California.
9. Charts (2) showing results of unpublished study of identical and fraternal twins.
Exhibited by: Dr. Frank N. Freeman, University of Chicago, Chicago, Ill.
10. Twin studies—59 photographs, 1 chart and 1 book.
Exhibited by: Dr. Gustav Korkhaus, Hofgartenstrasse 1, Bonn, Germany.
11. Charts (2) showing fingerprints of twins.
Exhibited by: Dr. P. J. Waardenburg, Arnhem, Holland.

12. Framed pictures (2) of identical triplets with fingerprints and anthropometric indices.
Exhibited by: Dr. Jacob Sanders, 240 Heemraadssingel, Rotterdam, Holland.
13. Chart showing fingerprints.
Exhibited by: Dr. Gustav Korkhaus, Hofgartenstrasse 1, Bonn, Germany.
14. Chart explaining construction of manuaries and models of manuaries.
Exhibited by: Dr. Heinrich Poll, Anatomisches Institute, Hamburg, Germany.
15. Blank forms for fingerprinting.
Exhibited by: Dr. Otto Schlaginhausen, Plattenstrasse 9, Zurich, Switzerland.
16. Analysis of Steggerda family fingerprints by H. H. Cummins.
Exhibited by: Dr. Morris Steggerda, Cold Spring Harbor, N. Y.
17. Fingerprint apparatus and 10 pictures.
Exhibited by: U. S. Bureau of Investigation, J. Edgar Hoover, Director, Dept. of Justice, Washington, D. C.
Pictures included a selection of criminal cases in which fingerprints played an important part in identifying the offender. The technical and typing sections of the Bureau and the manner of routing a fingerprint record through the bureau's identification division were shown.

BOOTH 3—SPECIAL CAPACITIES

Theme-sign.

- (a) Special capacities. Capacities are innate—hereditary. Capacity plus training equals ability.
- (b) Mental testing. Only as we measure qualitative characters in the different members of a family can we learn their heredity.

Exhibits:

1. Audiometer.
Exhibited by: C. H. Stoelting Co., 424 N. Homan Ave., Chicago, Ill.
2. Charts showing inheritance of musical capacity.
Exhibited by: Dr. Hazel N. Stanton, Eastman School of Music, Rochester, N. Y.

Section I. Data showing tests of Musical Capacities of children and adults showing suitability of the Seashore Measures of Musical Talents.

Section II. Charts 1, 2, 3 and 4 showing pedigrees of musical capacities for certain family units in an investigation of the inheritance of specific musical capacities in families of famous musicians and sponsored by the Eugenics Record Office. The 3 charts show the apparent tendencies of pedigrees of musical capacities among sibs, from records of the Seashore Measures of Musical Talents in the Eastman School of Music.

3. Genetic studies of artistic capacity.
Exhibited by: Dr. Norman C. Meier, University of Iowa, Iowa City, Iowa.
4. Tests for artistic sense. (a) Landscape composition. (b) Natural elegance in furs.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
For this exhibit an authentic Colonial house was made by Philip S. Graham, Architect, Westport, Conn. The fur samples were furnished by I. J. Fox, Fifth Ave., New York, N. Y.
5. Vocabulary study. Vocabularies of 5 two-year old children of the same family.
Exhibited by: Dr. John W. Scott, University of Wyoming, Laramie, Wyo.
6. Measurement of human talents. Tests, rating scales and inventories used in Europe and America for measuring abilities, aptitudes, interests and characteristics of personality.
Exhibited by: Personnel Research Federation, 29 West 39th St., New York, N. Y.
7. "Detroit Advanced Intelligence Test Form V"—K-family.
Exhibited by: Professor Roswell H. Johnson, University of Pittsburgh, Pittsburgh, Pa.
8. Intelligence Tests for Immigrants. Exhibited by: U. S. Dept. of Sanitation, U. S. Public Health Service, Dr. Lawrence Kolb, Senior Surgeon, Washington, D. C.
9. Psychological testing material.
Exhibited by: C. H. Stoelting Co. 424 N. Homan Ave., Chicago, Ill.
10. Moving picture illustrating work, training and recreation at Letchworth Village. Photographs of physical types of feeble-mindedness.
Exhibited by: Dr. Blanche M. Camp and Dr. Eugene W. Martz, Letchworth Village, Thiells, N. Y.
11. Pedigree wall chart showing community ramifications of bad blood. Statistical charts (3) giving eugenical classification of the chart.

- Exhibited by: Eugenics Survey of Vermont, 162 College Street, Burlington, Vt.
12. Measurement of intelligence in a rural area of England.
Exhibited by: J. B. Russell, B.Sc., Board of Education, London, England.
 13. Placards (3) showing effect of environment upon intelligence of children.
Exhibited by: Beth L. Wellman, Associate Professor of Research, Iowa Child Welfare Research Station, University of Iowa, Iowa City, Iowa.
 14. Charts (3) on Nature and Nurture.
Exhibited by: Kaiser Wilhelm Institute of Anthropologie, Berlin-Dahlem, Ihnestrasse 22/24, Germany.
 15. Photographs showing children in industry, street trades and agriculture.
Exhibited by: National Child Labor Committee, 331 Fourth Ave., New York, N. Y.
 16. "The Children's Charter."
Exhibited by: White House Conference on Child Health and Protection, Washington, D. C.

BOOTH 4—THE INHERITANCE OF RACING CAPACITY IN THE
THOROUGHBRED HORSE

Theme-sign.

- (a) The Thoroughbred Horse—For traits not predictable by Mendelian rules this method of study provides a new prediction-tool as definite for complex qualities which vary continuously as Mendelism is for combinations of definitely segregable units.
- (b) The direct object of this research is to learn how to predict by what probability the prospective foal will possess any given racing capacity.

Exhibits:

Showing the studies on the inheritance of racing capacity which led to the development of the mathematical formula covering this subject.

Pictures and pedigree analyses of 18 famous horses.

A mathematical model of the formula for the inheritance of racing capacity which can be used graphically to determine the probability that the foal, of any given descent in reference to ancestral racing capacity, will possess any selected racing capacity.

BOOTH 5—THE MEASURE OF RACING CAPACITY IN THE THOROUGHBRED HORSE

Theme-sign.

- (a) The invention of the yard-stick for racing capacity as an entity is possible because all of the major elements in the quality of racing performance are exactly measurable for each sex, *i.e.*, distance run in furlongs and yards; weight carried in pounds, age in years and seasons; and speed to the fifth of a second.
- (b) Racing Capacity. A type study for the invention of a new tool for the genetic study of complex and valuable traits in the higher mammals, including man.

Exhibits:

Charts and mathematical models, photographs and records showing the inter-compensation of sex, age, weight-carried, and distance-run in reference to speed. Showing also a diagram of the chromosomes of the horse, and a chart giving graphical comparison of the racing capacities of 10 Thoroughbred horses; namely, Princess Doreen b.f. 1921; Man O'War ch.c. 1917; Exterminator ch.g. 1915; Sarazen ch.g. 1921; Twenty Grand b.c. 1928; Equipoise ch.c. 1928; Display b.c. 1923; Gallant Fox b.c. 1927; Snowflake ch.f. 1927 and Faireno b.c. 1929.

Also a working laboratory whereby the Quality of Performance in any selected truly-run race can be computed.

The exhibits in booths 4 and 5 on the Genetics of the Thoroughbred horse represent the researches made possible by the joint support of Walter J. Salmon, distinguished breeder of Thoroughbred horses, and the Carnegie Institution of Washington. These researches, beginning in 1923, have developed a working laboratory for the investigation of problems on the inheritance of racing capacity. The researches were conducted by Harry H. Laughlin, with a staff of assistants.

BOOTH 6—MODEL EUGENICS LIBRARY

Theme-sign.

Every organized library—public, high school, college—interested in human welfare, history or biology should open a section on "Improvement in the breed of man" *i.e.*, eugenics.

Reference and research.

Exhibits:

1. In this experimental library a model classification of eugenical literature in accordance with modern library practice was set up, card indexes opened, and representative books, magazines, reprints, clippings and pictures were classified and placed on the shelves.

2. Case containing pamphlets; instructions on how to prepare a family pedigree; forms of field data on economic value of lives; student pedigree studies; Steggerda family history; pages from a book now in press by Dr. John Baer Stoudt "Washington's Earliest American Ancestor;" sample questionnaire sent to 1400 clergymen; Church and Eugenics.
3. Exhibit showing (a) Eugenics at the County Fair, (b) Mental theatre, (c) Fitter Families Contest, (d) Pedigree charts of good and bad families, and (e) Applied Eugenics.
Exhibited by: American Eugenics Society, 185 Church Street, New Haven, Conn.
4. Chart showing history of Pan-American Office of Eugenics and Homiculture.
Exhibited by: Dr. Delgado F. Ramos, 151 11th Street, Vedado, Havana, Cuba.
5. Chinese genealogies including Taoist Papacy Genealogy, Chang Family of Kiangsi, Confucius Family and the Kiang clan of Anhuei.
Exhibited by: Dr. Kiang Kang-hu, Dept. of Chinese Studies, McGill University, Montreal, Canada.

BOOTH 7—EUGENICS BOOK STORE

The purpose of this store was to acquaint teachers, parents, investigators, librarians and the general public interested in race betterment, concerning the standard in current publications in eugenics—the science of race betterment pure and applied.

BOOTH 8—THE SPECIAL SENSES

Theme-sign.

- (a) Genetics of the eye and ear structure and consequently the sight and hearing. Soundness and acuteness of the special senses can be developed by long time eugenics.
- (b) Pedigrees showing hereditary variations in the structure of the eye and ear which cause definite kinds of defects of vision and of hearing.

Exhibits:

1. Pedigree of color blindness.
Exhibited by: Dr. Robert K. Nabours, Kansas State Agricultural College, Manhattan, Kansas.
2. Incidence of color blindness among races.
Exhibited by: Professor T. R. Garth, University of Denver, Denver, Colorado.

3. Picture drawn by a color blind man. Ishihara color blind test.
Exhibited by: Museum of Science and Industry, 220 East 42nd Street, New York, N. Y.
4. Case of deformed eye-balls and chart describing structure of the eye.
Exhibited by: Dr. Bernard Samuels, 57 West 57th St., New York, N. Y.
5. Charts showing heredity of eye color. Pedigrees of pathological traits and of illnesses.
Exhibited by: Dr. G. P. Frets, Mental Hospital, Maasoord, Poortugaal, Holland.
6. Charts (28) showing eye defects and their inheritance.
Exhibited by: Dr. P. J. Waardenberg, Velperweg 22, Arnhem, Holland.
7. Charts (6) showing 22 different kinds of inherited eye defects.
Exhibited by: Dr. M. T. Macklin, University of Western Ontario, London, Ontario, Canada.
8. Pedigree showing occurrence of epicanthus and ptosis.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
9. Case of models of the organs of hearing and sight.
Exhibited by: Clay-Adams Co., 117 East 24th Street, New York, N. Y.
10. Audiometer for testing hearing.
Exhibited by: Graybar Electric Company, Graybar Bldg., New York, N. Y.
11. "Community study of deafness"—2 large wall panels. "Inheritance of deafness"—7 charts. Audiograms.
Exhibited by: Clarke School for the Deaf, Northampton, Mass.
12. Model of human ear, section through middle ear, section through middle ear with operation performed, transparent temporal bone in glass container and labyrinth model.
Exhibited by: Pfau's American Instrument Co., 2 East 23rd Street, New York, N. Y.
13. Pedigree showing inheritance of bone fragility and blue sclerotics.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
14. Charts (5) showing heredity of otosclerosis.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
15. Pedigree showing otosclerosis, blue sclerotics and bone fragility.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
16. Pedigree showing Familial Occurrence of Deaf-mutism. Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.

BOOTH 9—HEREDITY

Theme-sign.

(a) The Mechanism of Heredity. Ancestral Influences. Types of Inheritance.

(b) Pedigree charts of Constitutional and Physical Abnormalities in Man.

Exhibits:

1. Chart: Chromosomes in man.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
2. Chart: "Mechanism of Mendelian Heredity."
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
3. Pedigree charts showing manner of calculating ancestral influence in man; the mathematical measure of human heredity based upon average range and chance in the distribution of chromosomes from particular ancestors to the F_1 Zygote. (1) Basic formula, (2) Ancestral influence in male, (3) Ancestral influence in female.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
4. Major types of Inheritance. (1) Recessive, illustrated by pedigree showing albinism; (2) Dominant, illustrated by pedigree of cataract; (3) Sex-linked, illustrated by pedigree of hemophilia.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
5. Pedigree charts illustrating inheritance of specific defects, allergic conditions, manic-depressive insanity, epilepsy, club foot, diabetes mellitus and the familial incidence of pauperism.
Exhibited by: Eugenics Society of Great Britain, 20 Grosvenor Square, London, England.
6. Photographs and charts showing inheritance of abnormalities.
Exhibited by: Prof. Ladislaus Benedek, Debrecen, Hungary.
7. Pedigree showing Paralysis Agitans.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
8. Pedigree showing five generations of Huntington's chorea.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
9. Pedigree showing inheritance of cancer.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
10. Charts (2) pertaining to the inheritance of cancer.
Exhibited by: Dr. C. C. Little, Roscoe B. Jackson Laboratory, Bar Harbor, Maine.
 1. The rôle of the ovary in the incidence of cancer of the breast.
 2. Inheritance of tendency to form cancer of the breast.
11. Pedigree showing inheritance of myotonia.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.

12. Pedigree showing inheritance of diabetes mellitus.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
13. Pedigree showing inheritance of weak lungs.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
14. Charts showing a series of immature myeloblasts in progressive stages of mitotic division, prophase to anaphase, from the peripheral blood of acute and chronic myeloid Leukemia, in which highly immature myeloblasts are very numerous. (Case of Dr. J. R. Wiseman.) 2 booklets.
Exhibited by: Dr. Wm. A. Groat, Dept. of Clinical Pathology, College of Medicine, Syracuse University, Syracuse, N. Y.
15. Charts (6) on hemophilia, showing symptoms, heredity, blood findings, treatment, x-ray of pelvis and diagrammatic representation of transmission of hemophilia.
Exhibited by: Dr. Carroll L. Birch, University of Illinois, Chicago, Ill.
16. Chart showing the influence of inbreeding on the distribution of blood groups.
Exhibited by: Dr. Marianne A. van Herwerden, University of Utrecht, Parkstraat 47, Utrecht, Netherlands.
17. Chart showing the racial factors of menopausal arthrites.
Chart of 13 child family showing arthritis deformans.
Exhibited by: Dr. F. N. Walker, Toronto, Canada.
18. Photographs and pedigree charts of Anhidrosis; Inheritance of Anhidrosis associated with Anadontia; Hypotrichosis; Inheritance of Monilethrix, etc.
Exhibited by: Elmer Roberts and L. C. Thomas, College of Agriculture, Urbana, Ill.
19. Charts (7) showing inheritance of zygodactyly and of gap between central incisors.
Exhibited by: University of Minnesota, Minneapolis, Minn.
20. Charts and models showing (a) Decay of different types of teeth, (b) Decay of teeth and blood groups, (c) Decay of teeth in races, White and Negro, (d) Teeth in Eskimo women, (e) Eyebrows and heredity, inheritance of color, (f) Vacations and health.
Exhibited by: Professor V. Suk, Masaryk University, 38 Kounicova, Brno, Czechoslovakia.
21. Pedigree chart showing inheritance of nose character.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.

22. Pedigree chart showing the inheritance of the Hapsburg Lip.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
23. Pedigree charts (4) illustrating work of students at University of Wyoming.
Exhibited by: Dr. Mary J. Brown, University of Wyoming, Laramie, Wyo.
24. Pedigree charts shown at the Second International Exhibit of Eugenics, held in 1921—29 picture charts.
25. Sample Quaker genealogy.
Exhibited by: Mrs. Louis Robinson, 411 College Ave., Swarthmore, Pa.
26. Pedigrees of 4 famous families.
Exhibited by: Eugenics Society of Great Britain, 20 Grosvenor Gardens, London, England.

BOOTH 10—HEREDITY AND THE ENDOCRINES

Theme-sign.

Allergy. Endocrine effects in development and evolution. Animals showing definite hereditary traits.

Exhibits:

1. A study on the susceptibility of ivy poisoning.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
2. Allergy exhibit—6 charts and guide.
Exhibited by: Lederle Laboratories, Inc., 511 Fifth Ave., New York, N. Y.
3. Pedigrees showing inheritance of allergic diseases.
Exhibited by: Mildred H. Richards and Dr. Ray M. Balyeat, Balyeat Hay-fever Clinic, Oklahoma City, Okla.
4. Study in Specific Hypersensitiveness.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
5. Chart of endocrinopathic inheritance.
Exhibited by: Dr. Charles B. Davenport, Cold Spring Harbor, N. Y.
6. Charts (3) showing goitre studies in Maryland.
Exhibited by: Dr. Charles B. Davenport, Cold Spring Harbor, N. Y.
7. Model of the human body showing circulation of the blood. Model of the kidneys with suprarenal glands resting on them. Model of the thyroid gland. Illustration showing the glands of internal secretion.
Exhibited by: Clay-Adams Co., 117 East 24th St., New York, N. Y.

8. (a) Endocrine exhibit: Phylogenetic change produced by endocrine treatment in salamanders. Rôle of the anterior pituitary gland in production of red pigment in salamanders.
 (b) Environment exhibit: Influence of light in the return of vision and development of pigmentation in blind cave salamander.
 Exhibited by: Dr. G. K. Noble and S. H. Pope, American Museum of Natural History, New York, N. Y.
9. Live guinea-pigs showing inheritance of trembling and waltzing.
 Exhibited by: Professor Heman L. Ibsen, Department of Animal Husbandry, Kansas State College, Manhattan, Kansas.
10. Charts (2) showing racial improvements by genetic breeding.
 Exhibited by: Mount Hope Farm, Williamstown, Mass.
 1. Graph showing improvement in number of eggs.
 2. Chart of a good pedigree.
11. Pedigree showing plumage color in Andalusian Fowl.
 Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.

BOOTH 11—HEREDITY OF MENTAL DEFECTS

Theme-sign.

Pedigree charts on Mental Abnormalities in Man.

Exhibits:

1. Charts (10) showing expectation of mental disease, rates of incidence, expectation of life of insane and death rates of insane.
 Exhibited by: N. Y. State Department of Mental Hygiene, Dr. Horatio M. Pollock, Director, Albany, N. Y.
2. Pedigree showing probable hereditary impulse to self-destruction.
 Exhibited by: Miss Anette Phelan, Teachers College, New York, N. Y.
3. Charts (10) showing influence of alcohol and heredity.
 Exhibited by: Foundation for Narcotic Research, 150 Fifth Ave., New York, N. Y.
4. Pedigree chart showing heredity in a family of criminals.
 Exhibited by: Theophil Laanes, Cold Spring Harbor, N. Y.
5. Chart on the Dack Family of Social Inadequates.
 Exhibited by: Dr. William Sandy, Warren State Hospital, Warren, Pa.
6. "Hereditary Factors in 600 Institutionalized Epileptics"—11 charts.
 Exhibited by: Calvert Stein, M.D., Monson State Hospital, Palmer, Mass.

7. Historical and legal development of Eugenical Sterilization, charts and maps.
Exhibited by: Eugenics Record Office, Cold Spring Harbor, N. Y.
8. Explanation of Sterilization.
Exhibited by: Human Betterment Foundation, Pasadena, California.
9. Chart demonstrating two sides of the "Like Produces Like" doctrine.
Exhibited by: University of Minnesota, Minneapolis, Minn.

BOOTH 12—POPULATION ANALYSIS

Theme-sign.

- (a) Studies in quality of the American population.
- (b) Differential fecundity and its Consequences to the Race. Social groups.

Exhibits:

1. Population studies—vital statistics.
Exhibited by: Population Reference Bureau, Washington Square East, New York, N. Y.
2. Charts (11) illustrating vital statistics.
Exhibited by: Metropolitan Insurance Company, 1 Madison Ave., New York, N. Y.
3. Population analysis—3 charts, 9 maps.
Exhibited by: U. S. Bureau of Agriculture, Washington, D. C.
4. Charts (5) illustrating results of researches on the biological consequences of war.
Exhibited by: Professor Harrison R. Hunt, Michigan State College, East Lansing, Mich.
5. Charts (22) on crime by quota fulfillment, by race and country of birth of prisoners.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
6. Charts (7) illustrating researches on the population of New York City.
Exhibited by: Bureau of Health Education, Department of Public Health, New York, N. Y.
7. Alabama population studies—Graphs, maps and explanatory pamphlets.
Exhibited by: Roland M. Harper, University of Alabama, University, Ala.
8. Charts showing American People of Polish Origin in Texas.
Exhibited by: Dr. Boleslaw Rosinski, Nowy Swiat 30, Warsaw, Poland.

9. Charts on fecundity, intelligence and population correlations.
Exhibited by: Frank Lorimer, Eugenics Research Association, Cold Spring Harbor, N. Y.
Charts prepared for "Social Eugenics" to be published in 1933.
10. Charts showing differential fecundity according to social class.
Exhibited by: Milbank Memorial Fund, 40 Wall Street, New York, N. Y.
11. Charts (4) showing fertility and population studies.
Exhibited by: Kaiser Wilhelm Institute, Berlin-Dahlem, Germany.
12. Graphs (2) showing the outcome of differential fecundity and population turn-over in Hawaii.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
13. Chart showing birth order and parent age.
Exhibited by: Richard L. Jenkins, 907 S. Lincoln St., Chicago, Ill.

BOOTH 13—POPULATION ANALYSIS

Theme-sign.

Racial composition and quality.

Exhibits:

1. Map illustrating migration of the Negroes.
Exhibited by: Professor S. J. Holmes, University of California, Berkeley, Calif.
2. Studies on the slave trade.
Exhibited by: Elizabeth Donnan, Wellesley College, Wellesley, Mass.
3. Charts, reprints and pamphlets of studies of half-caste families in Liverpool.
Exhibited by: Miss Muriel E. Fletcher, 29 Bank Street, Dundee, Scotland.
4. Race integrity charts—3.
Exhibited by: Bureau of Vital Statistics, Commonwealth of Virginia, Richmond, Va.
5. Charts (3) illustrating the outcome of differential fecundity. Pedigree chart showing Pure-Sire Method of Race Assimilation in North America.
Exhibited by: Harry H. Laughlin, Cold Spring Harbor, N. Y.
6. Maps and charts illustrating population and culture of the American Indian.
Exhibited by: Bureau of Indian Affairs, Dept. of the Interior, Washington, D. C.

7. Anthropometric studies of Indians.
Exhibited by: Morris Steggerda, Cold Spring Harbor, N. Y.
8. Researches on the white Indians of Panama.
Exhibited by: Reginald G. Harris, Cold Spring Harbor, N. Y.
9. Maps, pictures and statistical charts on Estonian racial types, weight of brain of Estonians, stature of Estonian soldiers, etc.
Exhibited by: Eugenics Society of Estonia, represented by Theophil Laanes, Cold Spring Harbor, N. Y.
10. Charts on racial, religious and language factors in nationality. Rhyme of race or "Ethnology for the Million." The "Zones and Strata" concept applied to racial evolution and transport.
Exhibited by: Dr. Griffith Taylor, University of Chicago, Chicago, Ill.
11. Graphs (18) showing population growth in Germany.
Exhibited by: Dr. Friedrich Burgdorfer, Director of Statistischen Reichsamt, Berlin, Germany.
12. Statistical tables (9) giving birth-rate analysis by date, age and social stock.
Exhibited by: Dr. Willy Wagner-Manslau, Altstrasse Graben 58, Danzig, Germany.

THIRD FLOOR. BOOTH 14 TO 21.

BOOTH 14—HEREDITY OF THE EYE

Theme-sign.

- (a) The elimination of hereditary eye defects will be the next great advance in preventive ophthalmology.
- (b) You can help prevent blindness by encouraging laws, visual tests, and education.

Exhibits:

1. Cast of eye with muscles.
Exhibited by: Perkins Institution, Watertown, Mass.
2. Pedigree charts of families having two or more students at Perkins Institution.
Exhibited by: Perkins Institution, Watertown, Mass.
3. Charts illustrating the construction of the eye and various diseases of the eye, eye tests, map of "The World of the Blind" and various posters used for instructing the public.
Exhibited by: Perkins Institution and Massachusetts School for the Blind, in coöperation with the Howe Laboratory of Ophthalmology, Harvard Medical School.

BOOTH 15—TASTE THRESHOLDS

Theme-sign.

Persons vary greatly by inheritance in range and acuity in all special senses.

Exhibits:

1. Taste thresholds exhibit.

Exhibited by: Dr. A. F. Blakeslee, Dept. of Genetics, Carnegie Institution of Washington, Cold Spring Harbor, N. Y.

Attendant in charge tested the taste thresholds of interested visitors.

BOOTH 16—ETHNIC SURVEY

Theme-sign.

Population turn-over in race and family-stock quality constitutes the fundamental fact of history in relation to national character and achievement.

Exhibits:

1. Ethnic survey of Connecticut College and Pembroke College for Women, New London, Conn.

Exhibited by: Mrs. Bessie B. Wessel, Connecticut College, New London, Conn.

BOOTH 17—CANCER

Theme-sign.

In cancer, as in most diseases, there is an essential hereditary constitution which determines resistance and susceptibility.

Exhibits:

1. Screens (34) containing illustrative charts.

Exhibited by: New York Cancer Committee, American Society for the Control of Cancer, New York, N. Y.

BOOTH 18—ITALIAN DEMOGRAPHY

Theme-sign.

Sound demographic bookkeeping is a high-class national investment.

Exhibits:

1. Charts from Italian Institute of Statistics showing the demographic analysis of the Italian people.

Exhibited by: Dr. Corrado Gini, 10 via delle Terme, Societa Italiana di Genetica ed Eugenica, Rome, (30) Italy.

BOOTH 19—LABORATORY FOR CHILD STUDY

Theme-sign.

Foster children represent diverse heredity but in schools like Mooseheart they are given uniform environment. This set-up helps to factor out the essential different contributions of heredity and environment in human development and character.

Exhibits:

1. Pictures (28) from Mooseheart School.

Exhibited by: Dr. R. M. Binder, 279 Prospect Street, East Orange, N. J.

BOOTH 20—LABORATORY FOR THE STUDY OF RACE PROBLEMS

Theme-sign.

Nations may well invest in laboratories for the study of problems connected with the conservation of their best racial stocks.

Exhibits:

1. Posters and charts illustrating hereditary mental traits, measured and expressed in numbers.

Exhibited by: Jon Alfred Mjoen, Vinderen Laboratory, Oslo, Norway.

Basic psychic traits measured in II, III and IV generations.

Abilities of children in relation to those of parents, grandparents, side lines.

New method for a geneostatistical analysis of hereditary musical endowment.

Homogenial and heterogenial matings.

BOOTH 21—SOCIAL HYGIENE AND EUGENICS

Theme-sign.

Sound minds and sanitary bodies give sound hereditary endowments the opportunity to find normal development. Social diseases prevent reproduction, hamper development and cause destruction of body and mind.

Exhibits:

1. Charts pertaining to the prevention and cure of venereal diseases.

Exhibited by: British Social Hygiene Council, Inc., Carteret Street, London, England.

2. Posters, pamphlets and books.

Exhibited by: American Social Hygiene Association, 450 Seventh Ave., New York, N. Y.

Cases I to VIII. South Corridor. Third floor exhibit.

THE NATURAL HISTORY OF MAN

This exhibit was prepared by Dr. William K. Gregory. While it is to be a permanent Museum exhibit, it was inspired by the same purpose which inspired the temporary exhibits of the Eugenics Congress, and was timed to open to the public on the occasion of the opening of the Third International Eugenics Congress.

Ultimately the Hall of the Natural History of Man will consist of two halves, the first entitled "Introduction to Human and Comparative Anatomy," and the second dealing with the physical characteristics of the races of man, development, growth and allied topics. It is the first half of this hall, prepared by Dr. Gregory, which constituted an exhibit of the Congress.

As the title indicates, these exhibits trace the various structures and functions of man from their earliest geological beginnings. Thus the basic long-time background of human origin and advance is shown in close connection with current studies on the conservation and advance of the various hereditary endowments of living races and family-stocks.

The "Introduction to Human and Comparative Anatomy" begins by showing man in his cosmic aspect, conceived as a living engine which derives its working capital of energy directly or indirectly from the energy of the sun stored up in plant and animal tissue; this energy is appropriated by man in food substances. Case I deals with the intake and outgo of this energy through the various anatomical systems. It shows how the food energy is made available by the digestive system and distributed by the "currency of the blood," namely, the blood corpuscles. Other divisions give the most essential facts regarding the "main pump of the body," the "living bellows" (respiration), heat regulation and the like.

Wall Chart 1, a decorative design, illustrates the history of anatomy and stresses the fact that, thanks to the labors of Darwin and his successors, the study of human anatomy has become a part of the history of the vertebrates in geologic time.

In Case II A the exhibits deal with "Organ Systems of Shark and Man," showing the educational value of the anatomy of the common dogfish as affording an epitome of human anatomy. The organ systems of shark and man are then classified under twelve functional systems, some of which are illustrated by anatomical models.

In Case II B the "Elements of the Locomotor Apparatus" are set forth. In the simplest possible words it is shown how red muscle fibers of the fish are combined into W-shaped muscle flakes, or myomeres, how these consti-

tute the basis of the active part of the locomotor apparatus and how these muscle segments are represented by the primitive segments of the human embryo.

Wall Chart 2 shows a graded series of living animals forming an "*Échelle des Etres*" from fish to man; beneath this are the descending geologic ages and the staircase of fossil forms leading to older and older ages, with lines suggesting their genealogical relations with the living forms.

Case III sets forth "The Skeleton from Fish to Man" in a series of nine skeletons, beginning with a generalized fossil fish.

Wall Chart 3 comprises restorations of these same forms as they may have appeared in life.

Case IV A deals with the "Maintenance of the Upright Posture" in man and is concerned chiefly with the muscles of the back and limbs. In Case IV B one may examine a series of pectoral and pelvic girdles and limbs of vertebrates, showing how these structures have evolved out of the bases of the primitive steering planes of primitive fish.

Wall Chart 4 depicts the general body-form and relative length of limbs of the anthropoid apes in comparison with man. The late foetal stages of the same forms are also represented and the point is evident that in general appearance the foetal stages are less unlike than the adult stages.

Case V A, "Hands and Feet of Primates," deals with the muscular anatomy and external form of primates up to man.

Case V B, "Embryology" shows models and diagrams of human and other embryos, embryonic membranes, etc.

Wall Chart 5 is entitled "Comparative Embryology from Fish to Man." It depicts the chief stages from the undivided egg to the adult in shark, lung-fish, salamander, lizard, opossum, monkey (macaque), man. It is based on the most recent embryological material as figured by contemporary authors.

Case VI contains first a series of models of heads of vertebrates representing successive grades of organization and illustrating the evolution of the face; next are five tablets showing a series of models of skulls illustrating the evolution of the skull as a whole and of many of its individual elements; next, a series of models based on the dissections of facial muscles by the late Dr. Ernst Huber of the Johns Hopkins Medical School.

Wall Chart 6 is a sort of genealogical tree entitled "Man among the Primates." It is practically an illustrated classification giving life-like color sketches of the principal types of lemuroids, *Tarsius*, New World monkeys, Old World monkeys, anthropoid apes and man.

Case VII A deals with "Skulls, Jaws and Teeth." There is first a synoptic series of models of the principal known skulls and jaws of fossil pri-

mates, next a series of enlarged models illustrating the evolution of the upper and lower premolar and molar teeth from the oldest known mammals to man; another exhibit deals with the history of the jaw muscles.

In Case VII B the "Elements of the Nervous System" are set forth.

Wall Chart 7 depicts the "Rise of the Human Brain," comparative views of the brains of a structurally ascending series of vertebrates.

Case VIII attempts to give an outline of the "Brain and its Functions." It begins with the shark as representing a type of animal in which sensory stimulus is typically followed by an immediate and direct bodily response, in contrast with man in which the response is usually conditioned by ideas and general control is vested in the neopallium.

COLLABORATION OF THE AMERICAN MUSEUM OF NATURAL HISTORY

The Third International Congress and Exhibit of Eugenics, in 1932, like the Second in 1921, was held in the American Museum of Natural History, New York City. This institution furnished an ideal setting because of the great part which the Museum has played in restoring the correct history of the evolution of man, both his long geological history and the archaeological record of his struggle upward during recent millennia. All anthropological exhibits of the Museum were thrown open to the visitors to the Eugenics Exhibit. Thus the Museum's permanent exhibits on man's evolution were closely articulated with the current Eugenics Exhibit on man's present trends in race and capacities, and on the technique of his own purposeful control of his own future racial and family-stock evolution. In a folder prepared by the Museum for the use of the delegates to the Third International Congress of Eugenics there appears the following statement, "Nothing that pertains to the biological history of man or to the conditions of his racial progress or retrogression is foreign to the Third International Congress of Eugenics." This folder lists also the arrangement of exhibits in the Museum, particularly in the Hall of the Age of Man.

The first section of the Hall of the Natural History of Man devoted to "Introduction to Human and Comparative Anatomy" recently completed by Dr. William K. Gregory was quite appropriately opened concurrently with the opening of the Eugenics Exhibit.

The Museum's exhibits of plants and animals in domestication served to bring home the fact that within a few generations and careful guidance in mate selection and radical elimination of misfits, the larger breeds of animals may make family stock advances which required many hundreds and even thousands of years by means of natural selection. In short the Museum setting for the exhibit served to emphasize the essential unity of Nature in geological evolution and in eugenical purpose.

LIST OF PLATES ILLUSTRATIVE OF THE EXHIBIT

1. The Relation of Eugenics to Other Sciences.
2. The General Entrance View.
3. Panel: What Eugenics is All About.
4. Bust of Charles Robert Darwin.
5. Bust of Sir Francis Galton.
6. General View of Exhibition Hall.
7. Pedigree of the Galton-Darwin-Wedgwood Family.
8. Family Stock of George Washington.
9. Abraham Lincoln: Family Stock Study.
10. The Near-Kin of Theodore Roosevelt.
11. The Edison Family.
12. Anthropometric Studies of Indians.
13. The Pure-Sire Method of Race Assimilation in North America.
14. Anti-Miscegenation Laws of the Several States.
15. Migration of Negroes. 1910-1920.
16. Types of Body Build.
17. Three Charts on Nature and Nurture.
18. Mental Disorders in Twins.
19. Construction of Manuaries and Models of Manuaries.
20. A Proposed Census Card for Unifying the Population Census.
21. Race Descent: American Statesmen.
22. Race Descent.
 - a. Inventiveness by Racial Stock in the United States.
 - b. Race Descent of Population in the United States.
23. Historical and Legal Development of Eugenical Sterilization.
24. Differential Fecundity.
 - a. Population Turnover in Hawaii 1823-1930.
 - b. Outcome of Differential Fecundity.
25. Fertility and Population Studies.
26. Mechanism of Mendelian Heredity.
27. Expectation of Mental Disease; Rates of Incidence.
28. Specialized Tests for Sense of Elegance.



THIRD INTERNATIONAL EUGENICS CONGRESS, NEW YORK CITY, AUGUST 21-23, 1932
Introductory Wall Panel "The Relation of Eugenics to Other Sciences," based on a paper by Dr. Harry H. Laughlin, Cold Spring Harbor, Long Island, New York

THIRD INTERNATIONAL EXHIBIT OF EUGENICS

HELD ON OCCASION OF THE THIRD INTERNATIONAL CONGRESS OF EUGENICS
AMERICAN MUSEUM OF NATURAL HISTORY - NEW YORK CITY - AUGUST 22 TO SEPTEMBER 22, 1932

THE PURPOSE OF THIS EXHIBIT IS TO MAKE STOCK OF MAN'S PRESENT KNOWLEDGE ABOUT THE INHERENT ELEMENT IN HUMAN QUALITIES, PHYSICAL, MENTAL AND SPIRITUAL AND ABOUT THE CONTROL OF SUCH QUALITIES IN FAMILY-STOCKS IN RACES AND IN NATIONAL POPULATIONS, IN THEIR TURN-OVER FROM GENERATION TO GENERATION.
MORE BRIEFLY THIS EXHIBIT IS ABOUT IMPROVEMENT IN THE BREED OF MAN.



GENERAL ENTRANCE VIEW. EXHIBIT HALL.

WHAT EUGENICS IS ALL ABOUT

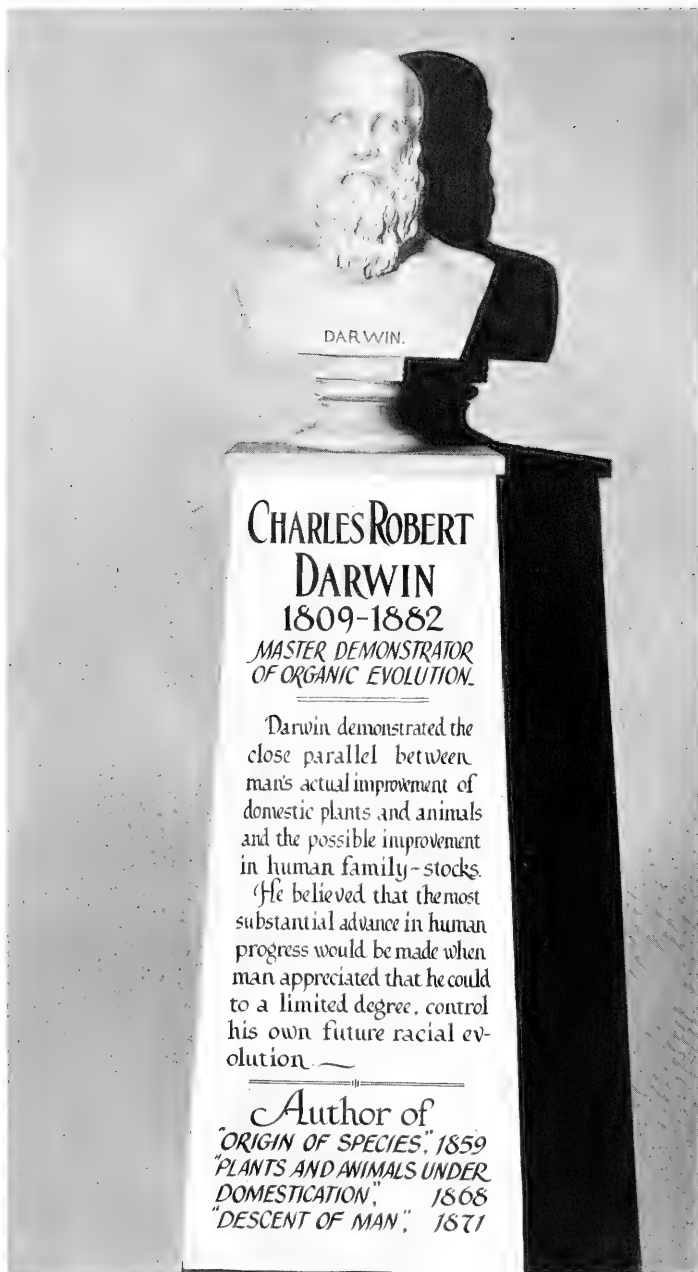
Eugenics is that science which studies the inborn qualities—physical, mental and spiritual—in man, with a view to their improvement.

Nothing is more evident in the history of families, communities and nations than that, in the change of individuals from generation to generation, some families, some races, and the people of some nations, improve greatly in physical soundness, in intelligence and in character, industry, leadership, and other qualities which make for human breed improvement; while other racial, national, and family stocks die out—they decline in physical stamina, in intellectual capacity, and in moral force.

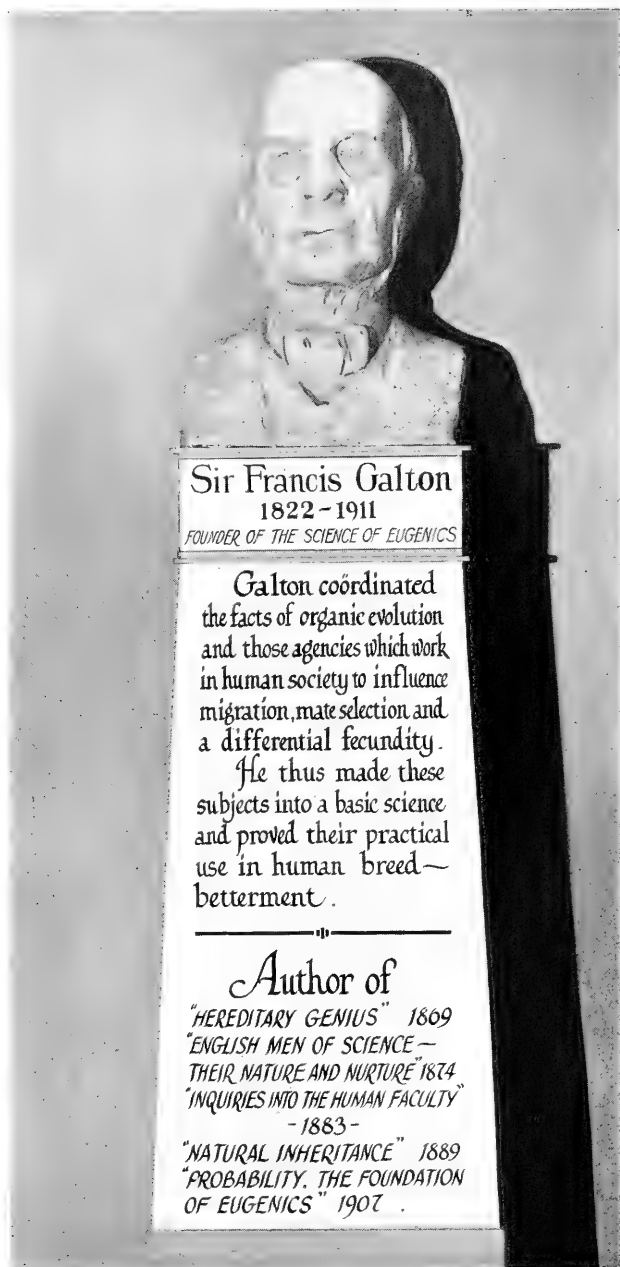
Both good and bad qualities are hereditary. It follows that every family and every race, as well as every nation, has its own eugenic problems. When the new generation is produced by sound and capable families "the breed of man tends to improve." If, however, the more degenerate members of the community produce the greater number of children, then "the breed of man degenerates."

The eugenical future of your community—and in parallel fashion of your family and your nation—depends upon (a) who moves into your community to become the ancestors of a portion of its future citizens, (b) how the present members of the community—both native and adopted—marry, and (c) how many children the different families have in relation to the "excellence of the hereditary stuff out of which they are made."

Eugenics, then, concerns improvement in the breed of man. Obviously it is closely parallel, in essential nature, to the improvement in domestic plants and animals; but it is clear that in man the methods of mate-selection, and of reproducing from the best and forbidding reproduction by the most inferior, must be different from the methods employed in plant and animal breeding. Applied eugenics works essentially through long-time education, in which young people build up an appreciation of the importance of "blood" and "breed"—that is of the hereditary foundations of individual and family success. In the long run, the appreciation of good blood is counted on to influence mate-selection and "family-size ideals"—unconsciously perhaps, but just as really and as powerfully as wealth, social position and charming personal qualities.



BUST OF CHARLES ROBERT DARWIN



Sir Francis Galton
1822-1911

FOUNDER OF THE SCIENCE OF EUGENICS

Galton coördinated the facts of organic evolution and those agencies which work in human society to influence migration, mate selection and a differential fecundity.

He thus made these subjects into a basic science and proved their practical use in human breed-
betterment.

Author of

"HEREDITARY GENIUS" 1869

"ENGLISH MEN OF SCIENCE—

THEIR NATURE AND NURTURE" 1874

"INQUIRIES INTO THE HUMAN FACULTY"

—1883—

"NATURAL INHERITANCE" 1889

"PROBABILITY, THE FOUNDATION
OF EUGENICS" 1907

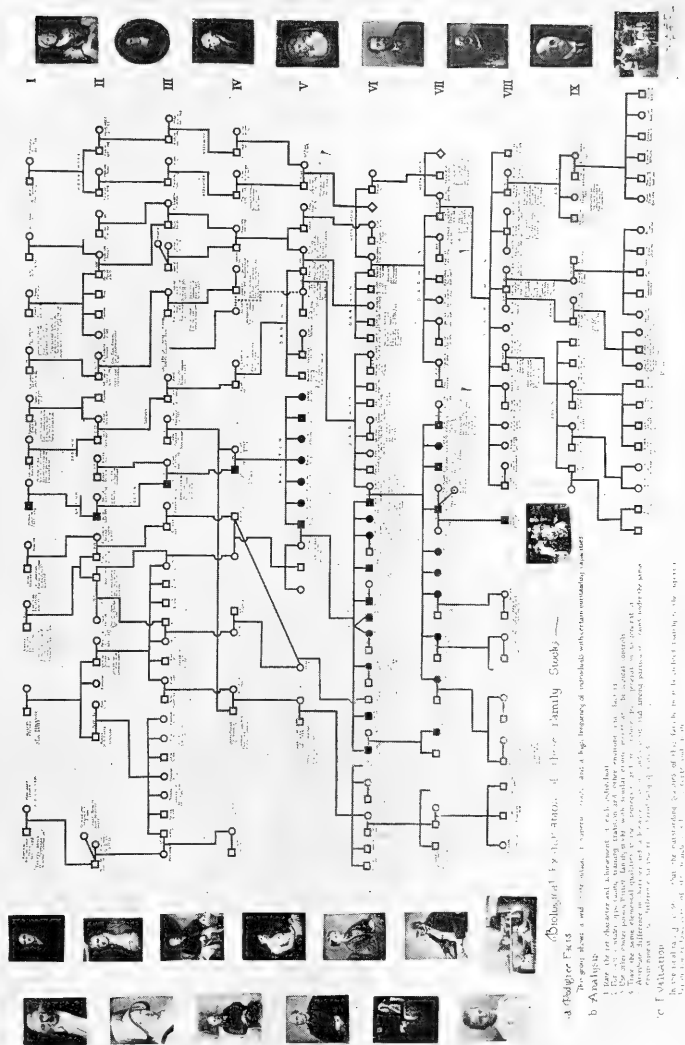
BUST OF SIR FRANCIS GALTON



GENERAL VIEW OF EXHIBITION HALL

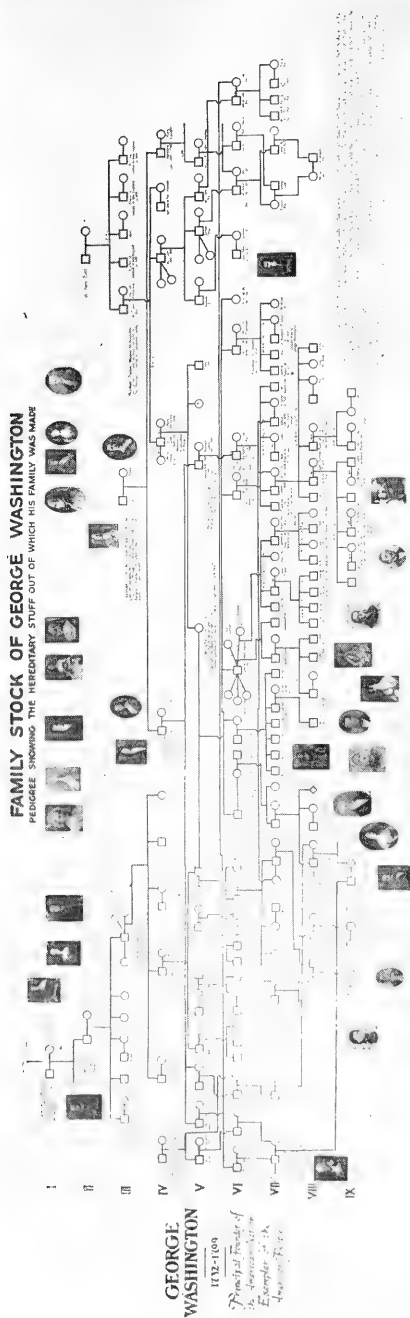
PEDIGREE OF THE GALTON-DARWIN-WEDGWOOD FAMILY.

A GROUP OF CLOSELY RELATED FAMILY-STOCKS CHARACTERIZED BY OUTSTANDING CAPACITIES IN PHILOSOPHY, SCIENCE AND ART.



PEDIGREE OF THE GALTON-DARWIN-WEDGWOOD FAMILY

A group of closely related family-stocks characterized by outstanding capacities in philosophy, science and art.
Exhibited by Dr. Harry H. Laughlin, Cold Spring Harbor, New York

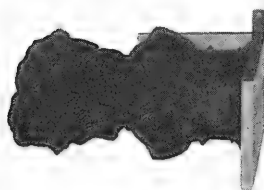


FAMILY-STOCK OF GEORGE WASHINGTON

Pedigree showing the hereditary stuff out of which his family was made. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.

ABRAHAM LINCOLN : FAMILY-STOCK STUDY

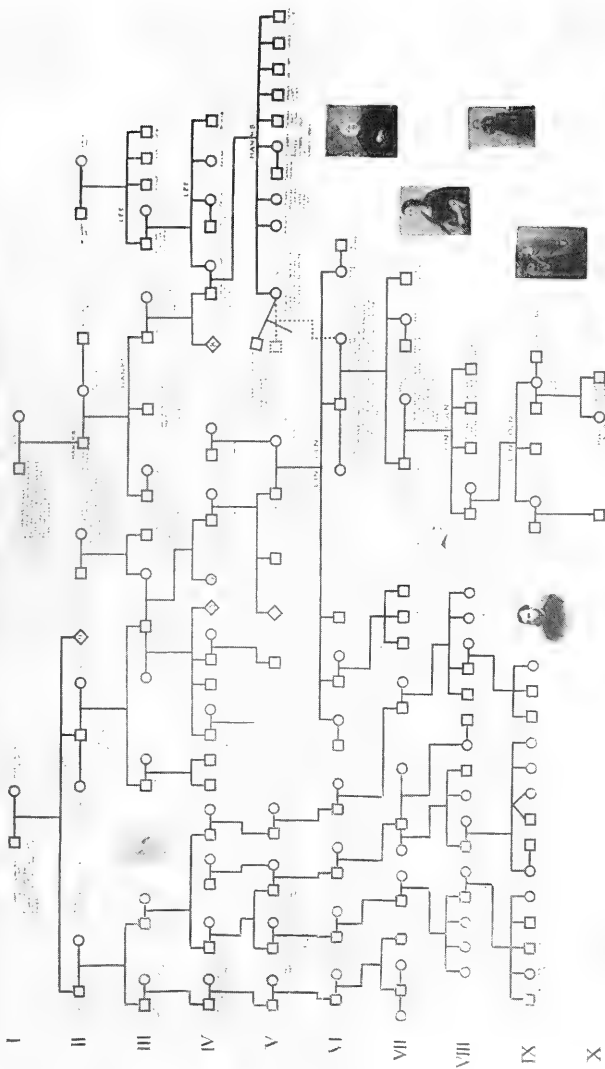
ANALYSIS OF INBORN QUALITIES OF NEAR-KIN OF ABRAHAM LINCOLN



**ABRAHAM
LINCOLN**

1808 - 1865

*Frontiersman.
Leader -
President -
Preserver of the Union.
Symbol of Freedom.
Political Genius.
Master of English Speech.
Lover of Humanity.*

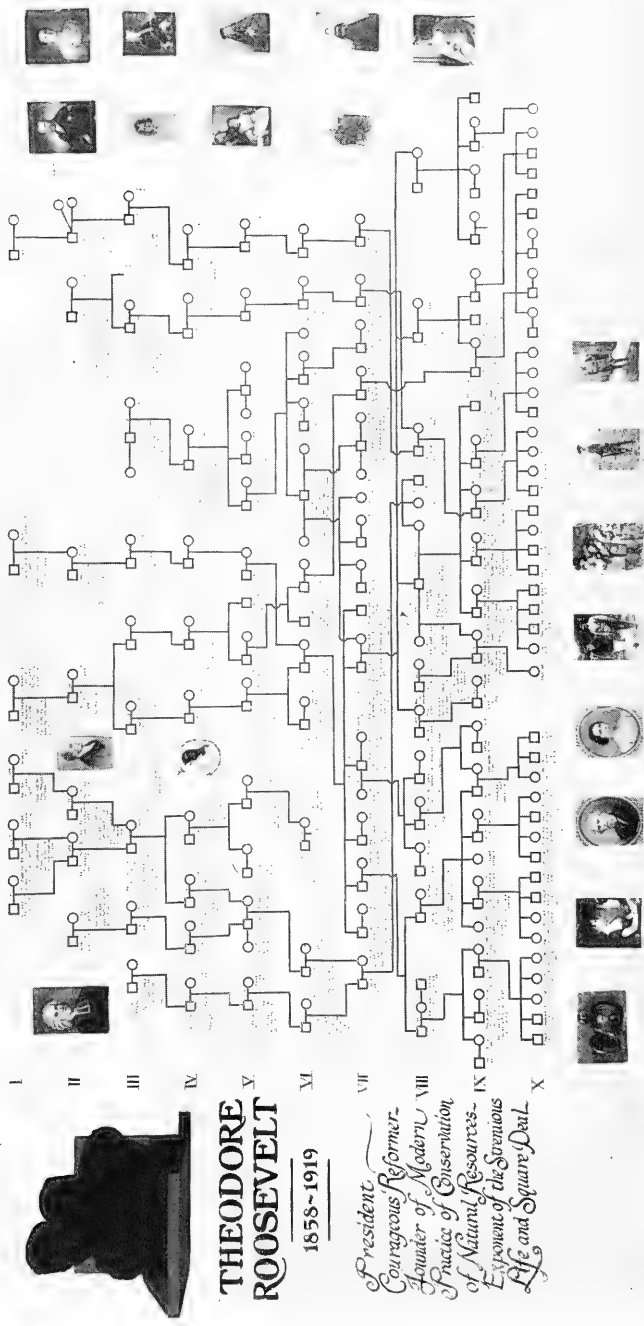


The Hanks family was reputable both in England and the United States

ABRAHAM LINCOLN: FAMILY-STOCK STUDY

Analysis of inborn qualities of near-kin of Abraham Lincoln. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.

THE NEAR-KIN OF THEODORE ROOSEVELT
A BIOLOGICAL STUDY OF NATURAL INHERITANCE IN THE ROOSEVELT FAMILY



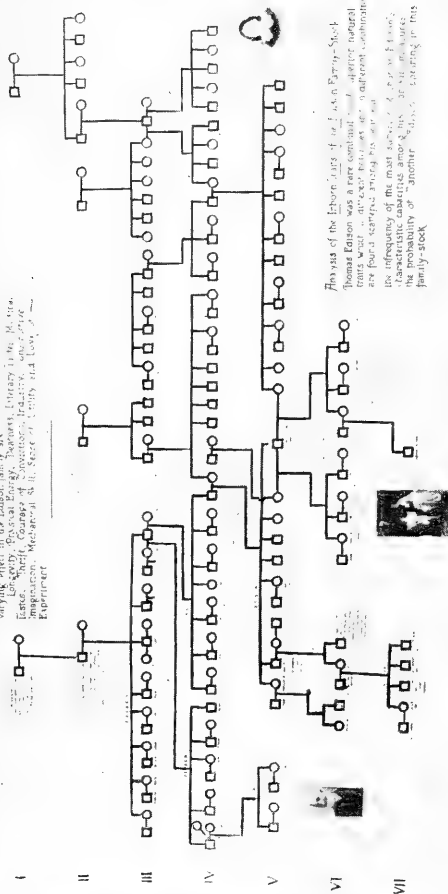
THEODORE ROOSEVELT
1858-1919
President
Courageous Reformer.
Author of Modern
Practice of Conservation
of Natural Resources.
Exponent of the Serious
Life and Square Deal.

THE NEAR-KIN OF THEODORE ROOSEVELT

A biological study of natural inheritance in the Roosevelt family. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.

THE EDISON FAMILY.

Thomas Edison's ancestor of the same name was a Dutch settler who came to America about 1730, and settled in a place called Edinboro, Pa. Outwardly characteristic with significant and strong varying effect in the Edison family are Longevity, Personal Energy, Thoroughness, Industry, the "Patent" Instinct, Faculty, Courtesy of Conversation, Industry, Originality, Imagination, Mechanical Skill, Sense of Utility and Love of an Experiment.



Analysis of the life history of *Helicoverpa* Stock
Thomas Edison was a very common ¹ generic natural
history writer. His work was characterized by combinations
of four separate, striking his or her
the infrequency of the most common ² of his characters
characteristic characters among his ³ his characters
the probability of "another" ⁴ his characters
family-stock



THOMAS ALVA
EDISON

INVENTOR

THE WORLD'S MOST
PRACTICAL PHYSICIST.
CONSTRUCTIVE IN
IMAGINATION.

LONGING FOR IMAGINATION.

Insensitivity in Currency Conversion

Industrious. Love of discouragement.

perimeter. The

Researcher's name: _____

with more than 200 million

in the course of inventing

half a century ago. —
— effort —

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7. 1972

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of the inborn tra

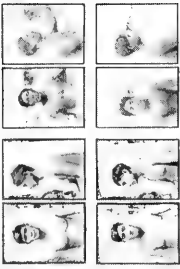
New York

W TOLK.

THE EDISON FAMILY

Analysis of the inborn traits of the Edison family-stock. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.

MAYA INDIANS
YUCATAN, MEXICO



Physical and Physiological Characteristics of Adult Maya Indian with Comparative Material

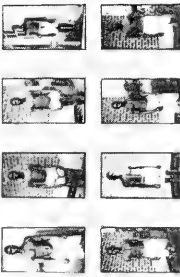
Measurements	Maya Indian	Comparative Material	Significance
			at differences
Stature (cm)	153.11 ± 4.0	South American	37.10
Relative Spine Height (%)	53.02 ± 1.1	South American	12.46
Shoulder Width (%)	24.28 ± 0.3	South American	16.94
Chest Girth (%)	25.65 ± 0.8	South American	18.86
Cephalic Index (%)	85.01 ± 2.2	South American	20.75

Basal Metabolism 4.8 ± 0.2
Pulse Rate (beats/min) 32
Blood Pressure (mm Hg) 35 ± 3
Respiration (liters/min) 35 ± 3

from these data it is learned that - Maya Indians are short and have broad-thick and relatively long trunks. They are brachycephalic. Their metabolism is high, their pulse low and they have a normal weight.

Maya Indians are short and have broad-thick and relatively long trunks. They are brachycephalic. Their metabolism is high, their pulse low and they have a normal weight.

JAMAICA NEGROES
BRITISH WEST INDIES



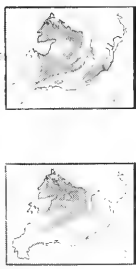
Physical Characteristics of Jamaica Negroes compared with Dutch Whites (continued)

Measurements	Negroes (mean)	Dutch Whites (mean)	Significance (P < difference)
Stature (cm)	170.60 ± 6.2	173.15 ± 5.8	5.00
Relative Spine Height (%)	100.10 ± 2.0	102.28 ± 2.1	6.62
Sitting Height (%)	51.45 ± 1.4	52.28 ± 1.0	4.77
Chest Girth (%)	40.95 ± 2.7	58.40 ± 3.0	0.34
Cephalic Index (%)	77.35 ± 3.5	79.30 ± 3.1	4.10
Nasal Index (%)	94.97 ± 9.5	68.90 ± 6.1	25.05
Aural Index (%)	57.56 ± 3.4	54.35 ± 4.7	5.35

These data show that Jamaica Negroes are tall, slender, long-headed, and have a high cephalic index. They are brachycephalic. Their metabolism is high, their pulse low and they have a normal weight.

DISTRIBUTION OF STATURES AND CEPHALIC INDICES
AMONG NORTH AMERICAN INDIANS

(For names and locations of tribes see "Notes")



Stature Cephalic Index

Note - The shortest Indians are found in Central America and southern Mexico and the tallest in the eastern half of the United States.
- the distribution of brachycephalic Indians from Alaska to Alaska. This may be partially associated with the short stature

ANTHROPOMETRIC STUDIES OF INDIANS. MAYA INDIANS, YUCATAN, MEXICO; JAMAICA NEGROES, BRITISH WEST INDIES
Distribution of statures and cephalic indices among North American Indians. Exhibited by Dr. Morris Steggerda, Carnegie Institution, Cold Spring Harbor, New York.

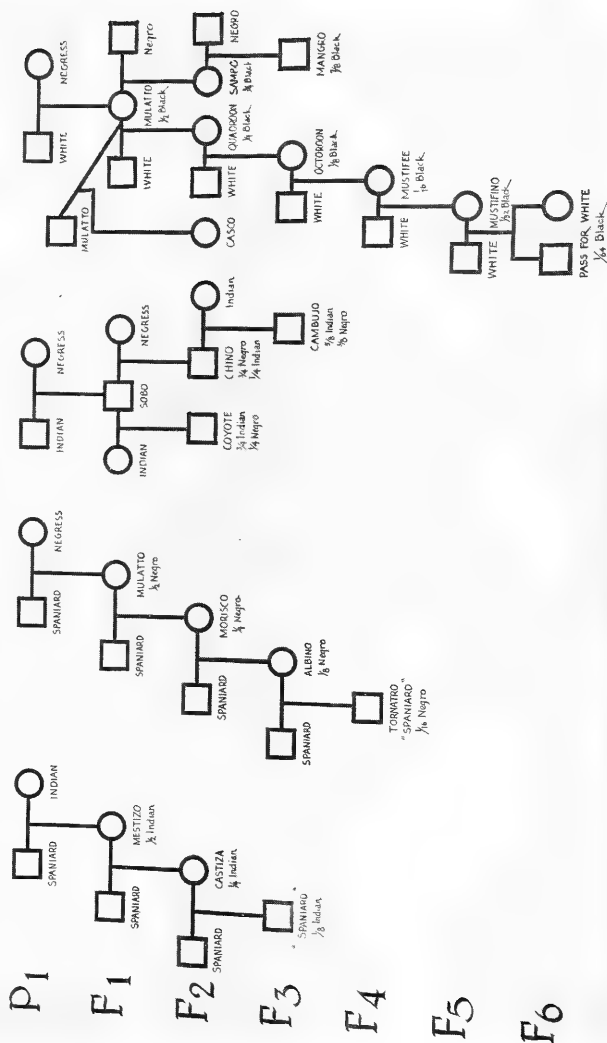
THE PURE-SIRE METHOD OF RACE-ASSIMILATION IN NORTH AMERICA

IN SPANISH AMERICA

IN SPANISH AMERICA

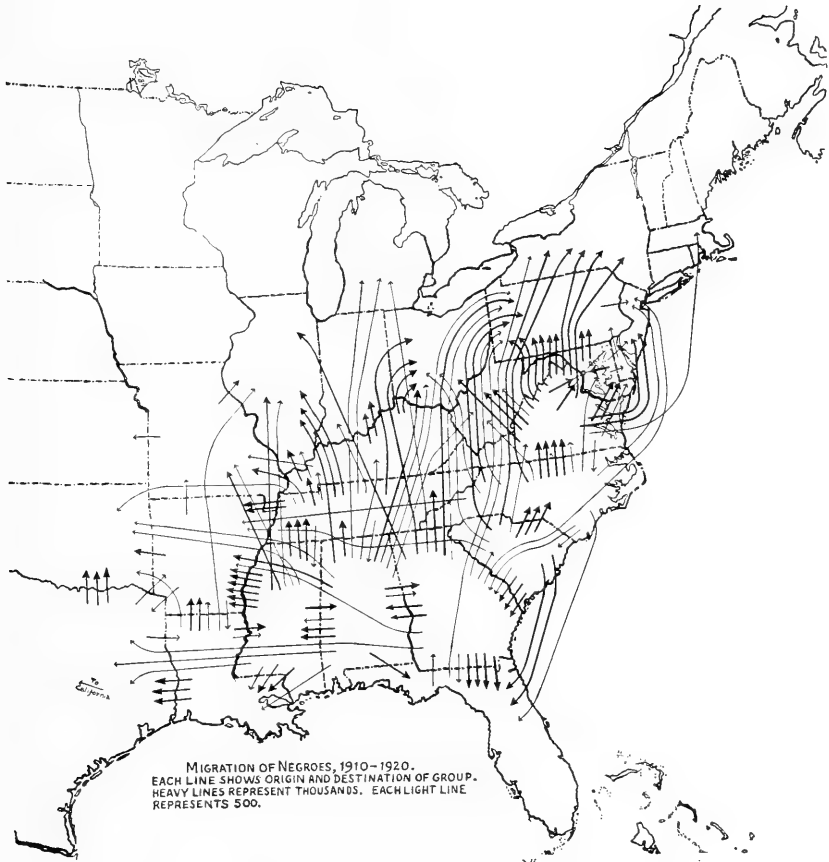
IN SPANISH AMERICA

IN JAMAICA



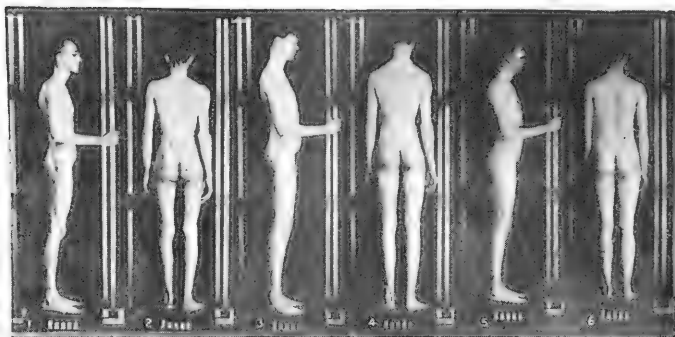
THE PURE-SIRE METHOD OF RACE-ASSIMILATION IN NORTH AMERICA

Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York



MIGRATION OF NEGROES, 1910-1920
Exhibited by Professor Samuel J. Holmes, Berkeley, California

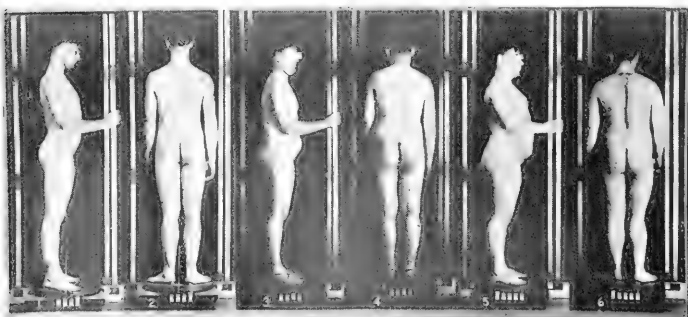
TYPES OF BODY BUILD



Figures 1. and 2.
Aspects of a man below
average of very slender
group.
Relative chest-girth: 41.5
Build: 1.6

Figures 3. and 4.
Aspects of a man of
average very slender
build.
Relative chest-girth: 41.4
Build: 1.65

Figures 5. and 6.
Aspects of a man of
slender build.
Relative chest-girth: 47.4
Build: 1.98



Figures 1. and 2.
Aspects of a man of
medium build.
Relative chest-girth: 51.3
Build: 2.3

Figures 3. and 4.
Aspects of a man of
fleshy build.
Relative chest-girth: 56.1
Build: 2.7

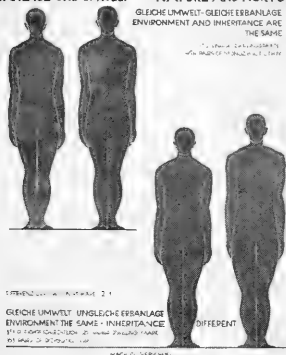
Figures 5. and 6.
Aspects of a man of
very fleshy build.
Relative chest-girth: 62.6
Build: 3.5

FORMULAE

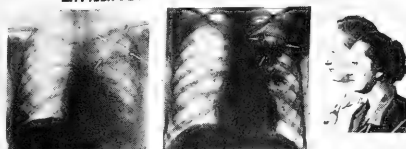
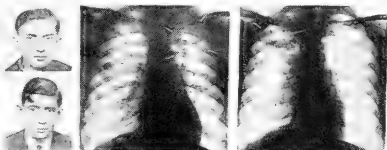
$$\left\{ \begin{array}{l} \text{RELATIVE CHEST GIRTH} = \frac{\text{CHEST GIRTH IN CMS.}}{\text{STATURE IN CMS.}} \times 100 \\ \text{INDEX OF BODY BUILD} = \frac{\text{WEIGHT IN GMS.} \times 100}{\text{STATURE IN CMS.}^3} \end{array} \right.$$

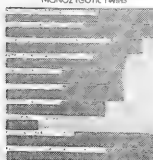
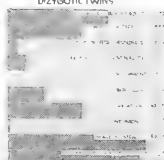
TYPES OF BODY BUILD

Exhibited by Dr. Charles B. Davenport, Carnegie Institution, Cold Spring Harbor,
New York

**KAISER WILHELM INSTITUT FÜR ANTHROPOLOGIE
MENSCHLICHE ERBLEHRE UND EUGENIK, BERLIN**
ERBANLAGE UND UMWELT — NATURE AND NURTURE:

**KAISER WILHELM INSTITUT FÜR ANTHROPOLOGIE
MENSCHLICHE ERBLEHRE UND EUGENIK, BERLIN**
**ZWILLINGE
TWINS**
ERBE VERSCHIEDEN - UMWELT GLEICH
DIFFERENT INHERITANCE - SAME ENVIRONMENT

ERBE GLEICH - UMWELT GLEICH
SAME INHERITANCE AND ENVIRONMENT ARE THE SAME

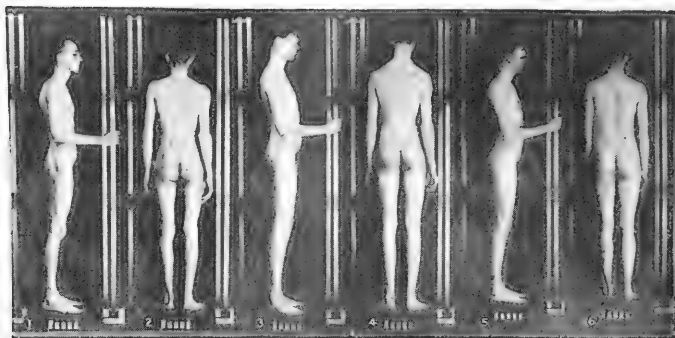
**KAISER WILHELM INSTITUT FÜR ANTHROPOLOGIE
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ZWILLINGE - TUBERKULOSE - TWINS

EINEIGE ZWILLINGE - SEIT 9 JAHREN GETRENNT - OSTPREUSSEN - BERLIN
ERKRANKUNG GLEICHZEITIG - K-PROZESS SEHR ÄHNLICH + MONOZYGOTIC
TWINS - LIVING APART FROM EACH OTHER DURING 9 YEARS IN A DISTANCE OF ROOMILES FALLING
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EINEIGE ZWILLINGE - MECHANIKER IN BERLIN - 9 JAHRE GETRENNT - LUNGEN
BEFUND SPIEGELBILDLICH + MONOZYGOTIC TWINS - MECHANICIANS
IN BERLIN - SEPARATED DURING 9 YEARS - MIRROR-IMAGE OF THE
PULMONARY DISEASE
NACH E. DEFLON, G. VERSCHUER

**KAISER WILHELM INSTITUT FÜR ANTHROPOLOGIE
MENSCHLICHE ERBLEHRE UND EUGENIK, BERLIN**
**EINEIGE ZWILLINGE
MONOZYGOTIC TWINS**

**ZWIERIGE ZWILLINGE
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DER VERSCHIEDENE GRAD VON GLEICHHEIT UND UNGLEICHHEIT ZEIGT DEN EINFLUSS VON ERBANLAGE UND
UMWELT FÜR DIE BETREFFENDEN FRANKHEITEN ECT
THE DIFFERENT DEGREE OF IDENTITY AND DIFFERENCE SHOWS THE INFLUENCE OF INHERITANCE AND
ENVIRONMENT ON THE DISEASES IN QUESTION

THREE CHARTS ON NATURE AND NURTURE

Exhibited by Kaiser Wilhelm Institut of Anthropology, Berlin-Dahlem, Germany

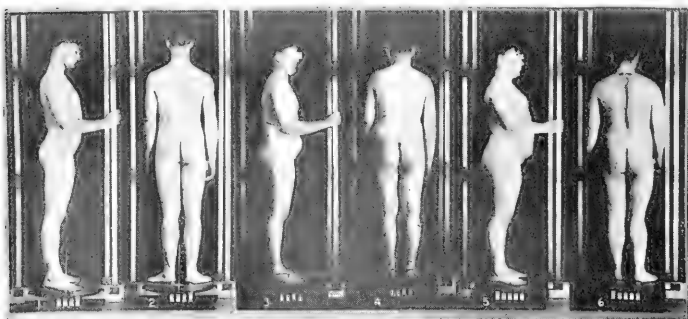
TYPES OF BODY BUILD



Figures 1. and 2.
Aspects of a man below
average of very slender
group.
Relative chest-girth: 41.5
Build: 1.6

Figures 3. and 4.
Aspects of a man of
average very slender
build.
Relative chest-girth: 41.4
Build: 1.65

Figures 5. and 6.
Aspects of a man of
slender build.
Relative chest-girth: 47.4
Build: 1.98



Figures 1. and 2.
Aspects of a man of
medium build.
Relative chest-girth: 51.3
Build: 2.3

Figures 3. and 4.
Aspects of a man of
fleshy build.
Relative chest-girth: 56.1
Build: 2.7

Figures 5. and 6.
Aspects of a man of
very fleshy build.
Relative chest-girth: 62.6
Build: 3.5

FORMULAE

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MENSCHLICHE ERBLEHRE UND EUGENIK, BERLIN**

ERBANLAGE UND UMWELT — NATURE AND NURTURE:

GLEICHE UMWELT — GLEICHE ERBANLAGE
ENVIRONMENT AND INHERITANCE ARE
THE SAME



DIFFERENZ DER UMWELT — DIFF. 2

GLEICHE UMWELT — UNGLEICHE ERBANLAGE
ENVIRONMENT THE SAME — INHERITANCE
DIFFERENT

DIFFERENZ DER UMWELT — DIFF. 2

NACH DR. V. SCHUBERT

**KAISER WILHELM INSTITUT FÜR ANTHROPOLOGIE
MENSCHLICHE ERBLEHRE UND EUGENIK, BERLIN**

**ZWILLINGE
TWINS**

ERBE VERSCHIEDEN — UMWELT GLEICH
DIFFERENT INHERITANCE — SAME ENVIRONMENT

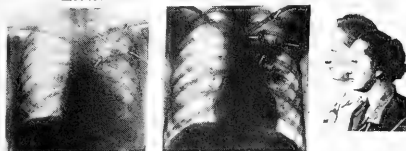


ERBE GLEICH — UMWELT GLEICH
SAME INHERITANCE AND ENVIRONMENT ARE THE SAME

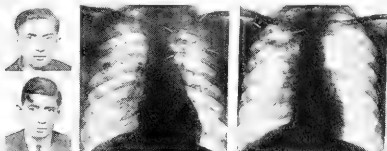


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MENSCHLICHE ERBLEHRE UND EUGENIK, BERLIN**

ZWILLINGE — TUBERKULOSE — TWINS



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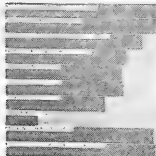


EINEIGE ZWILLINGE — MECHANIKER IN BERLIN — 9 JAHRE GETRENNT — LUNGEN
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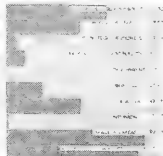
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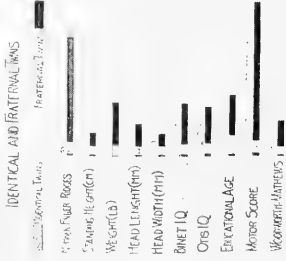
Exhibited by Kaiser Wilhelm Institut of Anthropology, Berlin-Dahlem, Germany

MENTAL DISORDERS IN TWINS

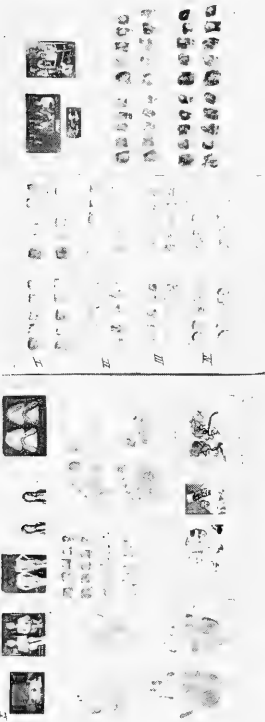
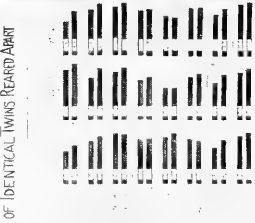
Summary of Material Accumulated to Date (Jan. 1932) in a Study Undertaken by Dr. Aaron J. Rosanoff with the Collaboration of Several Assistants at Los Angeles, California

CLINICAL GROUP	SAME-SEX TWINS				OPPOSITE-SEX TWINS				TOTAL		
	BOTH ONE AFFECTED		BOTH ONE UNAFFECTED		BOTH ONE AFFECTED		BOTH ONE UNAFFECTED				
BEHAVIOR PROBLEMS IN CHILDREN	10	4	18	2	11	10	14	7	18	3	130
JUVENILE DELINQUENCY	9	0	4	0	3	1	0	2	3	1	24
CRIME (ADULT)	5	1	0	0	1	5	0	0	8	0	20
MANIC-DEPRESSIVE PSYCHOSES	4	0	4	0	1	3	0	2	0	2	6
DEMENTIA PRAECOX	4	2	6	0	3	2	5	6	2	8	46
EPILEPSY	1	1	2	0	0	1	1	0	3	3	13
MENTAL DEFICIENCY	38	2	35	5	15	8	18	19	33	31	177
MONGOLISM	0	0	1	0	0	0	1	0	1	0	3
MISCELLANEOUS	9	3	11	4	4	3	5	9	8	2	53
TOTAL	89	13	81	11	38	33	44	62	52	76	542

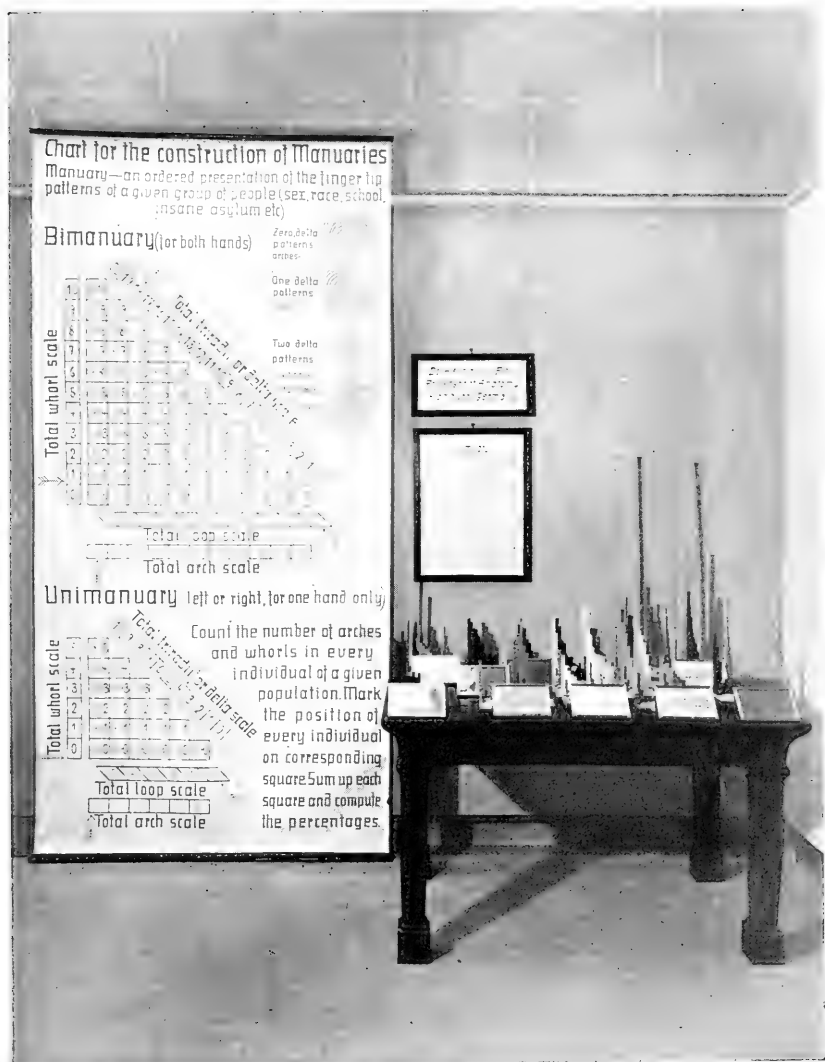
MEAN DIFFERENCES BETWEEN PAIRS OF IDENTICAL AND FRATERNAL TWINS



INTELLIGENCE AND EDUCATION ACHIEVEMENT OF IDENTICAL TWINS REARED APART



MENTAL DISORDERS IN TWINS
Exhibited by Dr. Aaron J. Rosanoff, Los Angeles, California



CONSTRUCTION OF MANUARIES AND MODELS OF MANUARIES
 Exhibited by Dr. Heinrich Poll, Anatomisches Institut, Hamburg, Germany

A PROPOSED CENSUS CARD

FOR UNIFYING THE POPULATION CENSUS, A POPULATION REGISTRY AND VITAL STATISTICS REGISTRATION.

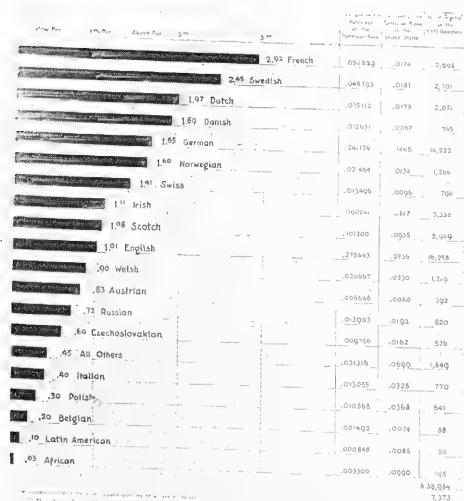
[illegible]

A PROPOSED CENSUS CARD

For Unifying the Population Census, a Population Registry and Vital Statistics Registration. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.

Inventiveness by Racial Stock in the United States 1927.

- BIASSES: 1 Study of the Old World Race descent of the 7,373 persons (all of whom responded to inquiry) out of all patentees of the first 10,000 patents issued by the United States in 1927.
- 2 Race stock is computed in terms of eighths, each patentee giving his own descent as accurately as possible by eighths. These eighths are accumulated regardless of combination in the individual and of the time elapsed since immigration.
- 3 The vertical lines of the chart represent the index of inventiveness, which is equal to the per cent of patentees of the particular race divided by the per cent of the particular blood in the American Nation according to the 'National Origins' basis.



Race Descent of the Population of the United States.

used as a basis for computing the Index of Inventiveness, giving the per-cent distribution of the several Old World Race-Stocks in the Population.

This table is taken from the National Origins Table compiled by Capt. John B. Trevor, 19 and the table prepared by joint Committee from the Departments of State, Commerce and Labor, 1917 provided by law as the basis for computing the Immigration Quotas.

Race Descent	Per cent of Blood in American People
1 English and North Irish	27.36
2 German	14.65
3 African (Am. Negro & Mixed races)	9.90
4 Scotch	9.35
5 Irish Free State	8.17
6 Polish	3.68
7 Italian	3.28
8 Welsh	2.30
9 Russian	1.92
10 Swedish	1.87
11 Dutch	1.78
12 French	1.74
13 Czechoslovakian	1.62
14 Norwegian	1.34
15 Swiss	0.96
16 Latin American	0.85
17 Austrian	0.80
18 Belgian	0.74
19 Danish	0.67
20 Hungarian	0.49
21 Yugoslavian	0.48
22 Finnish	0.32
23 Portuguese	0.25
24 American Indian	0.23
25 Greek	0.17
26 Rumanian	0.14
27 Spanish	0.14
28 Japanese	0.11
29 Syrian	0.07
30 Chinese	0.06
31 Armenian	0.04
32 Bulgarian	0.01
33 Others	4.46
99.97	

RACE DESCENT

(a) Inventiveness by Racial Stock in the United States. Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.

(b) Race Descent of Population in the United States. Exhibited by Capt. John B. Trevor, New York, New York.

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means providing an individual socially

in the N₂ atmosphere for sterilization, and

... in equity to males
... be compulsory or

... population at large; to degenerate only of normal persons of degenerate stock

with organized experimental attention began with the individual

$$1 - \frac{1}{2} \left(\frac{1}{2} \right)^2 = \frac{3}{4}$$

th law thus far the state has set a very low biological standard of sterilization, so that no one has complained that there are several thousand legally ordered eugenical sterilizations.

experience the states are very slowly but safely raising

Supreme Court of the United States (May 2, 1927) has upheld constitutionality of the Virginia statute which is based solely on

[illegible]

Wages and the Extent of Family Dependency

* *See also* 2010-2011, 2011-2012, 2012-2013, 2013-2014, 2014-2015, 2015-2016, 2016-2017, 2017-2018, 2018-2019, 2019-2020, 2020-2021, 2021-2022, 2022-2023, 2023-2024, 2024-2025, 2025-2026, 2026-2027, 2027-2028, 2028-2029, 2029-2030, 2030-2031, 2031-2032, 2032-2033, 2033-2034, 2034-2035, 2035-2036, 2036-2037, 2037-2038, 2038-2039, 2039-2040, 2040-2041, 2041-2042, 2042-2043, 2043-2044, 2044-2045, 2045-2046, 2046-2047, 2047-2048, 2048-2049, 2049-2050, 2050-2051, 2051-2052, 2052-2053, 2053-2054, 2054-2055, 2055-2056, 2056-2057, 2057-2058, 2058-2059, 2059-2060, 2060-2061, 2061-2062, 2062-2063, 2063-2064, 2064-2065, 2065-2066, 2066-2067, 2067-2068, 2068-2069, 2069-2070, 2070-2071, 2071-2072, 2072-2073, 2073-2074, 2074-2075, 2075-2076, 2076-2077, 2077-2078, 2078-2079, 2079-2080, 2080-2081, 2081-2082, 2082-2083, 2083-2084, 2084-2085, 2085-2086, 2086-2087, 2087-2088, 2088-2089, 2089-2090, 2090-2091, 2091-2092, 2092-2093, 2093-2094, 2094-2095, 2095-2096, 2096-2097, 2097-2098, 2098-2099, 2099-2100, 2100-2101, 2101-2102, 2102-2103, 2103-2104, 2104-2105, 2105-2106, 2106-2107, 2107-2108, 2108-2109, 2109-2110, 2110-2111, 2111-2112, 2112-2113, 2113-2114, 2114-2115, 2115-2116, 2116-2117, 2117-2118, 2118-2119, 2119-2120, 2120-2121, 2121-2122, 2122-2123, 2123-2124, 2124-2125, 2125-2126, 2126-2127, 2127-2128, 2128-2129, 2129-2130, 2130-2131, 2131-2132, 2132-2133, 2133-2134, 2134-2135, 2135-2136, 2136-2137, 2137-2138, 2138-2139, 2139-2140, 2140-2141, 2141-2142, 2142-2143, 2143-2144, 2144-2145, 2145-2146, 2146-2147, 2147-2148, 2148-2149, 2149-2150, 2150-2151, 2151-2152, 2152-2153, 2153-2154, 2154-2155, 2155-2156, 2156-2157, 2157-2158, 2158-2159, 2159-2160, 2160-2161, 2161-2162, 2162-2163, 2163-2164, 2164-2165, 2165-2166, 2166-2167, 2167-2168, 2168-2169, 2169-2170, 2170-2171, 2171-2172, 2172-2173, 2173-2174, 2174-2175, 2175-2176, 2176-2177, 2177-2178, 2178-2179, 2179-2180, 2180-2181, 2181-2182, 2182-2183, 2183-2184, 2184-2185, 2185-2186, 2186-2187, 2187-2188, 2188-2189, 2189-2190, 2190-2191, 2191-2192, 2192-2193, 2193-2194, 2194-2195, 2195-2196, 2196-2197, 2197-2198, 2198-2199, 2199-2200, 2200-2201, 2201-2202, 2202-2203, 2203-2204, 2204-2205, 2205-2206, 2206-2207, 2207-2208, 2208-2209, 2209-2210, 2210-2211, 2211-2212, 2212-2213, 2213-2214, 2214-2215, 2215-2216, 2216-2217, 2217-2218, 2218-2219, 2219-2220, 2220-2221, 2221-2222, 2222-2223, 2223-2224, 2224-2225, 2225-2226, 2226-2227, 2227-2228, 2228-2229, 2229-2230, 2230-2231, 2231-2232, 2232-2233, 2233-2234, 2234-2235, 2235-2236, 2236-2237, 2237-2238, 2238-2239, 2239-2240, 2240-2241, 2241-2242, 2242-2243, 2243-2244, 2244-2245, 2245-2246, 2246-2247, 2247-2248, 2248-2249, 2249-2250, 2250-2251, 2251-2252, 2252-2253, 2253-2254, 2254-2255, 2255-2256, 2256-2257, 2257-2258, 2258-2259, 2259-2260, 2260-2261, 2261-2262, 2262-2263, 2263-2264, 2264-2265, 2265-2266, 2266-2267, 2267-2268, 2268-2269, 2269-2270, 2270-2271, 2271-2272, 2272-2273, 2273-2274, 2274-2275, 2275-2276, 2276-2277, 2277-2278, 2278-2279, 2279-2280, 2280-2281, 2281-2282, 2282-2283, 2283-2284, 2284-2285, 2285-2286, 2286-2287, 2287-2288, 2288-2289, 2289-2290, 2290-2291, 2291-2292, 2292-2293, 2293-2294, 2294-2295, 2295-2296, 2296-2297, 2297-2298, 2298-2299, 2299-2300, 2300-2301, 2301-2302, 2302-2303, 2303-2304, 2304-2305, 2305-2306, 2306-2307, 2307-2308, 2308-2309, 2309-2310, 2310-2311, 2311-2312, 2312-2313, 2313-2314, 2314-2315, 2315-2316, 2316-2317, 2317-2318, 2318-2319, 2319-2320, 2320-2321, 2321-2322, 2322-2323, 2323-2324, 2324-2325, 2325-2326, 2326-2327, 2327-2328, 2328-2329, 2329-2330, 2330-2331, 2331-2332, 2332-2333, 2333-2334, 2334-2335, 2335-2336, 2336-2337, 2337-2338, 2338-2339, 2339-2340, 2340-2341, 2341-2342, 2342-2343, 2343-2344, 2344-2345, 2345-2346, 2346-2347, 2347-2348, 2348-2349, 2349-2350, 2350-2351, 2351-2352, 2352-2353, 2353-2354, 2354-2355, 2355-2356, 2356-2357, 2357-2358, 2358-2359, 2359-2360, 2360-2361, 2361-2362, 2362-2363, 2363-2364, 2364-2365, 2365-2366, 2366-2367, 2367-2368, 2368-2369, 2369-2370, 2370-2371, 2371-2372, 2372-2373, 2373-2374, 2374-2375, 2375-2376, 2376-2377, 2377-2378, 2378-2379, 2379-2380, 2380-2381, 2381

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Cultivation of P.

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1. The first step in the process is to identify the problem or issue that needs to be addressed. This involves gathering information and understanding the context of the problem.

[illegible]

Figure 1. Schematic diagram of the experimental setup. The subject is seated in a chair, viewing a video screen. The video screen displays a target (a red dot) and a starting point (a green dot). The subject's hand is positioned at the starting point. The video screen is connected to a computer system.

1

100

r, New York

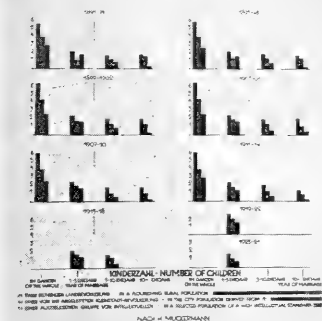
18. *Staph. pyrae* Muls. *Staph.*
laevigata G. (very common)

HISTORICAL AND LEGAL DEVELOPMENT OF EUGENICAL STERILIZATION

Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York

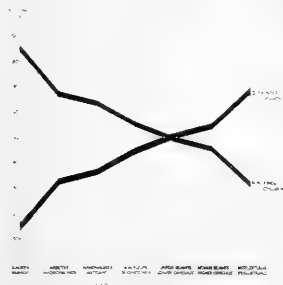
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DIE FÄHRDERUNG DER FORTPFLANZUNG VERSCHIEDENER SOZIALER GRUPPEN
IM DEUTSCHEN VOLK, 1891-1992
THE PROCESS OF THE DIFFERENTIATION OF BIRTH RATE IN SOME GERMAN POPULATIONS
1891-1992



KAISER WILHELM INSTITUT FÜR ANTHROPOLOGIE
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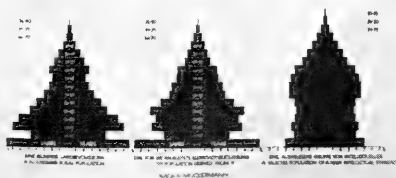


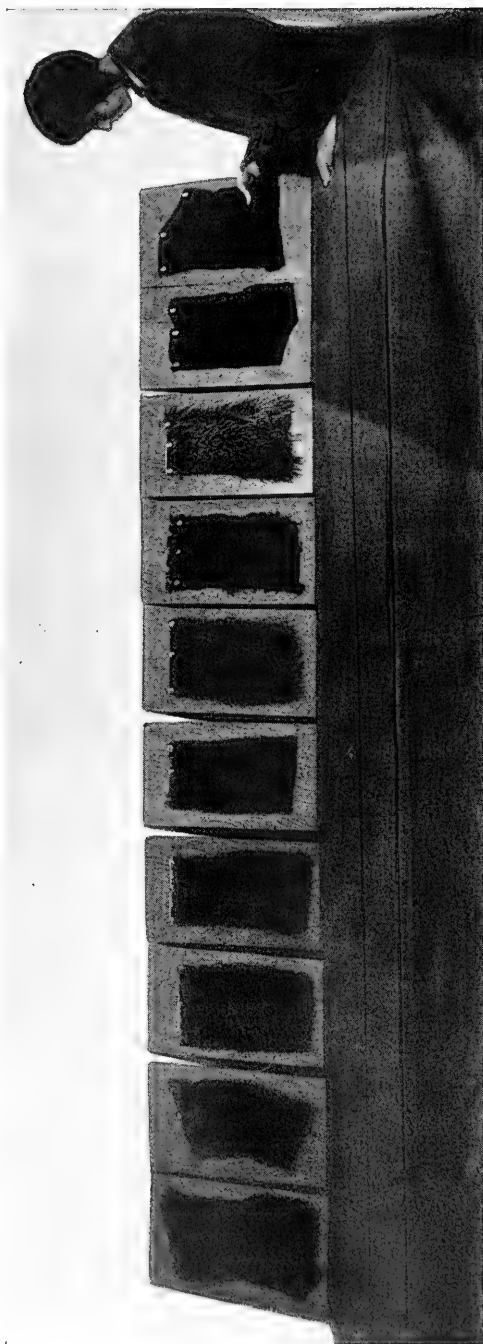
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THE BUILDING UP OF THREE DIFFERENT POPULATIONS IN GERMANY ACCORDING TO THE AGE OF THEIR CONSTITUENTS - THE PARENTS AND THEIR CHILDREN - 1995





SPECIALIZED TESTS FOR SENSE OF ELEGANCE. QUALITY IN FUR

1. On this table there is a sample of each of ten different kinds of fur.
2. Examine each sample critically with hand and eye.
3. Arrange these ten samples in the order of your feeling of their elegance if made into a woman's "best coat"—the most elegant first and so on.
 - (a) Be guided by your own personal liking or feeling of appreciation.
 - (b) Be not influenced by knowledge of cost or fashion—try to respond to real quality.
4. Fifteen minutes (or as many thereafter as needed) will be allowed for this test. Say so when you have finished.

Exhibited by Dr. Harry H. Laughlin, Eugenics Record Office, Cold Spring Harbor, New York.





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2. Association d'Etudes Sexologiques, 31 rue St. Guillaume, Paris VI, France.
3. Danish Anthropological Committee, Kristiansgade 12 B, Copenhagen, Denmark.
4. Eugenics Society of Canada, 14 Cornish Road, Toronto 5, Canada.
5. Eugenics Survey of Vermont, 162 College St., Burlington, Vt.
6. Society for Constructive Birth Control and Racial Progress, 108 Whitfield St., London, W.1., England.
7. Sociedad Eugénica Mexicana, P. O. Box 1938, Mexico City, Mexico.

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2. Brooklyn Botanic Garden, 1000 Washington Ave., Brooklyn, N. Y.
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APPENDIX II

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The International Congresses of Eugenics are now sponsored by the International Federation of Eugenic Organizations.

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Eugenics Section, Institute Tutelar di Manoes, Argentina.	Dr. Victor Delfino	1921 New York.	Physician and Editor of <i>La Semana Medica</i> , Laguna 73, Buenos Aires.
2. Austria, since 1928			
Austrian Racial Hygiene Society.	Prof. Dr. Heinrich Reichel.	1928 Munich.	The University, Vienna. Kinderspitalgasse 15, Vienna IX.
Austrian Bund für Volksaufartung.	Dr. F. Tietze.	1930 Farnham.	Währingerstrasse 5-7, Vienna II.

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4. Canada, since 1932			
5. Cuba, since 1912			
6. Czechoslovakia, since 1921			
Eugenics Society of Czechoslovakia.	Dr. Vlad. Růžička. (Deceased)	1921 New York.	Katerinska, 22, Praha. (Professor of Biology in Charles Univer- sity).
7. Denmark, since 1912			
Danish Anthropological Committee.	Dr. Sören Hansen.	1921 New York.	President of the Danish Anthropological Com- mittee. Kristiansgade 12 ^B , Cop- enhagen.
	Dr. Tage Kemp.	1930 Farnham.	University Pathological Institute, Juliana Maries Vej 22, Copenhagen.
	Dr. Wildenskow.	1932 New York.	Brejning Institute, Bor- kop, Jutland, Den- mark.
8. Dutch East Indies, since 1930			
Eugenitische Vereeniging in Nederlandse Indie.	Dr. J. C. Van Schou- wenburg.	1930 Farnham.	Laan Trivelli 21, Bata- via-Centrum, Java.
9. Esthonia, since 1928			
Esthonian Eugenic So- ciety.	Professor Dr. A. Lüüs.	1928 Munich.	Kinderklinik, Univer- sity of Tartu, Kütütri 14, Tartu.

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11. France, since 1912			
Institut International d'Anthropologie, Sect. d'Eugénique.	Dr. Georges Schreiber	1924 Milan.	26 Avenue du Recteur Poincaré, Paris.
Société Medico-Psychologique, 12 Rue de Seine, Paris VI.	Dr. René Charpentier.	1931 card vote.	119 Rue Perronet, Neuilly-sur-Seine, (Seine).
Société Etudes. Sexologiques, 5 Av. Victor Emanuel III, Paris.	Prof. Dr. Toulouse.	1933 card vote.	Hôpital Ste. Anne, Paris.
12. Germany, since 1912			
Deutsche Gesellschaft für Rassenhygiene, Kaiser Wilhelm Institut, Berlin.	Dr. Alfred Ploetz.	1921 New York	Herrsching bei München.
Kaiser Wilhelm Institut für Anthropologie und Eugenik.	Rector Dr. Eugen Fischer.	1929 Rome	Inhestrasse 22-24, Berlin-Dahlem.
Deutsche Forschungsanstalt für Psychiatrie, Kaiser Wilhelm Institut.	Prof. Dr. Ernst Rüdin.	1929 Rome.	Kraepelinstrasse 2, München, N. 23.
13. Great Britain, since 1912			
Eugenics Society.	Prof. R. A. Fisher, F.R.S.	1931 card vote.	Galton Laboratory, Univ. College, London.
British Human Heredity Committee.	Prof. R. Ruggles Gates.	1932 New York.	King's College, Strand, London, W. C. 2.
Animal Genetics Department, University of Edinburgh.	Prof. F. A. E. Crew.	1932 New York.	10 Salisbury Road, Edinburgh.

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15. Italy, since 1912			
16. Netherlands, since 1921			
Dutch Union of Genetics.	Dr. Marianna Van Herwerden. (Deceased)	1921 New York.	Deceased, 1934.
At large.	Dr. G. P. Frets.	1922 Brussels re-elected New York, 1932.	Physician and Prosector, Asylum, Maasoord, Poortugaal, Rotterdam.
Central Committee of the Co-operating Organizations for the Study of Heredity in the Netherlands.	Dr. P. J. Waardenburg.	1929 Rome.	Velperweg 22, Arnhem.
17. Norway, since 1912			
Director, Winderen Laboratory, Oslo.	Dr. Jon Alfred Mj��en.	1921 New York.	
Consultative Eugenics Commission of Norway.	Dr. Wilhelm Keilhau.	1926 Paris.	Assistant Professor of the University, Oslo.
	Prof. Dr. Klaus Hansen	1934	The University, Oslo.
18. Poland, since 1925			
Polish Eugenics Society.	Dr. L��on Wernic.		U1 Nowy-Swiat, No. 1, M. 3, Warsaw.
19. South Africa, since 1925			
20. Sweden, since 1921			
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Lillhagens Sjukhus, Lill-hagen.	Docent Dr. Torsten Sjögren.	1933 card vote.	Lillhagen, Goteborg.

21. Switzerland, since 1923

Julius Klauss, Stiftung, Zürich.	Dr. Otto Schlagin-haufen.	1923 Lund.	Professor of Anthropol- ogy, University, Plat- tenstrasse 9, Zürich.
	Prof. Dr. Hans Maier	1934	Psychiatricclinic, Uni- versity of Burghölsle, Zurich.
	Prof. Dr. Guggisberg	1934	Frauenklinik, Berne.

22. United States of America, since 1912

Eugenics Research Asso- ciation.	Dr. Harry H. Laughlin.	1921 New York.	Eugenics Record Office, Cold Spring Harbor, Long Island, New York.
American Eugenics So- ciety.	Prof. Irving Fisher.	1922 Brussels.	Professor of Economics, Yale University, New Haven, Conn.
Carnegie Institute of Washington, Dept. of Genetics.	Dr. C. B. Davenport.	1921 New York.	Cold Spring Harbor, Long Island, New York.

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Pan-American Office of Homiculture			
At large.	Dr. Delgado F. Ramos.	1921 New York.	151 11th St., Havana, Cuba.

INDEX

- Ability in the Common Man, 145
- Abnormal vs. Normal, 193
- Age Incidence of Scapular Types, 465
- Allergy, Inheritance of, 314
- American Indians, Special Capacities of, 159
 - Institutions, Race and Family in the History of, 175
 - Negro, Assortative Mating, 124
 - People of Polish Origin in Texas, 113
- Ancestral Lines, Merging of, 483
- Anterior Lobe Material, Experiments with, 330
- Anthropological Type, Unification of, 50
- Anthropology, 489
 - Standard Technique in Physical, 47
- Anthropometric Methods. Tests, 45
- Anthropometry, Need of Checking in, 45
 - Standardizing Measurements of the Living, 48
- Aristogenics, 380

- Balyeat, Ray M., 314
- Bickerton, Myles, 287
- Bijlmer, H. J. T., 51
- Binder, Rudolph M., 145
- Biology in Schools, 169
- Birth Control and its Effect on Birth Rate, 365, 366, 370
 - Rights and Wrongs of, 35
 - vs. Birth Selection, 29
- Birth-Rate as Affected by Birth Control, 365, 366, 370
 - Causes of Decline in, 356
 - Decreasing in Families in which Highly Intelligent Children Occur, 403
 - Future of Differential, 21
 - Negro, 119
- Birth-Rates, 372, 403
 - of Coeducational Graduates, 387
- Births, Deficiency of, 252
- Birth Selection vs. Birth Control, 29

- Black Death, 292
- Blacker, C. P., 367, 368
- Bloodgroups, 436
 - in Relation to Race, 51
- Boldrini, Marcello, 50
- Breeding Stock, Control of, 21
- Bronchial Trouble, Inheritance of, 427, 428
- Bunak, V., 431

- Caldwell, Otis W., 167
- Campbell, C. G., 36, 283
- Cancer, 290, 505
 - Mortality in, 305, 310
- Census Data, Inadequacy of, 171
- Characteristics, Eurasian, 90
- Child Hygiene in Human Ecology, 343
- Children, Development of E. Tenn. Mountain, 164
- Child Study, 506
- Chondrodysplasia, Hereditary Deforming, 295
- Church Coöperation Necessary in Eugenic Movement, 360
- Cobb, Margaret V., 403
- Co-educational Birth-Rates, 387
- Congress, 1st International, 1, 13
 - 2nd International, 3, 13
 - 3rd International, 8, 14
 - 3rd International, Organization and Membership, 511
 - 3rd International, Darwin's Message to, 23
 - 3rd International, Historical Background of, 1
- Contra-selection, 372
- Cook, Robert, 441
- Costs of the Abnormal, 194
- Craftsmen, Pedigree of, 429
- Crampton, C. Ward, 380
- Crania, Harmonic Types, 99
- Cummins, Harold, 430

- Darwin, Leonard, 2, 23, 363
 Davenport, C. B., 17, 45, 288
 Deaf mutism, 264
 Deaths, Untimely, 253
 Dentition, Autosomal Genes Affecting, 447
 Depression, Effect on Marriage, 389
 Differential Fecundity, 353
 Diphtheria, Hereditary Factors in, 300
 Mortality in, 311
 Disease, 283
 Inheritance of, 288
 Dover, Cedric, 87
 Downey, June E., 67
 Draper, George, 289
 Dublin, Louis I., 33
 Dutch, 176, 425
 Dutch East Indies, Bloodgroups in, 51
 Dutch Men and Women, Physical Measurements on, 425

 Ecology, Child Hygiene in Human, 343
 Economic Position, Eurasia, 89
 Education and Eugenics, 131
 Ehrenfried, Albert, 295
 Elimination, Selective, as a Factor in Increasing the Immunity of Populations, 300
 Endocrines, 500
 Endocrine Aspects of Human Infertility, 322
 England, Contra-Selection in, 372
 English, 176
 Ethnic Survey, 505
 Eugenic Prognosis, 367
 Program, A Pivotal Point in, 157
 Eugenics, 415, 441
 and Education, 131
 Book Store, Model, 496
 Development of, 17
 Dominance of Economics over, 138
 in a Rural State, 183
 Library, Model, 495
 Negative, 364
 Research, Data Available for, 152
 Research Inadequacy of Census Data for, 171
 Response to President's Address, 25
 Society, 367, 368
 Some Aspects of Instruction in, 167
 Survey in Vermont, 183
 Eurasian Community, 87
 Exhibits, Classification of, 486
 Extraverts, Handwriting of, 67
 Eye Diseases, Inheritance of, 287
 Eye, Heredity of the, 504
 Eye Color, Inheritance of, 427

 Families, Famous, 180
 Family History, 425
 Fecundity, 394, 399
 of Higher Social Classes, 355, 372, 378, 387
 of Lower Social Classes, 355, 372
 Reduction of, of Socially Inadequate, 364, 369
 Ferreri, Guilio, 264
 Fertility of Gifted, Measures to Encourage, 353, 378
 Finger Prints in a Dutch Family Series, 430
 Fitness Problems, 457
 References on, 478
 French, 176
 Frets, G. P., 131, 417
 Fuller, Raymond G., 333

 Galton, Francis, iv, 1, 32, 133
 Gates, R. Ruggles, 47
 Genes, Autosomal, Affecting Human Dentition, 447
 Genetic Formula for Intellect, 413
 Genetics of Human Mind, 409
 in Man, 409
 Gifted, Measures to Encourage Fertility of, 353
 Gini, Corrado, 25, 231, 421
 Goitre, 288
 Gosney, E. S., 369
 Graves, William W., 457
 Grove, Charles C., 171
 Guyer, Michael F., 329

 Hackbush, Florentine, 272
 Handwriting, 67
 Health Declaration before Marriage, 222
 Heart Disease, Chronic, 310

- Heredity, 498
 and Environment, 164
 Human, 425
 in Diphtheria, 300
 in Manic-Depressive Psychoses, 333
 in Prostitution, 255
 in Psychoses, 417
 of Deforming Chondrodysplasia, 295
 Herrman, Charles, 300
 Heterosis, 421
 Historical Background of 3rd Congress, 1
 History of American Institutions, Race
 and Family in, 175
 Hodson, Cora B., 372
 Holmes, S. J., 119
 Hunt, H. R., 244
 Hurst, C. C., 409
 Hutt, F. B., 447
 Huxley, Thomas Henry, 38
 Hygiene, Child, 343

 Il Sordomutismo Nel Campo Eugenetico e
 Sociale, 264
 Immigrant, Selection of, 79
 Immigration, Control of, 79
 Immunity, 292
 of Populations, 300
 Inbreeding, 436
 Incisors, Distribution of Spaced, 448
 India, 87
 Infant Mortality, 304
 Infertility, 283
 Human, 322
 Influenza, Mortality in, 310
 Inheritance of Allergy, 314
 of Bronchial Weakness, 427
 of Disease, 288
 of Disease of Eye, 287
 of Eye Color, 427, 428
 of Mental Test Abilities, 453
 Institute of Family Relations, 210
 Intelligence Quotient, 141, 411
 International Federation of Eugenic Or-
 ganizations, 2, 522
 Introverts, Handwriting of, 67
 Italians, Anthropological Type of, 50
 Italian Demography, 505

 Java, 31
 Johanssen, 133
 Johnson, Roswell H., 453

 Kemp, Tage, 255
 Key, Wilhelmine E., 175

 Landman, J. H., 266
 Laughlin, Harry H., 1
 Lidbetter, E. J., 365, 376
 Lorimer, Frank, 152

 MacCarty, William Carpenter, 290
 Macklin, Madge Thurlow, 157
 Mallet, Bernard, 364, 369
 Malzberg, Benjamin, 333
 Man, Natural History of, 507
 Manic-Depressive Psychoses, Heredity in,
 333
 Marriage Counselling, 210
 Rate of College Graduates, 387
 Mating, Assortative, in the American
 Negro, 124
 McGee, Anita Newcomb, 483
 Measles, Mortality in, 311
 Mechanical Ability, Pedigree of, 429
 Medical Genetics, Need of a Course in, 157
 Mental Defect, Eradicating Foci in, 272
 Sterilization to check, 367, 370
 Mental Defects, 501
 Mental Development, Social Factors in, 276
 Mental Disease, 417
 Mental Tests, Inheritance of Abilities in,
 453
 Merging of Ancestral Lines, 483
 Mesures A Envisager Pour Favoriser La
 Fecondite des Individus Les Mieux
 Doues, 378
 Migraine, 314
 Migration Control, 21
 Mjoen, Jon Alfred, 222
 Mortality, Ante and Post Natal, 302
 in Cancer, 305, 310
 in Chronic Heart Disease, 310
 in Diphtheria, 311
 Infant, 304
 in Influenza, 310
 in Measles, 311

- Mortality, in Pneumonia, 304, 310
 in Scarlet Fever, 311
 in Tuberculosis, 306, 307, 309
 in Whooping Cough, 311
 Maternal, 285
 Muller, H. J., 138
 Musical Talent, Seashore Measures of, 54
 Tests, 165
 Negro, Assortative Mating for Color, 124
 Effect of Migration on Natural Increase of, 119
 Northern, 120
 New-Born Infants, Sex Ratio of, 431
 Norway's Program for Race Hygiene, 229
 Osborn, Henry Fairfield, 29
 Ovarian, Modifications Resulting from Sterility, 329
 Over-population, 33
 Pennsylvania's Problems in Mental Defect, 272
 Perkins, H. F., 183
 Pessler, Wilhelm, 95
 Phillips, J. C., 387
 Physical Anthropology, 490
 Factors in Race Survival, 283
 Measurements on Dutch Men and Women, 425
 Pituitary Modifications Resulting from Sterility, 329
 Plates, List of, 510
 Plecker, W. A., 105
 Pneumonia, Mortality in, 304, 310
 Polish in Texas, 113
 Pollock, Horatio M., 333
 Popenoe, Paul, 210, 271
 Population Analysis, 502
 Tendencies in, 266
 Positive and Negative Eugenics, 193
 Post, Richard H., 48
 Powdermaker, Florence, 276
 Presidential Address, 17
 Preston, George H., 346
 Prostitutes, Psychic Abnormalities in, 260
 Prostitution, Causes of, 255
 Psychic Abnormalities in Prostitutes, 260
 Psychoses, Children of Parents with, 345
 Heredity in, 333, 417
 Quetelet, 132
 Race Amalgamation, 79
 Culture, Selective Sterilization for, 201
 Hygiene, Norwegian Program for, 229
 Problems, 506
 Survival, Physical Factors in, 283
 Racial Distribution and its Causes, 95
 Integrity, 105
 Ramos, D. F., 79
 References on Fitness Problems, 478
 Richards, Mildred Hoge, 314
 Robie, Theodore Russell, 201
 Robinson, Caroline H., 387
 Root, A. R., 67
 Roseboom, Henry E., 87
 Rosinski, Boleslaw, 113
 Rowe, Allan Winter, 322
 Ryan, W. Carson, Jr., 159
 Sadler, Lena K., 193
 Sanders, J., 353
 Scapulae, Types of, 457
 Scapular Types, Age Incidence of, 465
 Scarlet Fever, Mortality in, 311
 Schreiber, Georges, 378
 Seashore, C. E., 54
 Seashore Measures of Musical Talent, 54
 Segregation of Mental Defectives, 366, 370
 Selection, 283
 Sex Differences, 447
 Sex-Ratio of New-Born Infants, 431
 Social Hygiene and Eugenics, 506
 Socially Inadequate, Reduction of Fecundity of, 364, 369
 Social Problem Group, 365, 376
 Society and Eugenics, 131
 Soong Family, 145
 Southern Highlands, 164
 Spaniards, 177
 Special Capacities, 492
 of American Indians, 159
 Special Senses, 496
 Spermatotoxin Experiments, 329
 Spinden, Herbert J., 160

- Stanton, Hazel M., 54
State Aid in Eugenic Program, 361, 369
Steggerda, Morris, 425
Sterility, 395
 among College Graduates, 395
 Ovarian and Pituitary Modification
 Resulting from, 329
Sterilization, Selective, 201
 to check Increase in Mental Defectiveness, 367, 370
Sterling, E. Blanche, 343
Syphilis, 292
Szel, Theodore, 249

Taste Thresholds, 505
Taeuber, Irene Barnes, 124
Testicular Nucleoproteins, Experiments
 with, 331
Thoroughbred Horse, Racing Capacity in,
 494
Tuberculosis, 309
Twins Showing Inherited Tendencies, 290

Van Herwerden, M. A., 436
Variation, Inherited, 457
Vermont, Eugenics in, 183
 Rural, 183
Virginia's Effort to Preserve Racial Integrity, 105
Vitality Index, 431
Volkstemsverbreitung und Ihre Ursachen,
 95

Wallis, Ruth Sawtell, 99
War, Biological Aspects of, 244
 Eugenic and Dysgenic Effects of, 231,
 244
 Genetic Effects of, 249
Western European Crania, Harmonic
 Types of, 99
Wheeler, Lester R., 164
Whooping Cough, Mortality in, 311
Woods, F. Adams, 409, 410, 412

