PROBLEMS IN EUGENICS.

VOL. II.

REPORT OF PROCEEDINGS

OF THE

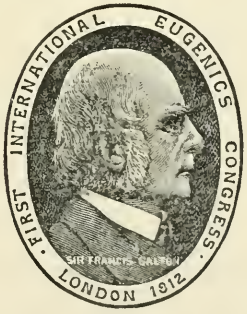
First International Eugenics Congress

HELD AT

THE UNIVERSITY OF LONDON,

July 24th to 30th, 1912.

Together with an Appendix containing those Papers communicated to the Congress not included in Volume I.



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Preface.

Before the meeting of this Congress it was decided that all the papers to be read should, if possible, be printed in time to be placed in the hands of the members during its sessions; for those not well acquainted with the language in which the paper was read would thus be enabled to follow the proceedings with greater ease. This was in fact in great measure accomplished in the volume entitled "Problems in Eugenics," though not without the most strenuous efforts on the part of all concerned; and we believe the facilities thus afforded were appreciated. It was, however, impossible for various reasons for some of the authors to send in their papers in time to be included in this publication, and of course the discussions at the Congress, which had not then taken place, could not be printed. The omitted papers and the discussions have, therefore, been included in this supplementary volume, so as to complete the records of the Congress.

One of the most beneficial results of the Congress was undoubtedly the establishment of the International Eugenics Committee on a permanent basis. The next meeting will be held in Paris, in August, 1913, when various questions connected with the future assembly of Eugenic Congresses will be considered.

In "Problems in Eugenics," the warm thanks of the Organizing Committee were expressed to all those who had worked so energetically in making the necessary preparations for the Congress, and these thanks I wish now to repeat in the name of the Eugenics Education Society, more especially to the members of the various Foreign Consultative Committees, on whom the success of the Congress so largely

depended. But we were not then able to express our gratitude to those who actually attended. English Eugenists are sincerely grateful to their foreign guests who came to us from afar, and who thus gave to the gathering its truly international character. From our intercourse with them we English acquired much valuable information, for which our hearty thanks are due. We believe, however, that our visitors will recognize that their labours have not been in vain. Eugenics was an unknown word to thousands before the holding of the Congress, who are now beginning to realize its meaning. The Eugenic ideal—the belief that we owe a paramount duty to posterity dependent on the laws of heredity—has been implanted in many minds; and this seed is, we firmly believe, destined to germinate, and to grow steadily with our increasing scientific knowledge, so that ultimately it will bring forth good fruit. All who attended the Congress did something towards promoting this scientific and ethical movement.

LEONARD DARWIN.

FIRST INTERNATIONAL EUGENICS CONGRESS.

INAUGURAL DINNER, HOTEL CECIL, JULY 24th, 1912.

After the dinner the loyal toasts were proposed by the Chairman, Major Leonard Darwin.

The Right Hon. A. J. Balfour, M.P., said: Mr. President, Ladies and Gentlemen, the toast I have to propose is not the least important upon our evening's list. It is that of our Foreign Guests and friends. This is an International Congress; one which deals with the interests not of one civilised nation rather than another, but a Congress which deals with problems which every civilised nation, both in new countries and in old, has got to face, and which in its magnitude naturally and necessarily obliterates all minor differences. In any case, ladies and gentlemen, we are scientific or we are nothing. Science knows no division between nations, and we collected in this room may all feel that, from whatever country we be drawn, to whatever Government we owe allegiance, whatever be our hopes for the future or our traditions from the past, we are all alike interested in a common scientific task, one of the greatest that can be presented, that is being presented, to civilised mankind at the present moment. Now, this International Congress, the first or one of the first which has ever been held upon the subject, has, in my conception of it, two great tasks allotted to it. It has to convince the public, in the first place, that the study of eugenics is one of the greatest and most pressing necessities of our age; that is its first task. It has to awaken public interest, to make the ordinary man think of the problems which are exercising the scientific mind at the present moment. It has also got to persuade him that the task which science has set itself in dealing with the eugenic problem is one of the most difficult and complex which it has ever undertaken. No man can do really good service in this great cause unless he believes not merely in its transcendent importance, but also in its special and extraordinary difficulty. I am one of those who base their belief in the future progress of mankind in most

departments upon the application of scientific method to practical life—(applause)—and, believe me, we are only at the beginning of that movement. We are only at the beginning of this marriage between science and practice. Science—even modern science—is old; relatively old; but the application of science to practice is comparatively new. I hope, and I believe, that among those new applications of science to practice that will be seen in the future, not the least important is that application which it is the business of this International Congress to further. Now, we have to admit that those who have given most thought to the problems which are included under the word eugenics—to the way in which the hereditary qualities of the race are transmitted—are those who at this moment take the darkest view of the general effect of the complex causes which are now in operation. I hope their pessimism is excessive, but it is undoubtedly and unquestionably founded not upon sentiment, but upon the hard consideration of hard facts; and those who refuse to listen to their prophecies are bound to answer their reasoning. For that reasoning is not beyond what it is in the power of every man to weigh; it depends upon facts which it ought not to be difficult to verify. It depends upon premises whose conclusions follow almost inevitably; and those who roughly and rather contemptuously put aside all these prophecies of ill to the civilisation of the future are bound. in my opinion, to give the closest scrutiny to all these arguments before they reject them, and to show where and how and in what particulars they fail to support the conclusions drawn from them. No doubt the subject, though certain broad conclusions may seem obvious, is itself one of profound difficulty. I would go further, and I would venture to say that probably there is more difference of opinion at this moment among scientific men with regard to certain very fundamental principles lying at the root of heredity than there was, for example, in the 70's or 80's of the last century, after the great Darwin's doctrines were generally accepted—as, indeed, they are, in their main outline, part now of the universal heritage of the race—but before all the more minute scientific investigations had taken place with regard to the actual method by which inherited qualities are handed on from generation to generation. Eugenics has got to deal with the fact of this disagreement, which is of scientific importance. It also suffers from another fact, which is of social and political importance—namely, that every faddist seizes hold of the eugenic problem as a machinery for furthering his own particular method of bringing the millennium upon earth. Further, I am not sure that those who write and talk upon this subject do not occasionally use language which is, I think, incorrect in itself, and apt to produce a certain prejudice in the impartial public. I read, for instance, as almost a commonplace of eugenic literature, that we are suffering at this moment from the fact that the law of natural selection, if not in abeyance, is producing less effect than it did when selection was more stringent, and that what we have got to do is, as it were,

to go back to the good old days of natural selection. But I do not believe that to be scientifically sound. I say nothing about its other aspects; I do not believe it is scientifically sound. The truth is, we are very apt to use the word "fit" in two quite different senses. We say that the "fit" survive; but all that means is that those who survive are fit; they are fit because they survive, and they survive because they are fit. It really adds nothing to your knowledge of fitness. All it says is that here is a class or race or species, or whatever it may be, which does survive, and therefore is adapted to its surroundings. From a strictly biological point of view, that is all "fit" means. It is not all that we mean—all that the eugenist means. He does not mean that mere survival indicates fitness; he means something much more than that. He means that he has got ideals of what man ought to be, what the State ought to be, what society ought to be; and that these are not being carried out because we have not yet grasped the true way of dealing with the problems involved. Now, I should have said myself that if you are to use language strictly, you ought never to attribute to nature any intentions whatever. You ought to say, "Certain things happen." Everything else is metaphor, and sometimes it is misleading metaphor. For instance, those who are interested in this subject will read constantly that in certain cases the biologically fit are diminishing in number through the diminution of their birth rate, and that the biologically unfit are increasing in number, because their birth rate is high. But, according to the true doctrine, as I conceive it, of natural selection, that is all wrong. The professional classes, who, we are told, now have families so small that it is impossible they should keep up their numbers—they are biologically unfit; for that very reason. Fitness means, and can only mean, if you are looking at it from a naturalistic point of view, that you are in harmony with your surroundings; and if your numbers diminish, you are not in harmony with them. There is not that adaptation which fitness in the naturalistic sense implies. In the same way, when I am told—as I am told, I am afraid, with truth—that the number of the feeble-minded is greatly increasing, that can only mean, from a naturalistic point of view, that the feeble-minded are getting more adapted to their surroundings. (Laughter.) I really am not making either a verbal quibble or an ill-timed joke. It is all-important to remember, in my opinion, that we are not going to imitate, and we do not desire to imitate, natural selection, which produces, and has no doubt produced, wonderful things in the way of organisms, such as man, but has produced very abominable things by precisely the same process. The whole point of eugenics is that we reject the standard of mere numbers. We do not say survival is everything; we deliberately say that it is not everything—that the feeble-minded man, even though he survives, is not so good as the good professional man, even though that professional man is only one of a class which does not keep up its numbers with an adequate birth-rate. The

truth is that we ought to have the courage of our opinions; and we must regard man as he is now as being, from the point of view of genetics, a wild animal. There may be—and there are—certain qualifications to that. I suppose there are, both among barbarous and civilised tribes, marriage customs, marriage laws, which have their root—I do not know whether in formulated laws of eugenics, but at all events which harmonise with what we now realise are sound laws of eugenics. Still, broadly speaking, man is a wild animal, and we have to admit that if we carry out to its logical conclusion the kind of scientific work which is being done by congresses of this sort, man is to become a domesticated animal. I am aware that that sort of phrase is liable to misinterpretation, but it is absolutely correct. The eugenist thinks, and must think, that he ought deliberately to consider the health, the character, the qualities of the succeeding generations. That is characteristic of domestication; it is totally absent from animals in the wild state. Ultimately—not we of this generation or the next generation; perhaps not for an unlimited number of years, but ultimately—we shall have to look at this question as an infinitely more complex aspect, an incomparably more difficult but also more important aspect, of the very kind of question with which we have to deal when we are dealing with the race of domestic animals, upon which so much of our happiness, indeed our existence, actually depends. I hope that does not sound too paradoxical or too extreme, but the very statement of it shows how enormously difficult is the problem with which we have to deal. It is not a problem of the individual, it is a problem of society. I sometimes see it stated that, after all, society is the sum of the individuals that compose it. In one sense, of course, that is true—a whole is always the sum of its parts. But in that sense it is an unmeaning and useless proposition. In the only sense in which it means anything, it is not true; and whether we shall ever know exactly how a complex society should be composed and how we ought to lead up to its proper composition, I know not. But the idea that you can get a perfect society by merely considering certain questions about the strain and ancestry and the health and physical vigour of the various components of that society—that, I believe, is a most shallow view of a most difficult question. But, Mr. President, I apologise; I am very sorry. I have been led, perhaps you will say into waters far out of my depth; in any case, I have been led into discussions very little appropriate to an occasion of this sort. And I believe that even if I were summarising a paper at your Congress, I have about reached the time when the President's bell would ring and I should be told I had only one minute more to speak. In these circumstances, I draw such disjointed observations as I have had to make, to a close. But in doing so I must ask you all—all who belong to this country—to join with me in drinking to our guests from other lands. And I desire to associate with that toast the name of M. Doumer, a name distinguished in the politics and in the administration of his country; a

man whose services to representative institutions and to colonial administration are well known, whose presence here is an honour to us, and a proof of the interest with which eugenic matters are considered by our friends in other countries; and who is therefore in every way worthy to respond to the toast which I have so unworthily proposed. Ladies and gentlemen, I ask you to drink to the toast of our guests from abroad.

M. PAUL DOUMER, in responding, said: Je veux tout d'abord exprimer au très Honorable M. A. J. Balfour ma gratitude personnelle pour ses trop aimables paroles, et lui dire combien les étrangers à la Grande-Bretagne sont flattés d'être accueillis par l'homme d'Etat éminent que nous venons d'entendre. Je tiens aussi à dire au Comité d'organisation combien nous apprécions ses efforts lorsqu'il nous invite à méditer sur le problème si délicat qui fait l'objet de ce Congrès sous l'égide du nom illustre que porte si allègrement le Major Darwin. Je m'adresse également à Mrs. Gotto, qui prodigue à tous les membres du Congrès renseignements utiles, paroles et sourires. Tout cela nous fait bien augurer de ce Congrès, où toutes les sciences ont été appellées à fournir les élements d'une science nouvelle, pour laquelle il a fallu créer un mot nouveau. Au moment où la vie des sociétés se transforme, où les conditions de la sélection sont modifiées, il s'agit de trouver le secret de ces vertus viriles auxquelles nous devons d'avoir conquis terre et ciel. Pour que l'humanité continue le cours glorieux de ses destinées, les efforts des hommes de bonne volonté ne sont pas superflus. Au nom des Français venus à ce Congrès un dernier mot: nous sommes les premiers à nous réjouir de votre accueil. L'histoire a étroitement uni la France et l'Angleterre; les deux peuples ont appris à s'apprécier aux grands coups qu'ils se sont portés. A l'aurore du siècle de la vapeur, on trouve les noms de nos grandes nations réunis dans les grandes inventions qui ont ouvert des voies nouvelles au genre humain: la marmite de Papin a précédé la marmite de Stephenson. Nous sommes amis; nous pouvons compter les uns sur les autres. Je veux en remerciant nos hôtes, lever mon verre à la gloire et à la prospérité de l'Angleterre.

The Right Hon. the LORD MAYOR said: Mr. President, my Lords, Ladies and Gentlemen, the toast that I have to propose is "The Eugenic Ideal." Very well have all the questions, or at least the leading questions, of eugenics in general been treated by Mr. Balfour and the last speaker. It devolves upon me to think with what euphonics I can speak further of eugenics in such a distinguished assembly of ladies and gentlemen. Undoubtedly the opinion of mankind in general will endorse the idea of a better race of mankind. But before we become of the *man*kind, we must become of the smaller kind; and this question of a better race must go to a deeper origin than simple treatment of mankind, except to insist upon educating mankind on the necessity of health in both parties with respect to future generations. I do not know how this can be fully carried out except through the persuasion of the masses of those who are not educated in

character or in any high sense of the future means of life. The great question of the present day in this country is the carelessness of the boys and girls who get married, as to what is to happen to their progeny. I have said these very words more than once in that home of charity in which I have the honour to live, at societies organised by generous and kind-hearted people for the relief of infancy and childhood—that if proper care had been exercised, by whom I do not like to say, no necessity for those societies would exist. I am told by my reverend friend my Lord Bishop here, that on one occasion I did remonstrate with a Bishop and clergy present, and said to them, "Why do you marry these boys and girls, wholly unfit for the grave responsibility of a future generation?" That is the point, ladies and gentlemen; and there comes in my difficulty of euphonics—in finding well-fitting words to express the sentiments of well-bred children. I will use the word *demos* as opportune. There is the crucial point of the whole thing: it is in the cottage where these eugenics must be taught. They are already known and largely practised, as we see if we look round upon our friends right and left who are married, under conditions wholly different from the marriages that so unhappily and so unfortunately exist elsewhere. Here is a social problem of the greatest importance, and how it is to be got at I should not like to say this evening, except by impressing it as often as we can, as firmly and forcibly as we can, upon all the youth of the proletariat, or of that generation who are at the present moment answerable for the major part of all these difficulties. I daresay my statements may be questioned; I shall be glad if they are. But at the same time they are the result of many years of observation as an active practitioner of the medical profession. I speak with all the responsibility that attaches to that position. I can only wish that this duty had fallen upon my friend on the right, the President of the College of Physicians, or his next door neighbour, the President of the College of Surgeons. I have little doubt that they would have emphasised the few remarks I have made with respect to eugenics. Of course, it does commend itself, as I again repeat, to all mankind—this idea of a better race of infants, a better race of adolescents, a better race of youth, better workmen, better husbands, better fathers, contributing towards a better and firmer and stronger nation to which we belong. Ladies and gentlemen, I shall not detain you one minute longer; but I am perfectly certain that this toast which I have the honour to introduce to you will meet with your cordial approval, for, as I say, in their hearts all mankind must wish well to the Eugenic Ideal. In the absence of Prof. Ploetz, I will couple with this toast the name of General von Bardeleben.

General VON BARDELEBEN, who apologised for his inability to reply in English, briefly responded.

Prof. BLEECKER VAN WAGENEN, in the absence of Dr. David Starr Jordan (President of Leland Stanford University), presented the greetings

of the brotherhood of Eugenists of the United States. Their number, and the popular interest in the subject were increasing rapidly, and they expected much from this Congress. Such a gathering would have been impossible two years ago; and gratitude was due to the President and the Hon. Secretary of the Eugenics Education Society for bringing it about. They hoped that out of the Congress would grow a small permanent international body, to act as a medium of communication between representatives of the eugenic idea throughout the world, and that the Congress would stimulate scientific research in regard to eugenics. Two years previously he had brought to Europe what his society thought was a new discovery in regard to blood-analysis, but he found that it was already known in Rome. This illustrated the need of communication. They hoped through the Congress to obtain wider scientific facts, which were especially needed in America. He concluded by submitting the toast of Success to the Congress.

Major Darwin, in reply, after warmly welcoming the guests, said that they hoped this would be the first of a series of Congresses. The science of eugenics was young—almost a baby science; conditions in different countries varied greatly, and the laying down of extensive and very definite programmes of reform suitable for all could not be expected to form part of their proceedings. Their main aim should for the present be to make the meaning of the word eugenics more widely known and to show that their aims were as practical as those of politicians. Politicians aimed at securing immediate benefits, not wholly without reference to votes. Eugenists were looking to the lot of future generations; and, being unable directly to affect their environment, they had to work largely through the agency of heredity. In fact the Congress was assembled to discuss all possible methods of benefiting future generations mainly by improving their inborn qualities; or, in other words, to consider our duties to posterity in view of our knowledge of the laws of heredity. Wide differences of opinion were certain to exist as to the methods. The subject was of enormous importance; for whether our civilisation was to be progressive or retrograde depended, they held, on the success or failure of the eugenic movement, a struggle to last for many years to come.

The meeting then adjourned to another room, where a conversazione took place.

SECTION I.—BIOLOGY AND EUGENICS.

THURSDAY, JULY 25th. MORNING SESSION.

Major DARWIN, who presided, after welcoming the delegates and members, delivered the Presidential Address(1).

Prof. V. GIUFFRIDA-RUGGERI's paper on "The So-Called Laws of Heredity in Man," in the author's absence, was read by Dr. Lindsay(2).

Dr. APERT (Paris) said that the difficulty of elucidating the laws of human heredity was shown by the publications of the Galton Laboratory. The laws established by the study of animals and vegetables seemed largely inapplicable to man. The rules of Naudin and Mendel were rarely borne out when applied to humanity. Yet it was unthinkable that the laws of heredity for man were different from those of other living creatures. It was only that the difficulties were greater in the study of the human species, on account of the practical impossibility of experiment, and such perturbing influences as correlation of characters, gametic associations, imperfections of dominance and recessiveness, and the absence of pure races of men. Nevertheless, as M. Giuffrida-Ruggeri had shown, certain characters (blue eyes, fair hair, etc.) in man did behave as Mendelian recessives, and he (M. Apert) had tried to show that the so-called *tache Mongolique* behaved as a Mendelian dominant. Morphological, physiological or pathological abnormalities appearing suddenly in a human family, like mutations, might be expected in their transmission to throw the laws of heredity into relief. In a work on "Maladies familiales et Maladies congénitales, 1906," he had demonstrated the identity of these diseases with anatomical mutations, and that several of them behaved as Mendelian dominants; others (*e.g.*, albinism) as recessives. The Mendelian proportions (50 : 50 and 75 : 25) were only imperfectly verified. Probably it would not be so if the abnormalities became racially fixed, but the abnormal families became extinct, by reason of the inferiority involved in their abnormalities. The Mendelian proportion, moreover, was exactly verified in the case of those diseases which descended by what he (Dr. Apert) had termed "matriarchal heredity." These were such diseases as hæmophilia, axial aphasia, certain forms of myopathy, etc. They were transmitted only by persons apparently free from them—*i.e.*, in the female line exclusively. Such results justified the conclusion that the Mendelian laws could always be traced if the perturbing influences could be calculated. On the knowledge available, the physician could already advise in certain cases. For instance, in the case of "parental maladies," no restriction need be placed on the unaffected individuals. In the case of "matriarchal maladies," the men need not be restricted. Only the women were dangerous—but these even when apparently untainted. In neither of these cases did consanguineous marriage increase the risk. In the case of "fraternal

(1) Problems in Eugenics, p. 1. (2) Ibid. Italian, p. 28. English, p. 38.

maladies," on the other hand, consanguinity should be a bar to marriage—however remote the relationship. Unfortunately, not all the transmissible maladies could at present be accurately placed in these categories.

Dr. Raymond Pearl read his paper on "The Inheritance of Fecundity"(1).

Prof. Punnett spoke of the great interest and importance of Dr. Pearl's communication. He had upset all the cherished ideas of the poultryman in regard to egg-production, and the selection of hens for breeding purposes; but he had given the explanation. It was from the human standpoint that fecundity was most important. Evidence had long seemed to show that fecundity (such as twinning) was inherited in particular strains. In sheep, to increase the yield of twins, they selected a ram which had been a twin. This quality was also likely to be inherited in man. He had seen a pedigree intended to illustrate the inheritance of a vicious nature, but it did illustrate the inheritance of multiple births. It showed a large number of triplets within a few hundred people, and at least one instance of four at a birth. The former occurred only once in about 8,000 times in normal births, and the latter was still rarer—only once in nearly a million. Workers on eugenic problems were sometimes criticised for experimenting with apparently useless things, such as sweet peas; Dr. Pearl had shown that such work might produce useful results. It was the fact that the problem of sex-limited inheritance had been worked out as regards colours in chickens that led Dr. Pearl to study it in relation to fecundity. But the interpretation of the colour experiments had been suggested by some experiments on moths, and this in turn by experiments on sweet peas.

Prof. Sergi's paper, on "Variation and Heredity in Man,"(2) was read by Prof. A. C. Haddon, who prefaced it by explaining the difference between Prof. Sergi's classification of cranial types and that generally adopted.

Dr. Seligman said that extremely little was known about the matters discussed by Prof. Sergi, who held that the physical characters of race were stable within such a comparatively short period as historic time except, when not modified, by contact with a new race. He had thus been led to postulate an Afro-European race, distributed on both sides of the Mediterranean. Recent research in North-East Africa had led to important conclusions, but had not invalidated Prof. Sergi's views. Yet there was a series of facts which, by themselves or in conjunction, gave rise to a *primâ facie* case against the persistence of racial characters, even for short periods, except under uniform conditions. Prof. Ridgway had stated that the assumption that identity or similarity of type implied identity of race "did not bear the test of scientific examination. It left altogether out of consideration the effect of environment in changing racial types, and that in no long time." Sergi laid great stress on the penetration of new elements and the effects of migration. With this the speaker agreed. There were instances

(1) Problems in Eugenics, p. 47. (2) Ibid. Italian, p. 9. English, p. 16.

in which large groups of people showed great complexity of structure. In other cases anthropologists wrote of races as essentially simple, even after intimate study of their physical character, yet the blending of two races might be so intimate that the two could not be dissected out by physical analysis, and was only proved by an analysis of their culture. The crucial instance of this was Australia. The seemingly simple Australian type had been shown by modern methods of culture analysis to be the result of a blend of two peoples, a later-coming people having so thoroughly assimilated the first comers that the physical characters of the latter had been obliterated or greatly modified. Again, Oceania had generally been regarded as inhabited by "Polynesians" and "Melanesians," but evidence now showed that there were three or four peoples mingled in Melanesia.

The speaker had himself investigated a nomad Arab tribe, who spoke of themselves as pure Arab. He had found traces of a negro element, and of a pre-Arab, *i.e.*, probably Hamitic strain; also the typical Armenoid nose, commonly called Jewish. This feature might be found combined in English Jews with abnormally long skulls, although the characteristic of its original possessors (the Hittites, Armenians, etc.) was round-headedness. This concurrence in individuals of features common to two races might be taken as supporting Prof. Sergi's view. It had long been recognised that the fact of a cross need not result in the dominance of either of the characters involved. Sergi's paper altogether omitted the effect of selection. He would not refer to it except to say that even Mendelian segregation did not permit the assertion that in the cases in which it occurred, the law of variation due to selection was absent. Certain experiments showed that progressive variation in one direction might be concurrent with Mendelian inheritance. On this basis, the speaker explained the blend of characters in the population of the Soudan. It might be assumed as proven that blending of characters might result from a cross, but the question was whether that blend was hereditary or whether in subsequent generations it exhibited segregation into its component factors. If characters such as dolicocephaly and the like were not simple, but controlled by several pairs of unit factors, then in time the extremes would segregate out and the complexity of a physical character did not imply that it could not be controlled by one or more characters. Experience showed that a fine Semitic nose and facial modelling might go with a black skin, or negro features with a white skin.

Dr. SOREN HANSEN read his paper on "The Increase of Stature in certain European Populations"(1).

The Chairman adjourned the meeting.

(1) Problems in Eugenics, p. 23.

THURSDAY, JULY 25th. AFTERNOON SESSION.

The chair was taken by M. Yves Delage, Hon. President of the French Consultative Committee.

Prof. R. C. PUNNETT[1] gave a lantern lecture on "Eugenics and Genetics." He said that a knowledge of heredity was of the first importance for eugenics. It was the common ground of the eugenist and the student of genetics. The latter, having ampler control of his material, came into contact with aspects of the problem which were hardly within the ken of the eugenist. He (Prof. Punnett) would lay before the Congress some of the latest results of genetic analysis. By lantern-slides he showed the results of crossing black and white rosecombs, the black being dominant and the white recessive. The first generation produced were all black; in the next there were three of the dominant black form to one of the recessive white. Numbers of such cases, illustrating Mendel's principle of the segregation of characters during the formation of the germ-cells, had been worked out in plants and animals; and for a few characters in man transmission had been shown to follow the same lines. With brachydactyly (double-jointedness in the hands), a marriage between a person possessing this character who had derived it from only one parent, and a normal, would give equal numbers of normal and affected in the offspring. The test of the Mendelian expectation was always applied, but hitherto few human cases had fallen in clearly with the simple Mendelian inheritance of characters. A dominant character was not found to become gradually attenuated by repeated crossing with the recessive form. Repeated crossing of the black with the white bantam did not result in birds of intermediate pigmentation; neither did human pedigrees support the supposition where they were sufficiently extensive to provide data. Brachydactylous children to-day were as deformed, and relatively as numerous, as their ancestors, though for four generations there had been no matings except with normals. Again in a case of night-blindness, after nearly three centuries of mating with normals, the defect was as marked as ever in those in whom it occurred. The Habsburg lip was as unmistakable in King Alfonso and his children as in the Emperor Maximilian. Nearly all human abnormalities seemed to behave as dominants to the normal form. This was eugenically fortunate, since a dominant was much easier to extirpate than a recessive. With respect to a pair of alternative characters, a population was commonly mixed, containing both dominants and recessives. It had been assumed that, with random mating, the dominant would gradually get the upper hand. Was this the case? Were brown eyes, *e.g.*, establishing themselves at the expense of the non-browns? The idea that they might arose from the fact that the word "dominant" suggested an unjustified connotation. Mr. G. H. Hardy had shown that, other things being equal, dominants and recessives were on precisely the same footing. Human defects being commonly dominant, it

[1] Problems in Eugenics, p. 137 (Abstract).

was reassuring to be told on high mathematical authority that the dominant, as such, had no inherent advantage. The cases thus far illustrated were simple; but there were many complications. A form of heredity probably of great importance in the human race was the one known as sex-limited inheritance. This was illustrated by the occurrence of gold and silver plumage in poultry. These colours occurred in many breeds of fowls, and each in itself bred true. But when a silver cock was mated to a gold hen the offspring were all silver. Such silvers mated together gave silvers and golds in the ratio 3:1, silver behaving as an ordinary dominant. The striking feature of such families was that the golds were all hens. No instance of a gold cock from such a crossing had been recorded. By mating a silver hen with a gold cock the result was quite different; golds and silvers occurred in approximately equal numbers, but all the silvers were cocks and all the golds hens. It was possible to predict the outcome in gold and silver of any of the possible types of mating among such birds. Parallel cases, involving different characters, had been worked out in other breeds of poultry, in canaries, pigeons, and lepidoptera. Cases where a given character was transmitted only to the opposite sex were probably important in human heredity. For example, the records seemed to show that colour-blind women married to normal men produced colour-blind sons and normal daughters; the children of colour-blind men and normal women were all normal, but the daughters of such unions could transmit the defect. This and similar cases in man were not yet fully understood. No exact counterparts of colour-blindness or hæmophilia had been met with among animals, and therefore they could not be experimentally studied. It often happened in a family that one child took after the mother almost exclusively, another after the father. Such cases demanded explanation from the student of genetics. He thought that some phenomena in the sweet pea and other plants which had recently been closely studied might throw some light on the processes which produced such resemblances in man. (The peculiar linkage of characters in the cretin was illustrated on the screen.) Crossing a normal sterile with a cretin sweet pea fertile produced all normal fertiles. Subsequent breeding from such plants showed that sterility and normality tended to stick together. likewise cretinism and fertility. This persistence of combinations was not confined to plants. It had occurred in rabbits, and Prof. Morgan had found it in flies. This association of characters was not at present explicable.

The lecturer pleaded for the utmost care in the collection and study of human pedigrees. Experiments on animals could be repeated, but that was, of course, impossible with human pedigrees; yet all knowledge of human heredity at present depended upon them. The student should personally examine every member of the family investigated. Dr. Drinkwater had a case of brachydactyly submitted to him which was apparently authentic, but upon personal inquiry he found that all the

material facts had been misrepresented. The interpretation of facts of heredity in terms of Mendelian factors was attracting much attention. It made possible valuable deductions as to the nature of the variations studied, but of their origin and causes it taught us little that was definite. One method of studying these problems would be the investigation of standardised material in a changed environment. Such investigation was costly, but from the eugenic as well as the genetic point of view it was enormously important. The lecturer concluded by expressing the hope that some imaginative millionaire would endow research on these lines.

Mr. J. T. Cunningham said that Mendelism was not synonymous with genetics. The latter was the study of heredity in its largest sense. Mendelism held that characters always segregated after crossing. In cases when the results of experiment did not agree with the expectation, the Mendelians, instead of considering whether their doctrine might not be absolutely true, assumed the finality of their doctrine, and sought for new factors which segregated in the way they assumed. These were often entirely imaginary. He had been working recently at some Mendelian experiments, and had found distinct evidence that in some cases segregation did not occur completely. He adduced cases conflicting with Prof. Punnett's statements concerning the transmission of colour in fowls. Since segregation was not always complete, the doctrine of units of heredity and variation was not proved. Mendelians, and eugenists in general. should bear that fact carefully in mind.

Mr. Mudge said that many of the characters transmitted from one generation to another were themselves not simple, but composed of a union of two or more substances which must affect the character. This was very manifest in animals; in human organisms it was both more manifest and more important. Moreover, we had to deal not only with segregation of characters in the germ-cell, but also with characters segregated in the body-cells when the organism was developed from the germ-cells; that is, with somatic segregation. Mr. Cunningham had overlooked this. His result could be quite well explained on Mendelian grounds; hence his criticism of the Mendelian doctrine was hardly fair. It did not necessarily follow that, although some genetic factors had been brought in, the manifestation of them was going to be identical. To take a hypothetical case. Assume a factor which stimulated growth of tissue. Suppose the two factors brought into the gamete were, in the course of the segregation of the body-cells, landed among the nerve-cells. This would result in a great growth of nerve-cell tissue, and might produce genius. But if the same two factors turned into the dermal and sub-dermal cells of the skin, they might produce something very different—possibly cancer. The same two characteristics put into a race might produce totally different characters. Mr. Punnett had referred to two pedigrees on the inheritance of mental defectiveness. In one case it bred true; in another, the defective individual arose from parents

apparently normal. This contradictory result could be easily explained on the basis of factors, as understood through modern genetic research; but it warned us not to be too certain in our estimates of what combination would produce this or that offspring.

Dr. D. F. WEEKS' paper on "The Inheritance of Epilepsy"(1) was read by Mr. van Wagenen.

Mr. V. NASER said that the question of preventing the transmission of epilepsy had been much discussed in the Scandinavian countries. Sterilisation would be the rational method, but there were others less drastic. He wished to call attention to a system of land colonies, where the sexes were segregated. It was possible by such a system to provide dwellings for poor epileptics that could be run at a low cost and need no Government subvention. In these the patients might be so comfortable that they would not wish to depart even when symptomatically cured. With keepers and nurses well-trained and interested in their duties, it was possible to provide a mental atmosphere so tranquil that the hypertrophy of sexuality common with epileptics was sensibly diminished. Such colonies existed in Denmark, where only five per cent. of the annual income was derived from subscriptions. Each patient paid £25 per annum.

Dr. MARRO'S paper, on "The Influence of the Age of the Parents upon the Psycho-physical Characters of the Children"(2), was read by Dr. Ewart, and a form prepared by Dr. Marro for the tabulation of data bearing on his investigations was circulated among the members of the Congress.

In opening the discussion, Dr. EWART said that in studying this question it was no use to take the child simply by itself. Three things should be allowed for: race, type, and acquired character. At Middlesbrough he had taken all the mothers who had given birth to a child in 1903, and classified them under age—30, 40, etc. He also inquired how old their parents were when they were born, and by comparing one series with the other he got a difference in type. All characters—eye-colour, height, fertility, immunity to disease—came in a curve in relation to parents' age at birth. He found the same series of relationships in studying the age at birth of parents and grandparents. In a group of mothers whose height was 125 cm., their offspring during the maturity period age (21-37) would be 1 cm. more than that; during the post-maturity period 1 cm. less. This character was transmissible, and the same variation would recur in a second generation. There was a tendency for increase of the character at maturity and decrease at the extremes. This meant that there was an unknown force, of a creative nature, acting on life; and this made it difficult to apply Mendelian laws to human beings. They applied to organisms—like peas—which were not evolving, but their application to man, who was rapidly evolving, was very obscure. Given a creative force producing, in those units born about the thirtieth year, a slight increase of stature in such generation, it was obvious

(1) Problems in Eugenics, p. 62. (2) Ibid. p. 118.

that enormous differences would accrue. Death hit very heavily at "extreme" births. He further showed how this force, tending to produce greater variability in the stock, was controlled by alteration in life expectancy and fertility.

Dr. SOREN HANSEN showed a table illustrating the fecundity of 994 Danish feeble-minded persons, graded according to age at parturition, and its variation from the fecundity of normal persons of corresponding age.

Prof. ENRICO MORSELLI'S[1] conclusions on "Ethnic Psychology and the Science of Eugenics" were read by Mr. Marshall.

Dr. MANOUVRIER said that it was most important to define a science exactly at its formation, as it was very difficult subsequently to change its definition. On this account he desired to criticise the definition and the position of eugenics. The practical purpose of eugenics, as conceived by Galton, made it in effect a branch of hygiene, and the means of attaining its purpose were declared to be agencies under social control. This part of the definition seemed to him to need enlargement, otherwise an important part of the means to be taken to improve the qualities of the race would be omitted. There existed, or should exist in the future, a private eugenic hygiene, needing no social control. As Galton had had in view only socially controllable agencies when framing his definition, it belonged to this Congress to extend the definition so far as the logical implications of eugenics demanded extension. This could be done by omitting from Galton's phrase the words "under social control." So defined, eugenics would be the study of all possible means to racial improvement; but they could still distinguish between those which could and should be placed under social control and those which should be left to individual choice. Social control could deal, for example, with the prevention of parenthood in the cases of epileptics, alcoholics, insane, imbeciles, etc. But future developments of biology and genetics would doubtless indicate considerations which should govern the choice of marriage-partners—considerations of age, temperament, physical and mental hereditary dispositions, deep-seated peculiarities of individual character. There might be a discipline prescribing the kind of individual life which would have the best influence upon conception and gestation, to enable people to know the eugenic effect of their conduct. The same associations of qualities which made consanguineous marriages dangerous occurred in cases where there was no consanguinity. Qualities in the parents not exceeding the normal degree might be carried to the pathological degree in the offspring. This explained the frequent connection between genius and madness or imbecility. In all these cases there could be no question of social control, yet eugenics was obviously concerned with them. Consequently eugenics should be subdivided into two sections, one concerned with social hygiene, the other with private hygiene. Eugenics was an art, or an application of a science; and such application was always more complex than was the science applied. The science of

[1] Problems in Eugenics. Italian, p. 58. English, p. 60.

hygiene itself was but little developed, and accordingly the application of it at present must be cautious, and even timid.

There being no further discussion, the President declared the session closed.

SECTION II.—PRACTICAL EUGENICS.

FRIDAY, JULY 26th. MORNING SESSION.

Major DARWIN, who presided, called upon Dr. Hoffman to read his paper on "Maternity Statistics of the State of Rhode Island."

Dr. HOFFMAN[1] said that he would not read his paper in full, since the same consisted almost exclusively of numbers and percentages. He said that America possessed perhaps the most heterogeneous population on earth, and therefore was faced by some exceptionally interesting eugenic problems. Immigrants were admitted without serious restrictions, sometimes to the number of more than a million a year. In 1911, 878,000 immigrants were admitted, and 22,000 were debarred, chiefly for the reason that they were likely to become a public charge. Within recent years there had been a complete change in the character of the immigration, which in the past had been largely from the North of Europe, but which was now chiefly from Southern European countries. Of the total foreign-born white population in 1910 the proportion born in Austro-Hungary was 12·4%, against 6·2% in 1900; and the proportion born in Italy was 10·1% in 1910, against 4·7% in 1900. In contrast, the proportion born in Germany had decreased to 18·7%, against 27·5% ten years ago; and the proportion born in Great Britain had declined from 11·4% in 1900, to 9·2% in 1910. These illustrations, he said, emphasized the seriousness of a race problem which was quite unique in the world's history. Evidently, the tendency was towards a decided diminution in the numerical importance of northern-born races in the United States, and a corresponding increase in the number of races and peoples from the southern countries of Europe. It was, therefore, significant that the available statistics of fecundity should also indicate a much more rapid decline in the birth-rate among the native-born of native stock than among the foreign-born of the first and second generations. This might properly be construed as race deterioration, considering the still preponderating numerical supremacy of the native-born of English origin. Rhode Island, he said, was one of the few States which collected at twenty-year intervals some very interesting and suggestive maternity statistics. Those for 1905 (the latest available) were presented in the speaker's paper. They showed that the numbers of native and foreign-born women in the State were approximately equal, but the foreign-born women were reproducing much faster than the native-born, and the speaker gave statistics classifying

[1] Problems in Eugenics, p. 334.

the foreign-born women according to the country of origin and relative fecundity. The number of childless wives among the native-born was much larger than among any section of the immigrant population. More Roman Catholic women were mothers, and fewer were childless, than Protestants, and a larger proportion of Jewish women were mothers than Roman Catholics, but there was a downward tendency in the birth-rate among every element of the population. Against the theory of the advantages of small families, Dr. Hoffman urged that a considerable proportion of artists, scientists, inventors, etc., had been children of large families, and he made reference to the Russian chemist, Mendeléeff, who was the seventeenth child of his mother, and a most important acquisition to mankind. Against the contention that the small family was improved in quality—physical, moral, and economic—he asserted that this could not be sustained by an appeal to the facts. Of course, he said, an ever-increasing preponderance of the foreign-born population would menace the perpetuation of English principles of government, which had been dominant in American life since the earliest settlement of the country. If the so-called superior class, he said, including the better educated people of trained intelligence and superior morality, persistently reduced their families there must necessarily be a preponderating quality of the opposite and less desirable types.* He believed emphatically in race pride for every element of the population and the duty of rearing normal families as a prerequisite of good citizenship, and acquiesced in a high standard of public morality. In any event, he said, no good could come to the nation from the children not born, and that the argument was best summed up in the retort of an Italian labourer to his employer's sneering reference to his children as a lot of brats, "May be they will be more good some day than the ones you haven't got."

Dr. MURRAY LESLIE said the diminution of native-born in proportion to foreign-born population was not confined to Rhode Island. In the East End of London the same phenomenon was wonderfully manifested. Dr. Hoffman's figures showing the relation between birth rate and religion were most interesting, and proved that the inculcation from early childhood of the function of parenthood as a religious duty had a considerable effect in increasing the population among the adherents of the religion in question. Mr. Hoffman had not given his opinion as to the causes of the reduction. Did he think questions of climate and environment bore any relation to it? There was a similar ratio between rural and urban populations. Few families endured for more than three generations in London or New York City. He agreed with Dr. Hoffman that the facts disclosed a serious menace, both in England and America; but he desired more explanation of them.

* For a more extended discussion of this question, see the article by Dr. Hoffman on "The Decline in the Birth Rate," *North American Review*, May, 1909. See also his "Race Traits and Tendencies of the American Negro," New York, 1896.

Dr. DUNLOP urged that, whereas the two last speakers had pleaded for encouragement of reproduction on the part of the better stocks, the question might be met by encouraging a lessened fecundity on the part of inferior stocks. The people who multiplied so rapidly were, for the most part, living lives of great misery, and their mortality was so high that it was doubtful whether ultimately they did increase very much. The better classes, with a lower mortality and better nurture, held their place in the end. A higher birth rate in the upper classes would be fostered by relieving them of the large burden of taxation imposed on them to help the inferior classes to maintain their children. The new humanitarian outlook compelled us to help maintain these children, and this was a strong force of repression to the better classes. Therefore the poorer classes should be asked not to have more children than they could afford to maintain. This was the very basis of an individualistic State.

Mrs. ALLMAN HENSLEY said that this question appealed directly to the laity. The decline in numbers of upper and middle-class families was largely a matter of social ambition. They wanted to give their children advantages which they could not afford for more than one or two children. It should be held as a moral conviction that it was better to have four, five or six children in good health and to bring them up in a less luxurious manner. This was more important than a college education.

Dr. HOFFMAN, replying on the discussion, said he did not believe that the decline of native-born population had any relation to climatic or other local conditions. This opinion was based on exhaustive inquiries, lasting through many years. The decline was due exclusively to artificial restriction, motived by the desire for an easy-going life. In America there was abundant prosperity, especially for those who gave their sole attention to the getting and spending of money. It was sophistry for the upper classes to talk of the careful nurture of their few children, when they usually brought them up in a way that unfitted them for the real struggle and duties of life. The capacity for struggle and the will-power of the one or two children of very small families were relatively less than of the children of large families. He (Dr. Hoffman) was under no illusion that there was any real decline in the physiological power of reproduction on the part of the native stock. It was simply that they were "living on Easy Street," and were determined to stay there.

Dr. ADOLPHE PINARD'S paper on "La Puériculture avant la Procréation"(1) was read by Dr. A. Marie, who, in opening the discussion, showed on the blackboard the genealogies of a large number of families, collected in Paris, illustrating the relation between parental alcoholism and insanity in the offspring. These tables also illustrated Dr. Marro's thesis regarding the influence of the age of parents on the defectiveness of children; but the method of inquiry (according to Dr. Marie) was at present insufficiently elaborated.

(1) Problems in Eugenics. French, p. 457. English, p. 458 (Abstract).

Prof. Houssay said that Dr. Marie's generalisation that the first children of alcoholics were generally the best, and the subsequent ones progressively worse, had been further verified by experiments on chickens. It might be regarded as a general law of biology, not a peculiarity of the human species.

Prof. Ploetz then read the paper on Neo-Malthusianism which will be found on p. 179.

Dr. Drysdale calculated that the movement he represented (the Neo-Malthusian League) had been the cause of a reduction of 25 millions in the number of births throughout the civilized world since 1876. The movement stood for race-hygienic principles. It had also laid much stress on qualitative improvement, as well as quantitative reduction in the birth rate, had urged the poor to restrict their families in accordance with their incomes, and advocated early marriage as a cure for many of the evils which circulate race-poisons.

Miss Rees urged that if the struggle for life among the upper classes could be lessened by limiting the supply of the lower classes, this would go far towards making possible more liberty, intellectual, moral and emotional. The methods which had been used by the upper classes in limiting their families were obviously hygienic. Liberty was impossible for women if they were overburdened by the production of too many children.

Dr. Lucien March said that the apologetic of neo-Malthusianism was based on the danger of a too rapid increase of population. Yet in all the countries where, in the nineteenth century, population had increased (England, Germany, the United States, etc.) wealth had increased yet more rapidly, whereas in such countries as Bohemia and Ireland a stationary or declining population had coincided with an increase of poverty.

Prof. Ploetz, replying on the discussion, said that neo-Malthusianism had attended to the quality of offspring only as within the family. But that was not the principal point from the eugenic standpoint. The case against Malthusianism was its tendency to diminish the better classes within a people, to reduce the numbers of those nations which represented the best races of mankind, and therefore to reduce their importance relatively to the rest of humanity. He hoped that out of the interest in eugenics would spring a movement strong enough to induce the upper classes to increase their families, and bring the higher nations to a larger birth rate again. The actual birth rate was declining in Germany, though this fact was partly concealed by the excess of births over deaths. An increased birth rate would be necessary to enable the Western world to compete successfully with the yellow races.

Dr. Louis Querton (Brussels) spoke on the subject of his paper on "The Practical Organisation of Eugenic Action"(1).

(1) Problems in Eugenics. French, p. 141. English, p. 146.

Dr. SALEEBY said that for the organisation of eugenic action it was necessary to proceed upon Galton's distinction between nature and nurture. We needed a primary or natural eugenics, concerned with inborn qualities—with genetics—and a secondary or nurtural eugenics, which should make the best of the material supplied by primary eugenics. But we should stultify ourselves if we set up an opposition between these, or allowed it to be assumed that we were opposed to social reformers or other persons interested in nurtural conditions. He divided primary eugenics into three categories: (1) positive eugenics—the original eugenics of Galton, the encouragement of worthy parenthood; (2) negative eugenics—the discouragement of unworthy parenthood; (3) a preventive eugenics, which should stand between healthy germinal material and racial poisons, such as alcohol, syphilis, lead, etc. These agents poisoned the race rather than the individual, and it was a cardinal duty of eugenists to intervene between what would be worthy parenthood and these things which were capable of degenerating it. The chief method of positive eugenics would be the education of opinion—education for parenthood, leading up to the ideal and instrument of all eugenics, eugenic marriage. Marriage certificates might be a source of danger—what would happen in the case of persons to whom they were refused? As regarded negative eugenics, the two possibilities were segregation and sterilisation. Advocates of these ought to base their plea not so much upon the interests of the race as upon those of the individual. The defective individual was at present neglected, and care should be taken of him primarily for his own sake. There was no opposition between eugenics and humanity. Under preventive eugenics came the question of alcohol. Every eugenist ought to be a temperance reformer. The venereal diseases also came under this category, and they ought to demand the notification of these, in both sexes and in all classes. Again, under nurtural conditions, it should be remembered that life was continuous; therefore it was stupid for the State to care for the individual merely from the ages of 5 to 14, or from 16 (the insurance age) to 70. The care of life must be continuous. It must begin from conception, with ante-natal care for the mother, and go on at least as long as the reproductive period in both sexes.

Dr. MACAULAY said it had been frequently claimed that first and second born children were generally inferior, physically, mentally and morally, to those later born. He should not oppose this contention if it were limited to the case of immature parents. but it was asserted without reference to the age of the parents. Having investigated the statistics adduced in evidence on the point, he discovered in them a fallacy which destroyed their value. The statistics were prepared by classifying the inmates of some institution, sanatorium or penitentiary, then comparing the number of first-born with the total of first-born children in all the families represented, the second-born with the total of second-born, and so forth. It was found that the percentage of first-born inmates was greater than the corresponding

percentage of fifth or tenth-born, and this was said to prove the inferiority of the early-born. But as the later-born were generally infants, it only really proved that children were too young to develop consumption or go into the penitentiary. Anything could be proved by such a statistical method. In this audience, many of the people had younger brothers and sisters; therefore it was certain that the number of early-born persons present was greatly in excess of the number of later-born. That did not prove the mental superiority of the early-born. (The speaker attempted by bringing forward other instances to establish the *reductio ad absurdum* of the argument he opposed.) The method was fundamentally fallacious when applied to any classification limited to adult life, or to any body of persons among whom adults predominated. Again, it was maintained that the number of children in families of tuberculous parents was larger than the normal, and this was "proved" by going to institutions, asking the patients how many there were in each of their families, and dividing the total of inmates by the total number of families represented. But obviously, in a family of ten, the chance that some member of it would be in the institution was ten times greater than in a family of one. To compare such figures with the average of the general population was to compare unlike quantities, and so to deceive.

Alderman Raffles-Bullay urged the importance of parents communicating to their children at the right period the knowledge of the facts and laws of the continuation of the species. The greatest danger to young people arose from their ignorance, through which they fell into errors which not only lasted for their lives, but vitiated or prevented the propagation of further generations. Teachers should have authority from parents for communicating the necessary knowledge to children.

Dr. Querton briefly replied.

Dr. C. B. Davenport's[1] paper on "Marriage Laws and Customs" was read by Dr. Raymond Pearl.

Dr. Mjöen said that in the Scandinavian countries the question had been discussed whether it would be possible to arrange medical examination before marriage. This important subject had been thrust upon public attention by the Women's Society of Stavanger, which in 1908 had sent a resolution on the subject to the Government. He (Dr. Mjöen) had proposed as an alternative resolution that two declarations, not more than six months old, should be submitted by the marrying couple, stating that neither suffered from any disease or weakness which could constitute a hindrance to the marriage or a danger to the health of the partner or the offspring. These should be shown to the relations on both sides. They should be procured from a legally authorised doctor, paid by the public authorities and forbidden to receive any fee from the bride or bridegroom. The basis of this plan was that certain sicknesses in the latent state could not be detected by the physician, while to grant a certificate wrongly would be worse than not to

[1] Problems in Eugenics, p. 151.

have any such system. In 1911 the Medical Society of Norway had declared against the certificate system, but not against this alternative proposal. Later a medical meeting representing the three Scandinavian countries had adopted the latter system, and undertaken to try to give effect to it.

Miss GARETT said that commercialism, in America at least, was deliberately over-stimulating the racial impulses of young people; also that the young, by hundreds, were begging their teachers to give them just such information as was being laid before this Congress. Teachers ought to be specially trained to impart such information. Dr. Davenport's conclusions with regard to the marriage of cousins, in particular, ought to be widely circulated.

Dr. SALEEBY said the question of marriage certificates ought to be carefully thought out before things were said which could be cited in the Press as representing eugenic opinion. They were sure to be misrepresented, but they should take care to be misrepresented as little as possible. There was a real distinction between a certificate without which marriage would not be permitted, and an optional examination, for the use of the parties and their parents, but not of the nature of a marriage permit. If they sought to legalise a permit system, the consequences (among persons to whom the permit was denied) would be of the gravest kind. He feared the principle of the compulsory certificate at the present stage of development; but they might disseminate the idea of the optional certificate, which, for example, the wise prospective father-in-law might demand from the man who proposed to marry his daughter. The American eugenists had drawn attention to another very difficult subject—that of the individuals who, as such, seemingly had no defect which would disqualify them from marrying, but who carried latent, recessive defects. Certainly a large proportion of the population came under that category. These persons were impure dominants, normal somatically—individually; but a proportion of their offspring would be defective—feeble-minded, or with neuropathic taint. Dr. Rosanoff had estimated the number of such persons at 30 per cent. of the population. This might be a gross over-estimate; but unquestionably there was some fraction. Segregation of such people was unthinkable; so was compulsory sterilisation before marriage, or the denial of marriage to them. Were not these the kind of people who should abstain from parenthood by neo-Malthusian means? Prof. Punnett had said that most disease conditions were dominants, but this did not apply to nervous diseases. Most of them were recessives, and very difficult to extirpate. This problem of the fit who carried unfitness was a definite issue which eugenists had not yet faced. The eugenic value of love had been too little noted in Dr. Davenport's paper. On Darwinian lines, sexual selection and affection were largely in terms of health, which was closely correlated with beauty. Galton had pointed out that endogamy, exogamy, totemism, etc., were restrictions on

marriage to which mankind had readily submitted, and the deduction was that in future mankind could be controlled by other restrictions directed along eugenic lines. They had to ask whether this was really the line of progress, or whether eugenics must not rather seek to educate and direct the natural eugenic forces within the individual. Those who held the latter view would find a great reinforcement of their conviction in Ellen Key's *Love and Marriage*.

M. QUERTON maintained that doctors were the first to recognise the difficulty of utilising certificates for marriage.

Dr. DUNLOP said that eugenic progress depended on the selection of births. They had to be limited; therefore the best should be selected. The papers just read bore out the contention that dysgenic propagation could be prevented without preventing marriage.

Mr. GLADSTONE said that in the lower classes marriage was regulated by the emotions; in the upper classes by the mind and the will. The evil results of the haphazard mating of the lower classes could be prevented only by education—not by law, since, despite law, human nature would insist on marriage.

Miss WOODALL appealed for education for those who had no idea of the prevalence of venereal disease. Girls and women especially went blindfold into marriage, not knowing that they might be ruined for life by such causes. The Congress ought to appeal for legislation denying legal marriage to anyone infected with venereal disease. Nurses went into hospital ignorant of the danger they were facing; even from the breath of some of their patients they might catch incurable eye-disease.

The CHAIRMAN said that this was a subject on which the Eugenics Education Society had taken action.

Prof. EDGAR said that under present-day educational and social conditions, educated men, who ought to be fathers, were deferring marriage until late in life, and those who married had few or no children. The State was bound sooner or later to put a premium on the marriage of healthy people and the production of healthy children. Clergymen, doctors, teachers, and the like, with incomes of from £200 to £400 a year. could not have families without foregoing a great many of the ordinary pleasures of life. They had no benefit from the State except a reduction of income-tax of 7s. 6d. for each child under sixteen. More should be done to encourage those who were bold enough to marry and self-denying enough to have children; and something should be done to encourage or compel the bachelor to undertake some of the responsibility of life. The shirking was exceedingly selfish, and it made things harder socially for the married. The single man with £500 a year was comparatively wealthy, and could set a standard which was impossible to his colleague with a fairly large family. Therefore the State should tax bachelors above a certain age, and tax also, proportionately, those who, being married, had no children, or

less than a certain number; it should also do something positively for those who were patriotic enough to marry and have healthy children for the good of the community.

The Chairman then declared the session closed.

FRIDAY, JULY 26th. AFTERNOON SESSION.

Gen. VON BARDELEBEN took the chair.

Mr. BLEECKER VAN WAGENEN gave a discourse embodying the information contained in his published paper(1). His committee had found that most of the easily-accessible information as to the results of sterilisation in various American States was scientifically worthless, and they had therefore made a thorough investigation of case-histories and heredity-histories of individuals, in order to discover the actual results of sterilisation, in cases both of normal and sub-normal mentality. The report now presented was only a preliminary one, and they did not feel justified in basing conclusions on the limited data available. Operations of the kind involved were now performed by thousands in the United States. Vasectomy might be a eugenic measure of considerable value if practised without law, but under protection of law to the operator, by consent of the individual who was manifestly unfit for parenthood, or his guardians. The sterilisation laws already enacted in several States were defective. Parts of them were thought by the best authorities to be unconstitutional. Such laws, however, had been enacted in eight States. This did not represent a widespread popular demand, but resulted from the enthusiasm of a small group of persons specially interested. The first law enacted was that of Indiana, in 1907; the latest was that of New York, passed in the spring of 1912. In the interim other laws had been enacted in California, Iowa, Nevada, Connecticut, Washington, and New Jersey. In New York and New Jersey only, the law provided for a definite review by a court of the action of the Commission which examined the individuals suggested for operation by the superintendents of the institutions in which they lived, before the operation was performed. In other States the decision of the Commission (which usually consisted of a surgeon, a neurologist, and the superintendent of the institution) was final. The classes upon whom the operation might be performed included in all the States those denominated as confirmed criminals or those with confirmed criminal tendencies(2). In Washington and Nevada the law was confined exclusively to those committing violent assaults upon women or children, and to those who became confirmed criminals through repeated conviction for such crimes. Iowa had gone further than any other State in its action on this matter, by making it obligatory that once every year all the inmates of the institutions within

(1) Problems in Eugenics, p. 460. (2) Ibid., p. 465.

the State which contained criminals, feeble-minded, drunkards, drug-fiends, epileptics, etc., should be examined by a board which should decide whether they should be operated upon. Not a great deal had been done. (See statistics for Indiana(1)). The story of Indiana had been spread over the world, and a good deal exaggerated. The operations had not been so extensive nor the results so general as commonly reported. The Committee had talked with a number of persons who had undergone the operation voluntarily, and a few compulsorily. In the former cases there was no evidence that the operation had produced any radical change in the individuals except that they were no longer capable of procreation. Most of them testified that they were better able to concentrate their minds on their daily work, and that they had put on flesh and could sleep better than before. Those who had been compulsorily operated upon were inclined to complain about it. In California these operations had for a year been practised upon women as well as men—insane, epileptic, and feeble-minded. (See p. 469.) In each case a thorough study of the heredity-history of the individual had been made. He (Mr. van Wagenen) offered no brief for sterilisation; far from it. He believed that their legislation had come too soon, and wished that none of it had been enacted. Sterilisation had, of course, been practised throughout the history of man, and was no doubt being practised in all countries to-day. In the States that had no law on the subject, it was being practised without law, but with the consent of the individual—except in the case of the hopelessly insane. Since, then, this thing was happening, whether they liked it or not, it behoved all earnest seekers for social betterment who desired to get rid of degeneracy and wretchedness, to investigate the problem with an impartial mind, that further scientific knowledge of the subject might be acquired.

A discussion by way of question and answer then took place, of which the following is a summary:

Question: What guides the surgeon as to the mental capability of persons confined in asylums?

Answer: We have no information that any criterion has been adopted.

Question: In the case of criminals, had the operation any effect on their criminality?

Answer: So far as known, no. The type was also criminally *defective*. All those who were operated upon, being criminals, were primarily degenerates. They were almost all sex-perverts, many of the most pronounced type.

Question: Should not a clear distinction be drawn between sterilisation as such, and castration, which involved sterilisation, to avoid the misrepresentation from which eugenics was suffering?

Answer: Yes. The term "sterilisation" was inclusive, and not intended to designate any particular form of operation. The specific terms vasectomy, ovariotomy, etc., could be used.

(1) Problems in Eugenics, p. 468.

Question: Has any question arisen in the United States as to the nullity, or otherwise, of a marriage previously sterilised?

Answer: I believe the question has arisen, but I cannot give precise facts. From memory, I believe the Court was willing to nullify the marriage if it could be proved that the facts were not disclosed before the marriage.

In reply to some questions as to the precise legal procedure connected with sterilisation operations, Mr. van Wagenen again emphasised the fact that his Committee did not recommend the laws they described.

Question: In carrying out sterilisation, have you encountered opposition from religious bodies?

Answer: There had been opposition. In one case, such direct opposition from a Roman Catholic member of the Pennsylvania Legislature that the Bill was dropped. In the Roman Catholic *American Ecclesiastical Review* the matter had been discussed (in Latin) for a year and a half. Two of the controversialists were for sterilisation as a eugenic measure, and three against. His Committee had carefully studied the whole controversy, and found that it ended exactly where it began.

Question: In instances of extreme sexual perversion, was it found that the persons were the offspring of old or worn-out parents? A large proportion of the cases I have seen were persons whose parents were beyond the age of successful reproduction.

Answer: I will reply to that question later.

Sir JOHN MACDONNELL said he could not discuss the subject from the point of view of medical science, but he would approach it from that of the criminologist and the School of Criminal Law. He expressed high appreciation of the researches of Mr. van Wagenen, and hoped similar inquiries would be instituted elsewhere. Some of the data in the report was somewhat fragile. In one of the tables, under the category "Criminals," the figure given was eighty odd thousand. That figure was worthless, owing to the enormous changes in criminal-law administration, the substitution of fines for imprisonment, of short terms for long, etc. The figures showed a diminution of crime in the States, whereas it was a practically unanimous opinion of criminologists that there had been a positive increase of crime. The eight sterilisation laws in America, apart from their unconstitutional character, were unjust, in that, with scarcely an exception, no intimation, according to the letter of the law, need be given to the relatives of the person to be operated upon, and in no case was that person represented by a lawyer. In New Jersey that defect had been rectified. He was glad that Mr. van Wagenen had not asked the Congress to express approbation of these laws. He protested against the assumption that even the habitual or confirmed criminal was in the great majority of cases a person who should be treated in this manner. The habitual criminal was in most cases a manufactured article—made by his environment. He was the

by-product of slums. No matter what his crime may have been, there was no warrant for assuming that he was the victim of certain qualities which would be transmitted to his progeny. The confirmed criminal often had in him the potentialities of good things. His very resistance to law and order showed a power of reaction. Did not Mr. van Wagenen think that most of the objects he had in view would be effected by an intelligent, strictly administered system of segregation? And did he not think this Congress would do well to appoint an international committee to frame a scheme of segregation, taking account of the various types of crime, of the ages of the persons, etc.?

Dr. Papillault said that the State, from the noblest motives, had become responsible for the maintenance of the infirm and degenerate. It now found itself constrained to reduce their number, as the cost of their maintenance increased unceasingly. But the measures by which the State could interfere with family hygiene and individual selection were detrimental to personal liberty and responsibility, and this was worse than the expenditure. Its action might also involve errors, for the laws of heredity were substantially unknown. Galton and his disciples had not succeeded in elucidating these laws in detail. In the case of criminals, certain of their characteristics were transmitted by heredity, but those due to the environment were not reproduced; and science was not yet able to distinguish these. How could a State functionary decide such grave issues? They should seek advice only from science. With this view, M. Cruppi had instituted at the Ministry of Justice a Commission of Criminology, and, in conformity with his conclusions, M. Briand had presented to the Chamber a scheme for an Office of Criminology, which had been accepted, for the purpose of making investigations in regard to criminals.

At this point Major Darwin took the chair.

Dr. Drysdale said sterilisation was a method of very limited applicability. It was suited only to those persons who were sufficiently responsible to be at liberty, and yet unfit, and too irresponsible voluntarily to avoid parenthood. This small section presented a much less important problem than the vast mass of the poor, who, if they had the knowledge, would be only too glad not to produce children with inherent taint. Lead was a racial poison, but poor women often took it to produce miscarriage. If the poor had adequate opportunities of avoiding parentage, defective germ-plasm would be rapidly eliminated.

Mr. van Wagenen, in reply, said that at the time he did not advise sterilisation by law. He had no data on the relation between criminality and the age of parents. He heartily agreed in the main with Sir J. Macdonnell, but it was becoming more and more evident that a large proportion of criminals were true defectives, and that criminality must be considered in relation to its causes, which often lay in defective mentality, and so probably in heredity. He agreed that it would be well to have an international committee on

segregation, and also on sterilisation. These two things should be considered together. As to the proportion of defectives to population, he could only say that in the State of New Jersey, with 2½ million population, there were 975 defective adults in State institutions, and a private committee had a record of 6,000 degenerate defectives not in custody. How could these be taken care of?

Prof. Houssay read his paper on "Eugenics, Selection and the Origin of Defects"(1).

Dr. Saleeby said he would refer again to the question of sterilisation. It would be useful only in relation to that minority of the defective who did not require to be segregated on personal grounds. Ninety per cent. of defectives required special care in their own interest and that of the community, quite apart from any consideration of heredity or parenthood, and therefore would not need to be sterilised. The future field for sterilisation lay mainly with the persons somatically normal, but liable to transmit a genetic defect. In such cases, the advocacy of voluntary sterilisation should be based on grounds of humanity, in order to leave free for marriage a person who would otherwise have to be segregated. It should be remembered that Darwin had never denied the transmission of acquired characters. He definitely believed in the Lamarckian doctrine under certain conditions. He (the speaker) believed that biology, after a period of exaggerated Weismannism, was returning to that view. This Congress was fortunate in listening to countrymen of the great Lamarck, from whom—a century after the publication of his *Philosophie Zöologique*—we still could learn. It could not be maintained that there was a representative change in the offspring corresponding to the change produced in the parent; but in the case of race-poisons we had unchallengeable evidence of things which affected both individual and offspring. Prof. Houssay had spoken of the reconciliation of moral principles with eugenics. They should make it quite clear that as eugenists they did not deny any great moral principle that mankind at large were agreed upon. They could not get eugenic success by alienating a thousand people for every one they convinced. The Mental Deficiency Bill in the House of Commons had been seriously imperilled by the wrong kind of advocacy, and it was now doubtful whether it would come up for third reading. The opposition, alleged by Huxley, between the cosmic process and the ethical process could be reconciled, so far as eugenics was concerned, by distinguishing between the right to life and the right to become a parent. The right to life must be admitted in all cases. Once a new individual—though only microscopic—had come into existence, we had to grant its right to the best possible nurture; but mankind must decide as to whether any individual should be permitted to become a parent.

The session then terminated.

(1) Problems in Eugenics. French, p. 155. English, p. 158.

SECTION IIa.—EDUCATION AND EUGENICS.

SATURDAY, JULY 27th. MORNING SESSION.

Major Darwin presided.

Prof. Samuel G. Smith(1) said the idea of eugenics was as old as Plato. Moses had said a great deal about eugenics, and the Book of Deuteronomy gave the first principles of it from the Hebrew point of view. The early eugenists were poets, philosophers and lawgivers; to-day the subject had fallen into the hands of the biologists, who had a way of monopolising things, and deserved great credit for their vigour and their usefulness to society. He had chosen the subject of the new social consciousness because it implied a psychological basis for their work, rather than a merely biological one. Lester Ward had been the first to point out that social development was animated by passions and desires. This psychological progress in the past had been largely unconscious; the time had now come to make it intelligent and purposeful. The great feature of modern times was the mastery of the State over other forms of social organisation. It had dominated the Church, and still more the home. The State set ethical and physical standards, and forced the parent to show himself fit to train his child, or else took the child as its own ward. The social consciousness, however, was not simply political or economic or religious, but was as complex as all the various interests of the groups subsumed under it. The more interests individuals participated in, the more complex society became, and the more efficient as an instrument of the social will. The great task of society was to impress on the rising generation the content of the social mind. This consisted of those ideas, traditions, passions and ambitions which any social group held in common. The child was plastic to all these influences. The State had a right to protect itself from its own wards, by prohibiting marriage to the feeble-minded, the insane, and the pauper. It could only do this effectively by the custody of the women. Feeble-minded women could not be protected simply by prohibiting them from marrying. The criminal class were in an entirely different realm. Between 1850 and 1860 it was found in France that of all the persons put on trial, from 12 to 19 per thousand had some criminal taint in their family; but the general population also had 12 per thousand, so that the only way to get rid of crime in France on the theory of segregation was to lock up all Frenchmen. We had come to see that men's inheritance consisted chiefly in strength or weakness. In many places, more feeble-minded people were the offspring of tuberculous parents than of feeble-minded. If he had to choose a father for himself, he would rather have a robust burglar than a consumptive bishop, though he would be glad to be promptly adopted into some other family. Ordinary human mating had usually worked very well. Men sought beauty and women strength, and nature tended to slough off the unfit. But economic considerations opposed to the natural instinct that governs sex-selection a convention which

(1) Problems in Eugenics, p. 480.

bore with it the seed of a great deal of defect. Galton had well said that heredity was concerned with large populations rather than with individuals. It was a question of the group, and not of the particular family. Discussions on eugenics often implied that the business of human nature could be reduced to the terms of a stock-farm or a poultry-yard. Other animals realised themselves through their bodies, but with man psychological interests were the most important. It was asserted that talent could be inherited, and that one could achieve a good character by being born right. There was not the slightest evidence that either talent or character, either intellectual or moral qualities were ever transmitted directly through the germ. Genius was the surprise of history. Nobody knew who were the parents of Moses. The parents of Luther did not matter. Burns and Shakespeare, Beethoven and Wagner rose out of the common plane of human life. The talented and wealthy classes were said to have a larger proportion of talented children; but that was due to education and upbringing, and if they did not it would be a disgrace to them. The criticism of them was that they did so poorly—not that they did so well. Society suffered more from the vices of the rich than from those of the poor. By what legal methods could they restrain the vices of the rich? Social efficiency and physical fitness were by no means synonymous terms. We needed muscular force for the world's hard work, good lungs and heart and breathing power to make good soldiers; but the leadership of the world did not consist in these things. Kant was advised not to study philosophy, because his chest was weak. Sir Isaac Newton, when a baby, was not expected to live a day. A remarkable treatise could be written on what the world owed to invalids. He was not sure but that for intellectual efficiency some little abnormality of the flesh was almost a pre-requisite. Of 600 slum children in a New York hospital, only 22 were found to have been badly born. Their mothers had not been properly fed afterwards, and had been sent to work too soon. The babies had been taken care of by other babies, dropped on the floor, poisoned by bad air, starved, injured by improper food; hence there was a maimed generation of 600, when there should have been only 22. We needed to take care of the babies we got. Nature did well in her transactions. The father might have one hand and the mother one eye, but the baby had two of each. If all the conclusions of physicians were correct, the race would have been rotten and doomed generations ago. Anything could be proved by positing a latent quality. We all had ancestors who either were hung or ought to have been hung, and we had all had a saint among our ancestry. To trace criminality to criminal ancestry and saintliness to saintly ancestry was to use a hypothesis by which anything could be proved.

Mrs. MACOY IRWIN said it had been implied that if marriage were prohibited to the unfit, an increase of immorality would ensue. It should be prohibited not only to the imbecile and the insane, but also to those who

by lives of sensual indulgence had unfitted themselves for parenthood. Prof. Smith had said that marriage and maternity were not synonymous terms. That was especially true of the upper classes. But they ought to be. They had become divorced because of the prevalence of unwilling motherhood. The separation of these ideas in the mind of the young must inevitably lead to moral decay, as well as race-suicide. Fit parenthood could not be encouraged by offering prizes, but by dignifying it and making it a matter of conscious self-control. The new social consciousness demanded that the artificial sterilisation of marriage should become a thing of the past. Prof. Smith had touched a deep note when he said that eugenics was a matter of psychical and ethical import. She had been startled by his assertion that nearly all children were born well; if that were true, eugenics would never have been dreamed of. When it was said that out of 600 only 22 were badly born, it would probably be truer to reverse the statement.

Madame Dorel said that her personal experience of the last 20 years made her confident of the success of the movement for man improvement. It would be recognised that in obeying the laws of eugenics man would be doing the best service, both to himself as an individual and to future generations. She suggested that the substitution of mechanical for manual work made the reduction of the birth rate possible, and would tend to raise the standard of living.

Mrs. Hensley said the notion that the bearing of a child endowed a woman with knowledge she did not before possess was a delusion. It was most important that children should receive proper teaching on sex matters in reply to their natural questions. If these questions were put aside, they were carried elsewhere and answered in an improper manner.

Dr. Saleeby said there might be a difference between supreme genius, such as that of Wagner and Beethoven, and talent. Prof. Smith had omitted Bach, who did not support his theory. The inheritance of talent, which was probably much less complex, might be more demonstrable than that of genius. The latter was probably due to a happy combination of a vast number of Mendelian units, which could only in the rarest cases be thrown into one or two germ-cells. If genius was an aggregation of co-ordinated talents, it might be demonstrated that some of them were inheritable. In the second edition of "Hereditary Genius" Galton admitted that that book was wrongly named, and that it should have been called "Hereditary Talent" or "Hereditary Ability." It was true that parents who had lost limbs had children who were physically complete; but if the defect in the parents were genetic, the precise opposite would happen. Certain forms of paralysis, for example, were invariably transmitted.

Miss Johnson thought Prof. Smith must have been joking when he said that most children were well born. As a social worker she knew of crowds of children who were not so; 300,000 feeble-minded were registered. Could

not this Congress petition Parliament to pass the Mental Deficiency Bill? Its meeting had broken down the conspiracy of silence which had prevented improvement on eugenic lines.

Prof. Ploetz said that in regard to the heredity of mental qualities, which Prof. Smith had denied, it was necessary to distinguish between the contents of an intellect or soul and its elementary qualities; the inheritance of the latter had been proved by Galton and others. The contents afterwards put into the intellect might, of course, be very different. With regard to the weakness of great men, the single organs of the body were largely independent of one another. A man might inherit a strong brain from his father and a weak body from his mother. Nobody could say that Schiller's weakness was an advantage; had he lived longer, he might have written twice as many great works as he did. On the other hand, strong constitutions (as in the cases of Moses, Bismarck, Napoleon, and Galton) had in no wise hampered their mental activity. It was always best that a strong constitution should go with a strong brain. The ancient Greeks had been as remarkable for bodily as for mental efficiency; but the limits of the power of regeneration were shown by the fact that their descendants had never recovered from their ancient overthrow. Eugenists had no objection to every child being well nourished and educated, but they held that not every possible child should be born.

Prof. Smith, in reply, said that Bach was a proof of his theory, not an exception to it. There had only been one Bach and one Mozart. The effect of alcoholism had been spoken of, but Prof. Karl Pearson had had something to say on that matter. As to the transmission of dyspepsia, one ought to ask not only whether the stomach of the grandfather was bad, but whether the kitchen of the grandchild was as bad as the grandfather's kitchen. As to the criminally born, England knew what to do with them: she sent them to America, to found the first families of New York and Virginia; or to Australia and New Zealand, where they became Premiers and Cabinet Ministers, and were knighted by the King. The Children's Home Society of New York City in the course of 50 years gathered 100,000 children from the slums—mostly children born out of wedlock. They were scattered over the country, and taken in by farmers' wives to milk cows and the like. Those children were absorbed in the general population. Many of them became clergymen, editors, and Congressmen. Here was an experiment of 50 years' duration, on 100,000 children. It was more than all the Mendelian experiments ever made. The world was doing well. Part of the increase of insanity was due to the fact that we were putting paupers into the asylums; we had also increased the longevity of the insane. Population increased, despite lower birth rate, because better care was taken of children, and infantile mortality decreased. Population would expand to economic conditions; that explained the high rate in Australia and New Zealand. Biologically, city life was favourable to women and unfavourable

to men—women had smaller chests and did not need so much fresh air. Every individual was unique, because there were so many possibilities of combination in the organs of the body and the cells of the brain that nobody could ever discover the law of the combinations. This showed the fundamental fallacy of projecting the doctrine of heredity into the future. Character was as unpredictable as finger-prints. Strong bodies could be bred, but the strength of men lay not in their limbs but in the nervous system and brain—that was, in a system which had never been and never could be explored. But we could have group organisation, an English language, surroundings that would produce a certain type; and by improving the surroundings we could improve the type. Shakespeare could have done nothing among the Hottentots, or Beethoven among the Alaskans. He believed in eugenics; he wanted children to be well born; but the environment was the supremely important thing.

Dr. RAOUL DUPUY'S paper on "Backward Children" was next read(1).

Dr. SCHILLER(2) said he would refer only to three points: (1) the biological failure of civilization: (2) the fact that this failure was largely a failure in education; (3) the necessity for action. The essential difference between men and animals was that men largely determined the conditions of survival in social life, and could alter them. Hence the possibility of contra-selection: society could favour the existence of qualities which could not exist but for the social organisation. Another fact was that society could make mistakes, and in aiming at certain ends could bring about effects which it had not intended, and which were contrary to its purpose. Civilization was acting like a man in a story told by Herodotus, who walked in his garden with a stick and knocked off the heads of the tallest poppies. The fact that civilization was doing this not from ill-will but from stupidity did not make it any better. It might make it more hopeful—though he did not know that stupidity was curable. So long as civilisation was so organised as to produce this result, it had to be regarded as a deadly enemy to the human race. As to the educational failure of which he had spoken, we had not provided the youth of the upper classes with sufficient motives to make the best of themselves. It was made too easy, too attractive and too pleasant for them to eliminate themselves. He was speaking not of one generation but of a number of generations. Here was a great field for eugenics. It could uphold a new moral ideal. This would appeal only to some, but it might strengthen the will-to-live and the life-affirming instincts sufficiently to render the intellectually superior material at the top of society resistant to the temptations of its position. He had shown in his paper how this moral ideal could with comparatively small changes be brought to bear on the organisation of our educational system. He had also pointed out the uniqueness of that system, which was highly Darwinian in organisation and methods. It was, therefore, theoretically possible, given time

(1) Problems in Eugenics. French, p. 428. English, p. 442. (2) Ibid. p. 162.

enough, that things would right themselves: the people who did not care to continue to be represented racially would disappear, and those who did care would continue; but would there be time enough? At present, civilised societies were eliminating at a very rapid rate the fitness they themselves recognised and rewarded. Probably, therefore, action would have to be taken promptly. Eugenists were often told that they must go slowly, that science knew very little, that they must wait until the nature of heredity was completely determined, and so forth. The reply was that the complexity and difficulty of social survival was so fully seen by eugenists that they felt that a beginning, at least, must be made immediately. There was danger on both sides—danger in doing nothing. Existing evils were very great, and if nothing were done, then by the time they could tell with certainty what the effect of any given measure would be, the opportunity would have passed, and, as Dr. Ploetz had said, the civilized races would have degenerated hopelessly, and become racially inferior. To do something immediately would be in accordance with the practice of politicians. They did not wait and examine exhaustively and scientifically the merits and probable consequences of the legislative measures they introduced. A measure was brought in as soon as a sufficient number of voters demanded it. They had often made mistakes, and would probably continue to do so. Napoleon, when he insisted, in the Code Napoléon, on the equal division of parents' property among children, probably did not intend to arrest the growth of the French population; but that was the effect. The unexpected effects of legislation were always very marked, and sometimes much more important than the objects actually aimed at. A campaign of education, in the sense of affecting public opinion in the matter, ought to be begun at once. Nothing could be effectual unless there were a large body of public opinion disposed to regard favourably all the discoveries that scientists might make in the future.

Mr. VAN WAGENEN now took the chair.

Dr. GEORGES SCHREIBER said that all the ancient civilizations had passed through parallel phases of development, and then disappeared. Modern civilisation might do the same, save for its possession of science. Science existed to enable man to control nature. The special task of eugenics was the study of heredity. They had to struggle against social maladies like tuberculosis, syphilis, alcoholism, etc. Physical and moral education, begun in the school, ought to be continued through adolescent and adult life. Only so could a full sense of responsibility and a full perception of remote consequences in connection with parenthood be ensured. All classes ought to be impressed with the duty of caring for the expectant mother, saving her from excessive work, etc. On these matters he had written a small book, "Le Livret de la Famille," which he had pleasure in presenting to the Congress.

Dr. Edgar said he noted with pleasure a distinct eugenic trend in modern education, in all classes. Education was much wider than book-learning. It ought to be adapted to the special needs of individuals. He had known a bright boy who stammered to be completely cured by a year's rest and open-air life. Very often nervous troubles, which could be cured by rest, were made chronic by over-application to study. Eugenics would tend to interfere to a large extent with the competitive element in schools. Selection entirely on the line of mathematics was a very unsatisfactory way of choosing those who were to do the work of the world.

Mr. Gladstone said it was much easier to teach boys on eugenic subjects when they were quite young. The foundations of the body were laid in the first seven or eight years of life, those of the mind in the second seven or eight years. From 15 to 19 the boy seemed to become less of an individual. He became shy, nervous, bashful, and difficult to get at. He had found it perfectly easy to teach boys on eugenic lines between the ages of 10 and 14, but very difficult with boys of 15 or 16, when they had become self-conscious and shy. It was, therefore, important to give this teaching early. The boys reverted later to their early character and their early lessons.

Dr. Devine raised the question whether in the *Titanic* disaster the strong men, such as Mr. Stead, Major Butt, Mr. Strauss, etc., were not making a mistake from the eugenic point of view in giving way not only to their own wives and children, but to the women and children in the steerage. The primary need of society was said to be for men able to conduct its affairs; if so, those men made a mistake. He, as a democrat, unwilling to identify the upper classes necessarily with those best fitted in the interests of the race to survive, held that the primary need of society was not for men conspicuously able to conduct its affairs, but to secure the protection of the weak from the exploitation of the strong. He believed there was such a thing as defective germ-plasm, and that it could be eliminated by segregation and otherwise; but it was not proven that backward children in school, and the wretched people in the slums, owed their position to defective germ-plasm. The primary need of society was to protect the weak, so that their inherent ability and capacity for progress should have a chance to develop and show itself. He rejoiced to hear it said that if eugenists opposed measures of social reform and social justice they would bring their theories and doctrines into contempt. What was wrong with most of those who were making shipwreck of their lives was that they had never had a fair opportunity. He did not urge eugenists to go slowly in getting rid of obvious strains of degeneracy and defect, but they ought to go very slowly in putting themselves in opposition to the instincts of humanity, compassion and social justice.

Dr. Murray Leslie emphasised the distinction drawn by Prof. Schiller between ordinary physical fitness and the all-round fitness, physical.

intellectual and moral, which was really eugenic. The inculcation of this ideal in education would lead to a better standard of marriage, and would make love itself a great eugenic factor. Our present education was lop-sided. It ignored all those surging life-forces within us which pressed for explanation, but which boys and girls were left to puzzle out without help. The greatest mischief had sprung from the criminal belief that innocence and ignorance were synonymous. Swedenborg had rightly said that chastity could not be predicated of boys and girls until they understood life and sex. His experience showed that it was the best, most thoughtful, most imaginative adolescents who were most apt to be affected by the results of ignorance on these matters. He pleaded for the giving of a higher ideal of girlhood, womanhood and parenthood to boys. The Boy Scout Movement, in which higher ideals were given, and in which good ideas regarding sex-problems were taught as an integral part of their work, promised well for the coming generation.

Dr. D'EWART said that the public demand for eugenic knowledge ought to be met by putting eugenics into the regular educational curriculum. He knew of no instance of this having been done, except in Manchester. A class there had created extraordinary interest. A syllabus for such classes ought to consist almost exclusively of points on which certainty had been attained. They could prove the existence of degeneration due to defective germ-plasm, and not merely to bad environment, and they could teach the elements of genetics, Mendelism, and biometrics. The subject of race-poisons interested everyone, and though difficult to deal with in a mixed audience of young people, it had proved the most valuable portion of the course. Such courses would help to get rid of the myths and fables regarding eugenics circulated by Mr. Chesterton and others. The public libraries should also be utilised. Very little eugenic literature was to be found in them.

Mr. Councillor CROOK opposed Dr. Schiller's view with regard to scholarships. They had been meant for poor children, and should go to them. He also objected to the lower classes being kept as a " reservoir of talent " until a revolution occurred. He spoke for the National Union of Teachers, and was there to find how the eugenic idea could be applied in schools, and he had strongly agreed with Dr. Saleeby that they should abstain from creating the idea that eugenics was opposed to social reform. The elementary schools were centres of social reform. The doctor had come into them, and every care was taken, as far as possible, to provide the best environment for the children in the schools. They were also trying, through the school doctors, to get them a good environment outside the schools. But they were handicapped by the influences which bore upon the children before and after the school age. The period of adolescence ought not to be left, as at present, mostly to chance. The medical inspection in schools was mere inspection, and did not go far enough towards remedy. The statistics as to

prevalence of diseases among school children were utterly misleading, because there was no common standard for compiling them.

Mr. John Russell urged that the Eugenics Education Society should as soon as possible draw up a eugenic handbook for teachers, which should be published at the lowest possible price, and a free copy sent to every headmaster and headmistress in the kingdom. It should contain a clear statement of the biological facts upon which the eugenic ideal was based; an equally clear statement of the ideal itself; a generous consideration of relevant objections (irrelevant ones could be safely ignored); suggestions as to how boys and girls could be led up to the eugenic point of view, and as to the eugenic attitude of teachers; and finally, some light on the root-problem of all schools and colleges—that of the demarcation-line between the action of heredity and the action of environment. Upon what sides of the growing human life did science lead them to believe that they could act effectively, on what sides could they do little or nothing? Many schoolmasters had wasted tragic years in attempting to gather grapes from thorns, without knowing it. He had talked with Prof. Karl Pearson on this matter, and as Prof. Pearson showed the narrowness of the field of productive educational labour, he had almost despaired; but finally Mr. Pearson reassured him by showing that, the narrower the margin, the greater the need for wise endeavour.

Mr. van Wagenen agreed with Mr. Russell. Thorough preparation of a plan for education was needed both in Europe and America. He knew of several men in America who were working out a system, to begin from the kindergarten and cover the whole school-life.

Dr. Schiller said that the contention of Mr. Crook, that the scholarships were intended for the poor, was not historically correct. A large number of the early-founded scholarships were for the poor, but only that poor boys might enter the Church. Many other foundations never had that poverty restriction. Winchester and New College, Oxford, were always intended for the professional class, and some recent ones had certainly no poverty restriction. It was part of his argument that from a eugenic and educational point of view there would be considerable loss in restricting scholarships in that way. He had not argued that the poor ought to be kept as a reservoir of ability for special occasions; he had only stated that that was what happened under the social conditions which formerly existed. It was then very difficult to rise from the ranks. Those conditions no longer existed in this country, and ability did now rise with great facility, with the result that the lower classes were continuously drained of their ability. This was very noticeable in the universities. Fifty years ago the academic population was recruited from quite a small number of families, mostly those of country clergymen. Nowadays the whole country was drawn upon. The very best kind of ability from the elementary schools got to the universities. Yet this very fact produced a danger to society,

because there was no longer the reservoir of ability which existed under the old social system; therefore if people were eliminated at the top, there was no other resource—no ability being retained at the bottom. He would not in general terms deny Dr. Devine's assertion that society ought to exist for the protection of the weak. But did they wish to protect every kind of weakness, even the socially fatal kinds, or were they going to be cautious as to what weakness they would protect? The policy of indiscriminate protection was obviously fatal. Probably all our politics were wrong, because most people called themselves either individualists or socialists. He thought both were scientifically wrong, because the nation was composed neither of individuals nor of one great mass, but of a number of stocks or strains—families—and these differed enormously in value. The problem of constructive statesmanship ought to be, how to organise the nation so as to favour the survival of the better stocks rather than the worse. That was not being done at present.

The Chairman then declared the session closed.

BUSINESS MEETING OF THE CONGRESS.

SATURDAY AFTERNOON, JULY 27th.

Major DARWIN, who presided, acting on behalf of the International Committee, read the following statement on the agenda.*

This, he said, had been fully endorsed by the Committee, but in bringing it forward he had his English colleagues specially in mind. Excellent work had been done in Germany in endeavouring to co-ordinate eugenic work in various countries, and they wanted to make it absolutely clear that they did not claim priority in this work, and that they fully appreciated what had been done in Germany. He moved this largely for his own satisfaction, but he trusted it would be received in a friendly spirit in Germany.

He then moved the resolution, which was carried *nem. con.*

Passing to the three remaining resolutions, Major Darwin said that the work of organising the Congress began 15 months ago, and had since gone on continuously. About a year ago they had asked various gentlemen in foreign countries to form themselves into consultative committees, and they had a most gratifying response. The committees were formed, and on them the success of the Congress had largely depended. Those committees had each been asked to nominate four members to an Executive Committee,

* Statement on behalf of the Committee, by Major Darwin:

"'That this Congress desires to place on record its acknowledgment of the fact that its meetings do not constitute the first international efforts which have been made in connection with Eugenics; and to express its appreciation of the excellent work already accomplished by the International Society for Race Hygiene.'"

which had sat in London at the opening of the Congress. The resolutions about to be moved legalised, as it were, this Committee as the International Committee, and endorsed the previous action of the Organising Committee before it was turned into this Executive Committee. He mentioned these facts to show the history of the movement. He thought it hardly suitable that he should move the resolutions, and would therefore ask M. March to move them.*

M. Lucien March, speaking in French, proposed the resolutions. He said that they disclosed the great efforts which had been necessary to ensure the success of the Congress. It was now possible to assert that the Congress had achieved a great success. They hoped that those efforts would bear fruit also in the future, and thus assure the continuity of the work which had been commenced here. For this purpose it was necessary that the Congress should assemble periodically, that there should be a committee to decide in what country it should next meet, and to make the necessary arrangements. It was also necessary that the committee should have power to increase its numbers by the addition of representatives of other countries besides those already represented.

A Member inquired whether all countries were represented, or was the present committee only English.

Major Darwin replied that there were four representatives from each country on the General Committee. The Executive Committee was formed from all the countries which had taken part in the work of this Congress.

A Member asked how the committee would be elected.

Major Darwin said they were nominated originally by the Consultative Committee of each country. That formed the original Congress Executive Committee, which was now made into the Permanent International Eugenics Committee, a permanent body, which would carry on its business as it thought right. It would no doubt create an Executive Committee, on which representatives from different countries would sit.

* The following resolutions referred to were then submitted to the meeting :—

"1. The members of the First International Eugenics Congress, meeting in London, 27th July, 1912, congratulate the Organisation Committee and the Eugenics Education Society on the efficiency of the arrangements made, to which the success of the present Congress is due ; and they endorse and officially approve all action hitherto taken by the Organisation Committee.

"2. The Executive Committee of the First International Eugenics Congress shall be constituted the Permanent International Eugenics Committee to hold office until the next Congress. It will preserve the international co-operation already established, and will determine the time and place of the next Congress, and shall make any arrangements as to general policy that may be necessary. But all the specific arrangements and control of the next Congress shall be in the hands of the National Committee of the country in which the Congress will be held.

"3. There may be added at any time to the Permanent International Eugenics Committee, as at present constituted, representatives of any country not now included in it, from which an important organised group of Eugenists shall make request for such representation."

Asked whether the Executive Committee would add to its numbers at its own discretion, or whether its members would be elected,

Major DARWIN replied that members could not be elected in the interval between meetings of the Permanent Committee.

Prof. PLOETZ moved the resolutions in German, and Prof. LORIA in Italian.

Dr. SOREN HANSEN, on behalf of his colleagues of the Scandinavian countries, expressed appreciation of the organisation of the Congress. They admired the pioneer work done in Germany. For the next three years they trusted themselves to the representatives of England. To all present he would say, modifying the words of Kipling, "We masters of the seven seas, we love and understand you."

Prof. KELLOGG said, for the information of the questioner in the audience, that the Executive Committee was composed of duly appointed representatives of the various countries represented here, and that any other country interested in eugenics might nominate to it. He expressed his sense of the effectiveness of the organisation of the Congress and the Hospitality Committee. Such gatherings promoted the noblest phase of internationalism—an internationalism that prompted them to step unhesitatingly across political imaginary lines whenever co-operation enabled them to work for the welfare of mankind more effectively than they could in isolation.

The CHAIRMAN asked for discussion of the resolutions.

Dr. SALEEBY asked whether it would be in order to suggest that the Congress should frame a resolution for publication in the Press or for sending to any Parliament or Government.

The CHAIRMAN hoped the suggestion would not be pressed. They had thought it over, and had concluded that it would not be wise, for a variety of reasons. They were an international body, and there might be differences of opinion on almost any resolution. This was not a representative gathering, the Congress in general would not have known the terms of the resolution, and he therefore thought the proposition not quite suitable.

Dr. SALEEBY said he deferred entirely to the Chairman's judgment. He had had in mind the urgent circumstances connected with the English legislation on the question of the feeble-minded, and he knew that if this Congress could have expressed its sense of the desirability of this legislation, the effect would have been very great.

The CHAIRMAN said they would consider the matter further, but he did not think action should be taken without due notice. There were great difficulties in the way.

The resolutions were then put, and carried *nem. con.*

The CHAIRMAN said that as the meeting was purely formal, he would not take the opportunity of returning thanks for the kind things that had been said. The satisfaction of the members, especially of those from abroad, was ample reward to the organisers.

The proceedings then terminated.

SECTION III.—SOCIOLOGY AND EUGENICS.

MONDAY, JULY 29th. MORNING SESSION.

Major Darwin presided, and announced a change in the order in which papers would be taken.

Prof. Kellogg read his paper on "Eugenics and Militarism"(1).

General von Bardeleben said he agreed in the main with Dr. Kellogg. The losses in war had not cost a fourth part of the fighting men, according to the new students of history. There were no lists of those who perished, and sometimes men reported dead were afterwards found alive and well. In the war of 1866 the Prussians lost many more men by *cholera morbus* than in all the battles. The number of rejected recruits in England showed the importance of eugenic and race-hygienic exertions. The standard of fitness for recruits varied in different armies. That of France was considerably lower than the German. Military life was very healthy. With regard to syphilis, they had heard that the German Army had the lowest number of hospital admissions. The officer in charge of a German regiment was empowered to institute a compulsory medical examination of all private soldiers, and even commissioned officers, once a month, or oftener if necessary. That was a very useful rule. Present-day wars were shorter than ancient ones; they seldom lasted more than a year. Prof. Kellogg had spoken of the vigour and capacity shown by the Japanese; he thought it was due to good leadership, discipline, and assiduous training in time of peace. The State that recognises principles will have the best army. The Boy Scout movement was now established in Germany, and was spreading all over the civilized world. It ought to be warmly supported, as conducive to good citizenship and national good will.

Col. Melville said that Prof. Kellogg had dealt rather with war than with militarism. War was only a rare incident. Germany had had no wars for forty years. The relation of militarism to eugenics could best be studied by observing the effect produced in peace time by military service on those subjected to it, especially in relation to venereal diseases. The incidence of these in the German Army was lower than in any other. But in one month in the year it was high—in October, when the recruits joined. Over one-fifth of all the venereal disease in the German Army was contracted prior to enlistment. The number of men suffering from the disease when called up was higher than the number in the ranks constantly ineffective from the same cause. Therefore the effect of military life was to reduce the prevalence of these diseases in men from 20 to 23 years of age. The two armies which suffered most from these diseases were those of the United States and Great Britain, whose soldiers were less hard worked, better paid, and had more leisure. Militarism was a eugenic influence with regard to these diseases if carried out thoroughly, as in Germany. Prof. Kellogg's

(1) Problems in Eugenics, p. 220.

figures were mostly old. The following were those for the British Army for 1910, as compared with the civil population (representing those of the civil population by 100):—

Cause of Death.	Army at Home.	Whole Army. (Home and Abroad.)	Civil Population.
Phthisis - - -	9	21·5	100
Enteric Fever - -	26	{ 65 (excluding India) / 0·6 per 1000 in India }	100
Total Death Rate -	60	75	100

An element of inaccuracy in these figures was due to the exclusion of the invaliding rates in the Army. The loss from tuberculosis should probably be trebled on this account—*i.e.*, civil population 100, home army 30, whole army about 60. Under the other headings the figures would not be seriously affected. On the other hand, it should be remembered that the figures for the civil population referred to all classes, while the Army was recruited chiefly from the unemployed. If the Army's death rate from phthisis were compared with that of men in the common lodging houses of London—a very fair comparison—the former would be represented by $2\frac{1}{12}$ and the latter by 100. With regard to recruits rejected for syphilis, Prof. Kellogg's figure was wrong. For 1910 it should have been 14 per 10,000, not $1\frac{1}{2}$ as he stated. Undoubtedly the number of men admitted to hospital for the disease was high in the British Army, but it was hardly fair to compare, in respect of this disease, boys under 19 with men from 19 to 30 years of age. The fostering of a healthy race was largely a question of suitable and sufficient food. Among savage races, the most militaristic must have appropriated the most fertile and healthy lands, acquired most cattle, and therefore bred the finest offspring. In India, the most warlike races had appropriated the parts where the best crops were grown and where tropical disease was least prevalent. As regarded the British Army, the lad who enlisted had—even taking the chances of foreign service—a better chance of becoming a healthy man at 25 or 26 than he who remained in the ranks of the unemployed. Soldiering was for this class the best eugenic agent we possessed at present. Since the Boer War, the Army had been taken, and had taken itself, more seriously; and as its work grew more strenuous, its health improved. This was shown by comparing the figures for death and invaliding of 1898 with those for 1910. Deaths from enteric fever in India had fallen from 654 in 1898 to 45 in 1910, though the number of troops had increased from 65,000 to 72,000.

Mr. Arnold White said that Prof. Kellogg had given no definition of "militarism." The word was generally used in a sense hostile to those who desired the fitting organisation of the military power of the country,

and in that sense it was a political epithet. If used to connote the submission of youth to discipline in the habit of self-sacrifice, it was a contradiction in terms to say that it was dysgenic. In the first year of the Boer War, 11,000 young men volunteered in Manchester. Of these 9,000 were rejected, and of the 2,000 accepted only 1,000 were physically fit for admission to the regular Army. Nobody could doubt that if the 9,000 rejected had been disciplined from school age, on the lines of the Boy Scout movement, they would have benefited greatly. And if the work were good in the case of the Boy Scouts, ought not this great Congress, which was expanding the mind of the world, to impress on those nations which, like England, had been long immune from danger, the eugenic effect of discipline, of training, of obedience, and of learning the secret of willingness to die for a principle? He could not escape a bitter sense of shame at the facts with regard to a certain disease which previous speakers had adduced. This Congress ought not to end without some uprising of the conscience of the nations represented, as to the responsibility of man for the troubles inflicted on the innocent and on the unborn. He regarded the late Mr. Stead (with whom he had had little in common) as one of the great martyrs of our age, because through good report and evil he championed women by protesting against their real grievances. If it were monstrous for a woman to go into an insane asylum, then go out and return after a while with insane children, was it not equally unreasonable that men should be let loose on the ignorant and innocent community to perpetuate suffering which did not end even with death? He hoped the word "militarism" would not cause members to forget that what they were asked to vote against was the effect of discipline and willingness to die on the character of human beings.

Col. Warden said that war or preparation for war must have certain disadvantages, and the man who was dutiful enough to serve his country abroad must suffer from disease like those who stayed at home and did not do their duty. He agreed with Mr. White and Col. Melville, that if the Army were treated seriously they would get better results than those cited by Prof. Kellogg. The whole Army used to be taken from the worst eugenic stratum of the population. The standard now was hard, aiming at quality rather than quantity. Prof. Kellogg had shown that disease was decreasing in the Army, and had indirectly admitted the advantages of military training in preventing disease. Besides its disadvantages, there were psychological, moral, mental, and physical advantages in preparation for war, so long as war was necessary.

Dr. Savage (Pretoria) expressed the sympathy of South Africa with the objects of the Congress.

Mr. Piddington (Australia) said he came from the only British country which had adopted the principle of universal training. It was shutting both eyes to ignore the fact that Prof. Kellogg's paper was in great part devoted to militarism in active practice—to the effects upon the race of the practice

of war. The net result of Col. Melville's cogent argument was that training for war was a good thing for young men, provided they never fought. He agreed with Mr. White as to the benefit of discipline and the value of preparation to be ready to lay down life for a principle. But was it impossible to get the eugenic conditions which surrounded the young soldier—proper food, full allowance of fresh air, fair leisure for physical exercise—without the universal drafting into barracks for years of the flower of the manhood of the country? The greatest movement of our time was that which sought these good conditions not only for the soldier, but for all. The value of Prof. Kellogg's paper remained untouched by any of the criticisms. Its conclusion was that though war might be an eternal necessity, it could never be a benefit to the race.

Prof. ANDRÉADES (Greece), as belonging to a country which had been beaten in war, assured the Congress that whatever might be the evils of militarism, the evils of defeat were much greater. The question of militarism had to be studied from two distinct points of view—from that of the permanent army (such as England's) and from that of the conscript army, in which men took arms only for a year or two. The problems presented were quite different. The sanitary conditions and the effect of military service on the race were quite different in the case of conscription. This distinction had not been clearly made in the discussion. In the case of a standing army, the army became a distinct and permanent class, and its hygienic and social position was entirely different from that of a conscript force.

Prof. KELLOGG thanked his critics for their courtesy and the interest of their comments. His only purpose had been to inquire whether there were not aspects of war and militarism which called for the earnest attention of eugenists. Germany had recognised this, and had worked nobly to improve the conditions of military life. Japan had done the same thing. Great Britain, France, and America should follow these examples.

Prof. ACHILLE LORIA (Turin) read his paper on "The Psycho-physical Elite and the Economic Elite"(1).

The abstract of Prof. NICEFORO's paper(2) on "The Cause of the Inferiority of Physical and Mental Characters in the Lower Social Classes" was read by Prof. Michels.

Prince KROPOTKIN said that Profs. Loria and Kellogg had widened the discussion. Prof. Loria had asked by what criterion artificial selection was to be guided. This was the most substantial problem for eugenics, and for the Congress. He had been regretting the exclusion from the discussion of the domain where eugenics came into contact with social hygiene, an exclusion which was producing an unfavourable impression outside, but the two papers in question had helped to remove it. The foundations of eugenics as a science had still to be worked out; yet they had been asked to discuss a number of practical measures, some involving legislation, such as marriage certificates,

(1) Problems in Eugenics. Italian, p. 175. English, p. 179.
(2) Ibid. Italian, p. 184. English, p. 189.

Malthusianism, the notification of certain contagious diseases, and the sterilisation of individuals considered undesirable. The President had insisted on concentrating attention on the heredity aspect of social hygiene; but by avoiding the consideration of the influence of surroundings, the Congress conveyed a false idea of both genetics and eugenics. Separation between surroundings and inheritance was impossible. Prof. Kellogg had shown the futility of eugenic measures when such powerful agencies as war and poverty were counteracting them. Science did not justify a mere verbal homage to the principle of sympathy, and action in the opposite direction. Darwin knew that the feeding by birds of their blind fellows was an instance of the chief element in the preservation of the race. Such benevolence nurtured the social instinct, without which no race could survive in the struggle against the hostile forces of nature. The Congress had not seriously discussed the Report of the American Breeders' Association, which recommended the sterilisation of criminals. Sir John Macdonnell had been quite right in maintaining that the criminal was a product manufactured by society itself. He (Prince Kropotkin) had given facts in evidence of this in his book on Prisons, and he could produce still more striking facts showing how sexual aberrations were the results of prison nurture. To create these perversions, and then to punish them by sterilisation, was one of the greatest of crimes. It killed justice; it was an attack on race-solidarity. Before recommending the sterilisation of the feeble-minded, the unsuccessful, the epileptic (Dostoievsky was an epileptic), was it not their duty to study the social roots and causes of these diseases? If children slept, till the ages of 12 or 15, in the same rooms with their parents, they would show the effects of early sexual awakening; these effects could not be combated by sterilisation. At present 100,000 children were in need of food, through the Dock Strike. Eugenics ought to study the effects of prolonged privation of food. By destroying slums, building healthy dwellings, abolishing that promiscuity between children and adults to which he had alluded, they would improve the germ-plasm of the next generation more than by any amount of sterilisation. Then came the question, who were the unfit?—the workers or the idlers? The women of the people, who suckled their children themselves, or the ladies who were unfit for maternity because they could not perform all the duties of a mother? Those who produced degenerates in slums, or those who produced degenerates in palaces?

Dr. Schiller said that Prof. Loria had asserted the absolute independence of superiority of intellect and superiority of income, and had denied that there was any casual connection between these two. There was an obvious fallacy in that argument, unless Prof. Loria contended that merit was never, under any circumstances, rewarded in this world. If he did not hold this, must he not admit that occasionally the reward took a pecuniary form? He (Dr. Schiller) believed that people did receive higher salaries for superior ability, and consequently rose in the social scale. Did it not

follow that there was a constant upward movement of ability towards the upper classes? If then there were not more ability in the upper than in the lower classes, it must be due to some other cause than that mental ability did not secure larger remuneration. There were such causes, and they were well known. Ability did not rise, nor incapacity sink, so easily as it might. A second reason, as he had contended, was a real failure in the education of the upper classes, which produced the degeneration observed by Prof. Loria. This was a serious and preventable danger, but not a danger of a biological nature. It was a moral and social trouble, and could therefore be removed by methods of education.

Mr. RICHARDSON said that great political changes would depend on whether the poorer classes were germinally inferior or not. The matter should be investigated, and for this purpose he would suggest a definition of "nature" compatible with laboratory investigation. "Nature" should be defined as "the limit of growth obtained under standard conditions of nurture." If environment were improved and personal endeavour increased, a point would be reached beyond which the individual's capacity for memory, or for arithmetic, could not be taken by any increase of effort or improvement of environment. Nature, then, was the limit of growth attained when environment and personal effort were so favourable that that point was reached; more briefly, it might be termed "saturated growth." If children of the poor were adopted as infants into well brought-up families, true evidence of their total nature could be obtained. A hundred such cases would throw more light on the germinal nature of the poor than 100,000 brought up under ordinary circumstances.

Mrs. HAWKES said the discussions at the Congress betrayed a misconception of the meaning of eugenics. It was their business to insist that heredity was more potent than environment. They had sufficient knowledge to justify action. Such terms as "fit" and "unfit" were stumbling blocks. They were scientific terms, and ought not to be used in popular discussion. They should be replaced by the terms "strong" and "weak." They were not there to make a class war. For the sake of the future generation, they were there to choose the best from every class, and not from the upper class alone.

Capt. ST. JOHN (Penal Reform League) said that the phenomena ought to be isolated. The discussion had implied that there was some antagonism between theories about environment and about heredity. The work of the eugenist would be greatly simplified if all members of the community were properly nourished. So long as many were ill-nourished, they had a great factor confusing them in their judgment as to who were well-born. He therefore thanked Prince Kropotkin for making that point clear. It should be made perfectly plain that the need of a better environment was not opposed to the theories of the eugenist, and that one of the first conditions of scientific eugenics was the assuring to every member of the community

of the opportunity of full life up to his capacity. That should not be put aside, but insisted on as the only possibility of deciding the problems of eugenics. Only then could they decide which types to select.

Mr. FARROW said it was implied that there was a definite psycho-physical ideal, but this was only the ideal of an individual, whereas it was the ideal of the community which was important. Discussions as to whether the economic ideal was the same as the eugenic ideal were only important in so far as they helped to give currency to the eugenic ideal.

Prof. LORIA briefly replied in French.

M. LUCIEN MARCH spoke (in French) on the subject of his paper, "The Fertility of Marriages according to Profession and Social Position"(1). In France, for 28 years, all families had been classified according to the number of their children. Up to 1906 only living children were included. In that year the number of children who had died was also recorded. Thus the infant mortality could be connected with some of the factors on which it depended. The chief of these factors were—age of parents, duration of marriage, environment, industry or profession, position in industry or profession, income, etc. As regarded income, the census gave no useful indications; but the relation of income to infant mortality had been studied in the case of civil servants. He would not give figures; they could be found in his paper. The first striking fact was that the fertility of marriages was less in towns than in the country. Among the causes of this, the housing difficulty and the high rent necessitated by a large family were important. Employers had commonly less children than workmen, and clerks (*employés de bureau*) less than employers. This differentiation corresponded to the difficulty of each class in educating its children according to the standard of the social class to which it belonged. Moreover, in a given social grade, the number of children varied greatly according to the profession of the father. They were most numerous where conditions of work were most easy. In a given social-professional category, the variations were due to various causes, particularly to psychological factors —to religious belief, to views of life, etc.; but chiefly to the economic charge represented by a greater or less number of children. The consideration of the economic factor in the conscious determination of the size of families was certainly legitimate. In France the limitation of families, observed since the seventeenth century among the nobility, had extended progressively to each stratum of the population. But the important question was whether these limited families would suffice to maintain the population, or could produce generations as vigorous as the large families of former times. The number of those who feared that this was not so was rapidly increasing. It became necessary to find a median term which, without returning to the system of unlimited reproduction, would enable population to increase moderately without losing anything of its energy. For this purpose, each individual of the right age for parenthood ought to have three or four

(1) Problems in Eugenics. French, p. 195. English, p. 208.

children. Two systems were possible: that all families, irrespective of profession, habitat or social position, should have the same number of children, or that large and small families should exist side by side. On the former theory, the ideal number, three or four, could not be secured by people having only three or four children; they would have to have seven or eight, to allow for all possible accidents between birth and maturity. This, then, as a universal rule, was impracticable. On the alternative system, seeing that those with large families would be at greater charge than those without, it was obviously just that they should be helped. A beginning had recently been made in this direction in France, and eugenic principles had been recognised by increasing the grant in the case of families that were insured against sickness. He hoped that statistical inquiries of the kind summarised in his paper would be undertaken in other countries.

Dr. STEVENSON (of the Registrar-General's Office) said that in New South Wales a similar inquiry had been made, but the French was the first on a large scale. The same inquiries had been included in two censuses in the United States, but the results had not been completed or published. M. March's paper showed the danger of hasty conclusions from insufficient data. For example, he showed that paupers and criminals were below the average of the French population in productiveness. In England it had been assumed that the reverse was the case. Had M. March been sufficiently careful in correcting for varying age at marriage of parents, and for duration of marriage? In his first comparison he dealt only with marriages of over 25 years duration, and found that the children per hundred families were 303 for employés, 360 for employers, and 409 for workmen. But suppose the workmen married at 23 and the employés at 28, the difference might be accounted for by the fact that the workmen's wives had five more years' opportunity, and that at the most fruitful age. This refinement was irrelevant to the social effects, if they alone were to be considered. If the professional man had three children and the workman four, the result was the same whatever the cause. But if remedies were to be considered, the distinction was of the utmost importance. Nothing would be gained by enabling professional men to marry early if the lateness of their marriages were not the reason for their infertility. It was not proved that it was a question of prudential limitation of families; on the figures, it might be merely a question of earlier and later marriage. Given equal duration of marriage in two classes, that which married earliest would be likely to have more children, without postulating artificial restriction at all. Workmen attained their maximum earning power earlier than professional men; and it paid them to marry younger, to secure children who could support them in their age. In England they tried to compare like with like by tabulating simultaneously age of husband and of wife at marriage, and duration of marriage. He would be interested to have M. March's opinion of criteria other than social status. They proposed to use number of rooms, or of servants, in

proportion to number of inmates per family. By a proper system of card-indexing, this would enable them to compare the fertility of families of the same circle but different occupations, or of the same occupation but different prosperity. It would be useful to know whether farmers with two rooms per member were more fertile than farmers with two inmates per room. It was also necessary to ascertain the rate of *effective* reproduction. If workmen were more fertile but subject to greater mortality, the effective reproduction of the professional class might be greater. They were endeavouring to assemble as many data as possible for the study of this question, under the headings of occupational natality, occupational infantile mortality, and occupational mortality in later life.

Prof. Michels (in French) said this was a matter to be explained not only in economic but in psychological terms, etc.

M. March said time prevented his replying adequately to Prof. Michels. As regarded Mr. Stevenson's argument, he said that the French statistics, taking account both of age and of duration of marriage, permitted the comparison of groups of families likely to have the same number of children.

Prof. Roberto Michels read his paper on "Eugenics in Party Organisation"(1).

Mr. Councillor Chapman said that the danger of eugenics and eugenics societies was that they might become debating grounds for what the public regarded as fads and cranks, to the detriment of purely scientific considerations. The men of science could continue their work whether there were eugenics societies or not. The societies could co-ordinate the results of scientific research on the problem of race improvement. But the scientific men would not come to them if they feared that their results would be identified in the public mind with a lot of fads and fancies. The *Pall Mall Gazette* had said, with reference to one of their papers: "If they go coursing March hares of this description, we fear their career of usefulness will be short." There were among them representatives of all parties. They ought to wave aside all individual fancies, and allow nothing to come up for approval but what had received the general consent of the scientific world. He had seen persons asking delegates whether they were in favour of woman suffrage. If that principle were extended, it would destroy all the usefulness of the Congress. Some of their medical members thought that race-regeneration was impossible unless the manufacture of intoxicants was prohibited by law. He hoped the Eugenics Society would not be used as a field for their propaganda. By care and moderation they could secure grand and permanent results.

The session then terminated.

(1) Problems in Eugenics, p. 232.

MONDAY, JULY 29th. AFTERNOON SESSION.

Baron Raffaele Garofalo presided.

Mrs. Whetham read the paper on "The Influence of Race on History"(1).

Dr. F. A. Woods spoke on the theme of his paper, "Some Interrelations between Eugenics and Historical Research." It was important for the eugenics movement to emphasise the preponderating influence of heredity, and also to show that environment could not cause the differences among men. If environment explained them, why take up a new remedy? It had been thought impossible to separate heredity from environment, and it was so if the problem was confined to one individual. A man's stature or weight was the sum total of both forces interwoven. But practical advance was possible if the question were approached from the side of two or more individuals. A person six feet high was the combined result both of the chromosome determinants and of his food and surroundings; so was a person five feet high. The difference between them must be a matter of gametes; because most people, in that audience at least, had had all the food they wanted, and virtually all the nourishment they could take. Common sense attributed the difference to inborn characters. The same was true of pigmentation. (See paper, p. 247.) But on some problems there was little light to be had. For example, the Congress had discussed the question of criminality. If criminals were more numerous in the slums than in the favoured classes, we could not say whether that was due to heredity or to environment. There were some problems on the border line between the two influences. Again, there were cases in which environment was the decisive factor—*e.g.*, linguistic differences. For his purpose heredity must be defined not as "resemblance between parent and offspring," but in line with the Mendelian point of view, as something contained in the primary fertilised cell after fertilisation had taken place, and in the entity within the cell wall; he would not go so far as to say it was chromosomes, but all those potentialities were what ought to be called heredity. Galton had shown that men of genius were related to each other to a very considerable extent. His subsequent investigations into other forms of organic life showed that this relationship was such as heredity would demand. But environment might cause the same sort of thing. Mr. Ellis's investigations went in the same direction. (See p. 248.) He (Dr. Woods) had investigated royal families, and of 832 individuals, 20 or 30 were unquestionably geniuses—men such as Maurice of Nassau, Gustavus Adolphus, Prince Eugene (who won more battles than Marlborough), William the Silent, etc. The percentage (20 in 800) was between 50,000 and 100,000 times as great as among the masses. It was shown not to be due to environment or opportunity, by the fact that there were idiots, imbeciles, and degenerates in the same families; and this alternative heredity was just what Mendelism led them to expect.

(1) Problems in Eugenics, p. 237.

It explained not only the general correlation and resemblances, but also the sharp contrasts. (See the study of the early kings of France and England, p. 249.) He had expected to find in the Dark Ages a general picture of cruelty and licentiousness, but this was not so; there was a general dropping out of the cruel and licentious types. The degenerates did not leave as many descendants as the superior sort. Within any class of society there might be, from a purely internal, biological reason, an amelioration of the race going on, by reason of a correlation between fertility and other qualities. This was found to be taking place among the lower classes, and it had not been sufficiently taken into account. (Dr. Woods then gave the comparison between Europe and America, pp. 249-50.) He concluded by urging the importance of this line of study.

Dr. Holt emphasised the importance of the economic factor. The chief cause of prostitution and venereal diseases was economic. The young women were prevented from earning an honest living, and the young men from marrying early. The cost of living had increased 40 per cent. in 20 years, while wages had risen only 20 per cent., and professional incomes still less. The economic system was also responsible for overcrowding, overwork, lack of leisure, etc. (Dr. Holt was proceeding to indicate legislative remedies, when the Chairman ruled him out of order.)

Mr. Mudge said that, according to Dr. and Mrs. Whetham's paper, the success or decline of a nation was largely owing to the influence exercised by the born organisers, who were characterised by the physical features of the Northern European nations, and that nations began to decline from the moment the darker, shorter race entered to any extent into the government. With regard to Dr. Woods' paper, he did not think the importance of the work it reviewed had been appreciated. Dr. Woods' book on "The Inheritance of Intellectual, Moral and Physical Characteristics in Royalty" was one of the most important and interesting works produced for a generation. He urged "environmentalists" to study it, as he was certain they would then throw off the idea that a race or an individual could be made good by the sole influence of the environment. If Sir John Macdonnell had studied it, he would not have asserted that the criminal was a by-product of the slums; nor would Prof. Smith have denied that talent was ever inherited. He would like to debate the matter with Sir John Macdonnell at any time. The descendants of Philip V. of Spain, 37 in number, fell into four classes: (1) cruel, or dissolute, or both—14; (2) insane or neurotic, 7; (3) mentally indolent to a pathological degree, 6; (4) normal, 10. Here were a number of criminals, protected only by their position. They were not born in slums, nor were they products of poverty. Such cases, of degenerates born under the most favourable circumstances human society could furnish, were an absolute disproof of Sir J. Macdonnell's assertion. Prof. Smith had spoken of the unpredictableness of genius. It was not necessary to be able to predict a manifestation of character to prove that it was inherited. Dr.

Woods had shown that resemblance was not a necessary element in heredity. Genius (musical genius, for example) was not simple, but a complex set of qualities, some of which might come from the mother, some from the father. So long as there was not the combination in one individual, there was not the genius.

Mr. Cunningham said a word of caution was necessary before accepting dogmatic statements about heredity. Until 1859. the immutability of species had been generally accepted. That was overthrown by Darwin; but now they were going back to another form of the same doctrine. Although they held that species were not immutable, they were now being taught that all the qualities which made up species were immutable. If they accepted that doctrine, they might as well give up evolution altogether. He quite admitted the influence of heredity in human affairs, but he would mention an instance to the contrary. The evolution of the frog was quite inexplicable on the principle of the immutability of hereditary qualities. In the transition from the tadpole to the frog, there was throughout a close correspondence between structure and environment. On the theory that environment produced no hereditable qualities, these changes from the fish-ancestor must have had no direct relation to the external conditions. They must have come about without any relation of cause and effect. That conclusion was inconceivable.

Dr. Whetham said he could amplify in one direction the work of Dr. Woods. Dr. Woods had said there had been no investigation of the nobility. He had lately studied a large number of members of the British House of Lords. He had divided them into two groups: eminent men and able men. Each eminent man had on the average five able relatives. In the case of eminent men of middle-class origin, the figure fell from five to under one. He believed the effect of environment was much less than was commonly supposed. He thought the higher proportion of ability in the upper class was due to there being in that class more selective mating than in others. The class was ready formed from which men would naturally choose their wives. In a segregated class which intermarried, faculties became fixed.

Dr. Alfred Woods said (in reply to Mr. Cunningham) that the instance of the frog was an entirely different type of problem from that which he had studied. It was a problem of phylogeny, and went through countless generations. His study dealt only with two or three generations. He was much interested in Mr. Whetham's supplementary report. The facts it elicited were such as he would have predicted—so that their science was already able to predict something of the nature of results. Even without selective mating, a great genius always carried with him a high average of blood relations. The greatest men in history had had the largest number of eminent relatives.

Prof. Kellogg now took the chair.

Miss E. H. Siedeberg said she would speak of measures already passed in New Zealand dealing with degenerates. Many of their Cabinet Ministers were interested in eugenics, especially on account of the cost to the State of maintaining degenerates. Several members of Parliament were vice-presidents of their society. In 1909 an Act provided that an inmate of an industrial school, who was morally degenerate or otherwise unfit to be at liberty, might, under periodic orders of a magistrate, be detained in the institute. The periodic orders safeguarded liberty. If the person improved he could be liberated. This law enabled them to safeguard degenerate girls, who might otherwise have eight or ten illegitimate children. In 1910, it was enacted that all blind-deaf, feeble-minded or epileptic children should be notified to the Minister of Education, who might direct that they should be sent to a suitable public institution, to be maintained by their parents if possible; if not, then by the State. The same provision was made under this as under the former Act for the indefinite detention of feeble-minded and epileptic children. The police had also been empowered to bring before the magistrate, with a view to admission to an industrial school, any child under 16 not under proper control (including degenerate children). These also might be detained indefinitely. In 1911, an Act was passed for the permanent detention of the habitual criminal—this term being carefully defined for the working of the Act. A maternity benefit was provided for every married woman who applied for it, whose husband's income was under £150 a year. This money was given to the doctor and nurse, to see the woman safely through her confinement. These Acts had not yet been put fully into force, for lack of the necessary buildings and officials, but these were being supplied as quickly as possible.

Mme. Dorel spoke (in French) on the treatment of backward children.

The abstract of Dr. Corrado Gini's paper(1) on "The Contributions of Demography to Eugenics" was read by Prof. Michels.

The session then closed.

SECTION IV.—MEDICINE AND EUGENICS.

TUESDAY, JULY 30th. MORNING SESSION.

Major Darwin presided.

Dr. Hallopeau read his paper "Sur la Prophylaxie de la Syphilis héréditaire et son action eugénique"(2).

Dr. Lindsay said that the problem of the social control of venereal disease had hardly yet been raised in this country, but it would have to be faced, and was capable of practical solution. One person in six suffered from these diseases, which were also the cause of such terrible maladies as general paralysis, locomotor ataxy, etc. They caused 67 per cent. of cases

(1) First part in Problems in Eugenics. Italian, p. 254. English, p. 294. For whole paper in English, see p. 71 of this Volume.

(2) Problems in Eugenics. French, p. 343. English, p. 347.

of congenital deafness, and many cases of blindness in the infant. Of all the cases of disease at the hospitals for women, one-third or one-half were due to venereal disease. These diseases tended to die out in three or four generations, but meantime they caused great mischief. Women and children were often their innocent victims. It was often said that these diseases were becoming less prevalent, but there was no clear evidence of this. These diseases were easily diagnosed, and capable of successful treatment, and there was now a method of determining whether the treatment had been successful or not. These facts favoured the social control of venereal disease, and encouraged the hope that it would be successful. What form should that control take? Not, he hoped, the State regulation of vice, in any form. They had no right to make vicious habits safe. What were other nations doing in this matter? Sweden had made syphilis a notifiable disease. Some of the American States were moving in the same direction. We had had several years' experience in connection with the notification of fevers, etc. Notification had formerly been regarded with dislike, but it was working perfectly smoothly; the dangers and difficulties which were anticipated had not arisen, and it had the complete assent of the medical profession. It was therefore an opportune time to extend the principle of notification. Germany had made marriage illegal until a certain number of years had elapsed from infection by syphilis, and was now considering a law to make wilful transmission of these diseases a criminal offence. Here was the outline of a policy: notification, some amendment of the marriage laws, and penalties for wilful transmission of these diseases. We needed more knowledge in this, as in all departments of the eugenic movement. These diseases had flourished in obscurity; they had reached the zenith of their diffusion through having been regarded as things which must not be talked about. More light should be let in upon them. More plain speaking and more courage were needed.

Dr. D'EWART protested that Dr. Hallopeau's paper dealt with the therapeutics of syphilis. This meeting was not a suitable one to discuss that side of the question. Our duty lay with the prophylaxis of the disease. He had been astounded to hear it asserted at a previous meeting that nearly all children were born well. He was astonished that any person knowing of the existence of syphilis could say that on any public platform. We must insist that we could not get a good race unless this disease was extirpated. How could the public be educated? Here came in one of the eugenic aspects of militarism. It was part of the duty of medical officers in the English Army to teach their men the dangers of venereal disease. These men, passing out of the Army, disseminated that information. Hence public knowledge was increasing in regard both to syphilis and gonorrhœa. The Territorials ought to be instructed in the same way. It was most desirable that accurate information should be circulated, because this matter was discussed *sub rosa*, and all sorts of ridiculous assertions were made,

which did great harm. Women ought to be educated on this subject, though he did not know how this could be done. In spite of Dr. Lindsay's words, notification of disease was accepted in England only with great reluctance. The bacillus of tuberculosis was discovered in 1881, but notification was not legalised till 31 years later (1912). In 1906 the spirochæte of syphilis was discovered—were they to wait 31 years for notification of that? By means of the local authorities, they could have tests made for certain diseases, to assist in the diagnosis of them. Could they not do this with regard to syphilis? If the test was positive, where would be the need for notification? If negative, again it was not necessary. Syphilis was often extremely difficult to diagnose. If the doctor made a mistake by wrongly diagnosing typhoid fever, the patient or his friends would forgive him; but if a disease was falsely declared to be syphilis, there was intense disgust. The test would do the business, without notification. It was not generally known in regard to infantile mortality that ante-natal mortality was probably as great as post-natal. We lost every year half a million children after they were born, and half a million before they were born. In his opinion this was due in four-fifths of the instances to wilful murder on the part of the mothers. In the remaining fifth, most of the deaths were due to syphilis. That one-fifth could be dealt with, and then the birth rate would rise. Some people might deplore that, but he believed in a high birth rate.

Mr. Hawkes said that in much of the discussion of eugenics in relation to politics, to the Army, and in various other connections, it seemed to be forgotten that eugenics related more to posterity than to the living generation. They must protect those who were to come, leaving to the medical profession all curative measures relating to the living. The best method of eugenic education was that of example. Whoever was honest in his attachment to eugenics must live a life of purity and chastity. Publicity was also necessary. Houses of prostitution should be put in the broad thoroughfares, and their entrances lighted. In ordinary hotels an honest register of those who came should be kept, and enforced by law. This would almost immediately stop most of the houses in question. If that tended to spread the disease in more secret ways, that difficulty could be met by the publicity advocated by previous speakers. Why should they be silent about this never-ceasing poison, when they published all the records concerning anyone who had smallpox or bubonic plague? In those cases danger ceased when the disease ended; with syphilis, the patient remained a source of danger for six or seven years. If children before the age of 15 could be judiciously taught all the dangers, to individuals and to the community, arising from these diseases, much would be accomplished. How many people with full knowledge would plunge into the danger? It ought not to be difficult for fathers to warn their sons in this matter.

Dr. ETTIE SAYER expressed appreciation of Dr. Hallopeau's work, and of the strides which medical science was making in combating these diseases. The recent debates on them at the Royal Society of Medicine showed that the continuance of the evil was due not to the inability of the profession to formulate proposals for an effective campaign against the flood of fresh cases, but to the failure to obtain legislative aid in dealing with subjects which had any connection with prostitution. In a way venereal diseases might be regarded as the twin evil of the white slave traffic, since each was the logical outcome of prostitution. The opposition which the White Slave Bill now going through Parliament had met from certain politicians had revealed a determination to protect prostitution, which from the law-makers of a Christian country was as lamentable as it seemed incredible. The original Bill was inadequate, but even this had been so devitalised and stultified in Standing Committee that unless the weakening amendments which had been introduced were deleted on the Report Stage or Third Reading the Act would be futile as a weapon against the traffic. If white slavery and venereal diseases could be abolished without endangering prostitution, there would probably be no legislative opposition to their abolition. But this was obviously impossible, and consequently the only hope of any permanent amelioration must come from education; especially from eugenic teaching against the replacing of the higher emotions by commercialised vice, and against the prevalent false doctrines, that violations of the fundamental laws of life and love were "necessary evils." No evil was "necessary": and no true eugenist could fail to strive after an ideal in the education of children, the raising of the status of womanhood, and the evolution of humanity generally to higher psychical planes, which would lead to marriage laws on a sufficiently sane, humane and reasonable basis, for prostitution itself to be reduced to vanishing point, and for its secondary evils to be altogether eradicated.

Dr. SALEEBY said that there were enemies of the White Slave Traffic Bill in the House who thought that under cover of it we should get back to the Contagious Diseases Acts and to a *police des mœurs*. Mr. Wedgwood was violently opposed to it because he thought it would lead to registration. It was very satisfactory to have Prof. Lindsay's pronouncement that that method was not successful. If Prof. Forel were there, he would tell them the same thing. Under the much-condemned Insurance Act (the principles of which he believed to be absolutely sound) it would become much easier to identify syphilis. A certain proportion of the insured would contract it, and then it would become a national business. He wished to draw attention to the notable remarks made the previous day by the Archbishop of York in his presidential address to the National Health Congress. The Archbishop approved the Mental Deficiency Bill, and favoured an amendment of the marriage laws to provide that marriages should be declared null and void if within a certain time it were shown that the presence of insanity, epilepsy,

or venereal disease in either party had not been disclosed. This statement by the Archbishop made him feel that their cause was triumphing.

Sir John Cockburn thought this subject the most important one that could come before a Eugenics Congress. If the terrible effects of this degrading disease could be lessened, a great step would have been taken towards solving the whole problem of the betterment of the race. No statement could be too strong to show how prevalent this disease was. A practising physician divided chronic cases into two classes. He first considered whether the case before him was syphilis, or whether it belonged to the category which comprised all other diseases. That showed how common syphilis was. It could not be guarded against by the exercise of the most extreme virtue. It was almost a mistake to consider it a venereal disease at all; it was a contagious disease of the highest virulence, which might be contracted in a number of ways. When he was practising medicine, he had met many cases in which this disease had been contracted in no manner which could be characterised as venereal. He had seen more than one case in which it had been contracted by the scratch of a dirty razor in a barber's shop. He believed that was quite common. Barbers' shops were often notably insanitary. Even in the City of London "barber's itch" was propagated by the dirty habits of assistants, and there was no legislation to deal with it. Legislation ought to be introduced. To prevent syphilis, no corner should be left untouched. He had seen the primary sore on many parts of the body; once on the knuckle of a young hero who had protected a poor person from a big bully. He scratched his knuckle on the edge of the man's tooth, and was infected with syphilis. Probably the number of instances in which the disease was communicated in such ways was far greater than was generally recognised. The invasion of the disease was often marked by little obvious evidence; no legislation merely directed to the ordinary source of contagion would cover all the modes of infection. Its association with vice was merely accidental, and it should not be included under the catalogue of venereal diseases at all, because it could be communicated in so many other ways. They should adopt any measure possible for stamping it out.

Col. Hendley said that 300 years ago an experiment on this subject had been tried by the Great Mogul. He set apart a portion of the town in which prostitutes might live, and those who visited them had to sign a register. No good result was achieved, but if tried in this country it might be more effective.

Dr. Mary Stopes was glad to hear that the Army, and perhaps in future the Territorials, would be a channel of accurate information regarding this disease. In a Manchester hospital a woman brought in a child infected with syphilis. It was the third or fourth horribly diseased child she had had, and she had begun to suspect the cause. She asked the doctor whether her husband was all right, and said that if he were not she would

have no more children. The doctor told her a lie, as men generally did in such cases. Women ought to be told the truth about these things.

Dr. BEVERLEY, as a hospital surgeon, wished to assure the lay members present that he thoroughly endorsed all that had been said as to the prevalence of venereal disease in every class of the community, and also what Sir John Cockburn had said as to the many sources of infection. He had known many surgeons to contract the disease in the performance of their duties. A hospital nurse had told the Congress at a previous meeting that nurses should be enlightened as to the danger of their contracting it. He had known hospital nurses to contract it in the fulfilment of their duty. He had no statistical information, but he felt justified in drawing attention to the fact.

Mr. VAN WAGENEN said that interest in this subject had been spreading widely in the United States. Knowledge was rapidly being diffused. Many physicians were adopting a policy of education on the subject, rather than one of suppression. The Dean and clergy of the Cathedral of Chicago had recently made it known through the newspapers that they would refuse to solemnise the marriage of any person who did not produce a "clean bill of health" from a reputable physician.

Dr. HALLOPEAU replied on the discussion. (In French.)

Dr. ALFRED MJÖEN gave a discourse on "Alcohol and Eugenics," which is printed on page 172.

Dr. FILLASSIER read the paper on "Alcoholism and Degeneracy"(1).

Prof. PLOETZ said that the deleterious effects of alcohol upon the individual and upon offspring were less if the alcoholic beverages were diluted. He therefore thought that for political action in regard to alcohol the proposals of Dr. Mjöen were very valuable. Politics was the science and practice of the possible, and Dr. Mjöen's system was easier to embody in legislation than complete prohibition. All strugglers against drinking habits were indebted to Dr. Mjöen. He (Prof. Ploetz) intended to advocate the system in Germany.

Dr. SALEEBY expressed the highest appreciation of Dr. Mjöen's paper, and looked forward with pleasure to its publication. Alcoholism might be purely symptomatic. A person who was neuropathic or feeble-minded was deficient in self-control, therefore in presence of anything requiring resistance he went under. He was called an alcoholic; but it was a symptom of a pre-existing condition, which was probably native and transmissible. If he had defective offspring, one was not entitled to say that it was the alcohol which had made them so. They had an initial defect. That point had long been overlooked, but Dr. Mjöen had recognised it. With regard to Prof. Pearson's assertions, the Mendelians had taught that all investigation of heredity was worthless if it did not extend to at least three generations. Therefore all biometric investigations limited to two generations had to be

(1) Problems in Eugenics. French, p. 354. English, p. 367.

put aside. Prof. Pearson had said that he was studying representatives of the working-class population. He did not in fact know where the material came from. It came from the North Canongate district of Edinburgh, one of the worst slum areas in Europe. In no case did Pearson ascertain whether the parental alcoholism occurred before or after the birth of the offspring. That fact completely nullified all his conclusions. One source of evidence Dr. Mjöen had omitted to mention—the paper read at the International Congress on Alcoholism at the Hague by Dr. Berthollet, which ought to be published in England. It carried further the investigations described by Berthollet in an earlier work to which Dr. Mjöen had alluded. The American eugenists in their Mendelian study of the inheritance of neuropathic taint, epilepsy and feeble-mindedness had found that the incidence of these was much higher than the Mendelian expectation in cases where it was complicated by parental alcoholism. The sterility which often concluded a case of extreme alcoholism was protective. Most racial poisons did not sterilise. There was generally a disastrous sequence of defective births before the tale was completed. In the so-called Laws of Lycurgus there were regulations against drinking at marriages, which showed that the influence of alcohol on offspring was recognised in antiquity. He regretted the absence of Dr. Archdall Reid, whose theory that alcohol itself, by eliminating its victims, ultimately produced a race immune to it would have been an interesting contribution to the discussion. His evidence was mostly from the Mediterranean races; and the reply to it was modern industrial Italy, where alcoholism was rampant and increasing. The vital task for temperance reformers was to protect parenthood from alcohol.

Mrs. Hawkes wished to raise the question of the effects of tobacco-smoking, but the Chairman ruled that the subject was irrelevant.

Mrs. Drysdale thought Dr. Mjöen's scheme admirable, and pleaded for legislation to limit the percentage of alcohol in drinks and make it difficult to get the higher percentages. The result of prohibition in garden cities was that people went off in crowds to the nearest town, and returned in the small hours full of alcohol. It would have been far wiser to permit alcohol and limit the strength of the beverages. She did not know to what extent germ-plasm was inviolable, but the evidence adduced by Dr. Mjöen as to the progressive deterioration of the children of a formerly healthy family, which corresponded increasing drinking on the father's part, was most suggestive. Both heredity and environment ought to be considered in their relation to eugenics.

Dr. Fillassier replied (in French).

Dr. Mjöen said he had tried to correct the abuse of statistics that had occurred in connection with this subject. Statistics could be of much value, but also could be most deceptive. They had once heard in Norway that, of British officers sent to India, 50 per cent. died of yellow fever and 50 per cent. had to return. The truth proved to be that only two

officers went, one of whom had a slight attack from which he quickly recovered, and the other came home to get married. With regard to Dr. Archdall Reid's theory, which Dr. Saleeby had mentioned, if it were possible to exterminate some drunkards by drink, might they not also produce new drunkards by the habit of drinking? With regard to tobacco, most of the harm was done not by the carbonic acid, but by the carbon monoxide, which combined with the red corpuscles of the blood. But he must protest against bringing up the tobacco question and the alcohol question together. He had never known a vessel run on the rocks through the crew using tobacco, but it had happened in many cases through their using alcohol. Ascetic life might be good for humanity, but he was not arguing for it. He admired the work of the abstinence people, but temperance reform could not be achieved by small organisations. He had been talking of what the State could do by legislation to carry people forward from heavy drinking to light, and from light to none at all.

In reply to a question whether there was alcohol in sour milk,

Dr. MJÖEN added: Certain bacteria produce a strong sugar in the milk—lactic acid—and that precipitates caseine. Besides that, in sour milk which has been exposed to bacteria there goes on another process which produces alcohol. This has been shown time and again by a chemist in Christiania, Schmenk. Sour milk generally contains about one-half per cent. of alcohol.

Dr. H. E. JORDAN'S paper[1] on "The Place of Eugenics in the Medical Curriculum" was read by Prof. Kellogg.

Miss MERRITT (Child Study Society) said that environment could at once be dealt with, but they needed further knowledge as to hereditary influences. Björnson had said that the same qualities were good or bad, according to the direction given to them. These influences were chiefly dependent on women. Conditions were bad in the elementary schools. The children had not time to be children. They had to do many things besides getting education. Growth in all directions was going on, and development of will-power, and they had no right to take five hours of each child's day for education. They were promoting drunkenness, insanity, etc., by destroying will-power, balance, and rhythm. It was eugenically necessary that women should be put on a level with men as enfranchised citizens. Unmarried women were in an inferior social position to married ones. As women they lived on sufferance, but being someone's wife gave them a status. They would marry for love and desire to be mothers when they were free. Environment was of paramount importance, and they needed legislation such as that described by Dr. Mjöen, which had been passed in Norway, where women voted and sat in Parliament.

Mr. NASER agreed that eugenics should be included in the medical curriculum, but applied psychology ought also to be taught. He urged also that the different pedigree systems adopted by writers on genetics

[1] Problems in Eugenics, p. 396.

involved great waste of time, and pleaded for standardisation of pedigree-symbols and an international nomenclature of genetics.

Nurse Woodall said that it might be necessary to alter the law which prevented doctors from disclosing the condition of a patient. A man about to marry had occasion to consult a doctor, who was also the family doctor of the woman he was to marry. The doctor found that the man was epileptic, and advised him not to marry. He did so, however, without disclosing the fact to his wife. It came out, of course, after the first year. Several miscarriages occurred, and the health of the wife was impaired. If the doctor had informed the woman's family of the man's condition, the marriage would not have taken place. The woman could get no divorce. Divorce ought to be granted if a man was a lunatic, an epileptic, or suffered from venereal disease. Doctors had the idea that the standard of purity and continence ought to be lower for men than women. Women should raise the standard they expected from men; they ought to demand the same standard as men demanded of them. The economic position of women was at fault. There was too much temptation to women to secure an easy life by becoming the mistresses of rich men. The average wage of women was only 9s., whereas that of men was 17s. to 19s. The economic position of women could only be improved by raising their status and giving them the vote.

Prof. Kellogg said that the assumption that eugenics was a science, based on a body of scientific fact, had been criticised by the Dean of St. Paul's and others. He maintained that it was a science. It did not have to begin from the beginnings, like biology; it took from biology a mass of ascertained fact, and other masses of fact from sociology and political economy. The material submitted by Dr. Mjöen that morning was undeniably scientific knowledge, and it belonged to eugenics. He had not realised that this assumption was made for the first time in Prof. Jordan's paper.

The meeting then adjourned to the Exhibition Room, where General von Bardeleben explained a number of pedigree-charts prepared by Dr. Agnes Bluhm.

TUESDAY, JULY 30th. AFTERNOON SESSION.

Major Darwin presided.

Dr. F. W. Mott gave a lantern lecture reproducing the tables and diagrams in his paper on "Heredity and Eugenics in Relation to Insanity"(1).

Sir Geo. Savage, after paying a tribute to Dr. Mott's able paper, said that the first duty he felt was in showing the relationship of a healthy mind to a healthy body, and the importance of eugenics in the treatment of

(1) Problems in Eugenics, p. 400.

insanity. He used to demonstrate that there was no such thing as insanity, and this was recognised by Dr. Mott. It was a neurotic tendency, but there was no actual disease which could be called insanity. Insanity was a negation. As regarded hereditary connection, what relationships were associated with the transmission of mental disorder? Insanity in many cases had to be looked upon as very much like genius; but genius never bred true, and scarcely ever produced a genius in the second generation. It was comforting to know that many cases of so-called sporadic insanity were like genius and did not propagate. The relation of eugenics to heredity was strongly brought out in the question of feeble-mindedness; but what was transmitted was a tendency, not a disease. Nor should they forget, with heredity, to consider the surroundings, which were the acting causes of the disorder. The deviations that were transmitted were, as Darwin had pointed out, the slighter ones. They could not expect a genius son from a genius father. Eugenics was very important, for this reason, in relation to the study of insanity. The slight deviations called mental deficiencies, associated with backwardness and the like, were most readily transmitted, and had to be guarded against. There was danger of the transmission of mental weakness, or anti-social characteristics of habits rather than of intellectual capacity. Dr. Mott had rightly insisted on the danger of accentuation. In cases of insane ancestry, if blood-relations married, there was a four-fold danger. His experience coincided exactly with that of Dr. Mott in regard to anticipation, and this was of vast importance. He was constantly asked, "Is it legitimate for the offspring of an insane parent ever to marry?" There were different forms of insanity. Some were not transmitted, nor (he believed) transmissible. If insanity was to be transmitted, some nervous symptom would almost certainly be evidenced before the individual was 25. Therefore it was all-important that the marriage of a person who had insanity in his family should not take place before that age. Although anticipation was the rule, there were exceptions. Some forms of nervous disorder were specially malignant, and these rather altered one's view in relation to anticipation. Some of these seemed to be specially transmissible and inheritable. In these cases, not only would there be anticipation, but individuals who had passed the age of 25 or 26 might break down. In some of Dr. Mott's cases, there were individuals who had broken down at about 30. Another important point related to intermarriage. Cleopatra, typically beautiful, was an eroto-maniac and was the result of a consanguineous union. Risk was involved by the slightest taint on either side; but if there was not a clear male element on both sides, the marriage should. if possible, be stopped. One had to remember not only the danger of propagation but the possibility of cure. A lifelong experience enabled him to say that there was such a thing as healthy breeding-out of disease. He recalled a number of families that seemed almost saturated with insanity. In one, three or four members

had given evidence of mental disorder. The offspring of one of these families (four of them) married into wholly unrelated families, with the result that they had perfectly healthy children. There was a natural tendency to breed out, as well as a terrible responsibility for breeding in. One could not exclude all neurosis, by marriage, by eugenics, or anything else. If one could, it would reduce the world to such a dead level of respectability that it would be hardly worth living in.

Dr. Mott expressed pleasure at finding that his experience coincided with that of Sir Geo. Savage, to whom they all looked up as the greatest living authority on insanity.

This terminated the Congress.

PRESIDENT'S FAREWELL ADDRESS.

Major Darwin, rising amid a storm of applause, spoke as follows: The time has now come to bid each other farewell, and thus to bring this Congress to a close. On such an occasion as this one cannot but feel tempted to inquire as to what has been the result of all our efforts. To enter on such an inquiry at the present moment would, however, hardly be wise; for time alone can tell whether the eugenic movement will progress rapidly or slowly; and, moreover, I shall never be the right person to endeavour to estimate to what extent the gaining of the ultimate victory—for we shall conquer in time—will have been assisted by this great meeting. On two points I can, however, speak with no uncertain voice. In the first place I am sure we shall all of us look back to this occasion as one at which many new and pleasant friendships were made. This is, in my opinion, not only a gratifying result in itself, but one of no small importance for our cause; for of the results of international congresses, not the least important are those which spring from the opportunities thus afforded for free and personal interchange of ideas between individuals coming from widely separated localities. And from this point of view we English ought to be, and unquestionably are, very grateful to our guests from over the waters for giving us the chance of thus conferring with them, a chance I hope and believe we have made full use of. Then, in the second place, it can hardly be doubted that the able and interesting papers which have been read, and the valuable remarks made in the course of our discussions, have aroused a widespread interest in this subject in the minds of the public at large, and have thus tended to disseminate more correct views concerning the ideals of eugenists. And this educative movement may, it is hoped, have some immediate practical consequences in the way of hastening on legislation such as that now being discussed in our Parliament. It would not be fair on this occasion to discuss controversial matters; but, if I have

judged the tone of this meeting aright, all would place legislation tending to stamp out feeble-mindedness from future generations in a leading place in their programme. Possibly the result of the Congress will also be to clarify the views of us eugenists ourselves; and I deliberately say to clarify rather than to unify, because I hope there always will exist differences of opinion amongst our leaders. For absolute identity of views only exists in a moribund movement. Having thus so firmly asserted my belief in the rights of individuals to maintain their own opinions, perhaps I may be allowed to express my own views as to the necessity of keeping the meaning of the word eugenics within well-defined but not too rigid limits. Progress, it is true, has at times been hampered by attempting to confine by means of definitions the labours of men of science to the particular field to which they were supposed to be attached. But, in order to obtain the greatest results, what we have to do is to divide our labourers and to scatter them all over the land; and definitions—the giving of names to the different fields—may be made to serve the useful purpose of ensuring that no pasture shall altogether escape from cultivation. To continue my simile, those crops which produce no return for many years, and which consequently reflect but little credit on the labourer, are likely to be neglected for those fields where the cultivation is easy and the return rapid. It is to the more neglected fields of human social policy that we wish to direct the attention of the public; to those fields in which the crop will only be raised by future generations. And if we do look thus to the future, we must see how disputable and limited are our powers of being able by anything we can now do to affect the environment of the citizen of the distant future, whilst our powers of affecting his inborn qualities cannot be doubted by those who have made even the most elementary excursion into the region of heredity. We all know Galton's famous definition that eugenics is the study of agencies under social control that may improve or impair the racial qualities of future generations, either physically or mentally. This definition I hope we may adhere to; though personally I should like to strengthen it by substituting the word inborn for the word racial. I speak thus strongly because I am certain that we shall for long be met with this practical difficulty. There will always be many philanthropists nobly endeavouring to fight the evils of the social life they see around them, and they will always naturally be calling on eugenists to help them. As men we must give this help most freely. But as eugenists we must be careful lest the result be that the field we ourselves have promised to cultivate should go unlaboured. Looking back at our discussions during this Congress, is it not true that in proportion as speakers have had in their minds the attainment of immediate benefits—in proportion, that is, as they have added other aims to those purely eugenic—in that proportion have our debates been animated. And herein lies our danger. It is by constantly reminding us of our special sphere of action that a somewhat rigid definition may be useful; for we may thus be induced

to continue to labour at a task where no present glory is to be won and where no definite results may even be visible in our own lifetimes. We eugenists must content ourselves with feeling, each one of us, that the nation to which we belong is, as regards its future, largely dependent on the success of our movement. We are the true patriots, because we are toiling without hope of reward; and to keep on this narrow path we are bound to separate ourselves somewhat from those who are seeking for more immediate objects, however laudable those objects may be. Is our civilization to be progressive or is it to be retrograde?—that is the question. You who have assembled here at this Congress have shown your determination that as far as in you lies it shall be progressive. For this you may win no gratitude during your lifetimes, though you will have deserved the thanks of posterity. With these few words I announce the formal termination of our proceedings.

Gen. von Bardeleben moved the following resolution: "That the members of the Congress desire to express their sense of the excellent arrangements of the Congress, which have secured its success; and to return their sincere thanks to the University of London for the use of the building, to the members of the Organisation Committee, to the Stewards and other officers, and particularly to the President, Major Darwin, and to the Hon. Secretary, Mrs. Gotto."

This resolution was seconded by Sir John Cockburn, and supported by Baron Garofalo and Prof. Kellogg.

M. Delage moved the following resolution: "That the members of the Congress desire to return their sincere and grateful thanks to their hosts and hostesses, to the Hospitality Committee, and in particular to its Hon. Secretary, Mrs. Alec Tweedie, for the generous and delightful hospitality which they have received, and which they have so highly appreciated."

This resolution was seconded by Dr. Adams Woods, and supported by Dr. Soren Hansen and Dr. Mjöen.

Both resolutions having been carried by acclamation, and a basket of flowers having been handed to Mrs. Gotto by Prof. Kellogg, the President and Mrs. Gotto suitably responded.

The proceedings then terminated.

DOCUMENTS AND REPORTS PRESENTED TO THE CONGRESS.

ANDRIANOMANANA, BENOIT (*Antananarivo, Madagascar*).—Letter of greeting and photograph.

DANJOU, Dr. G. (*Nice*).—Report on causes of degeneracy, with proposals for improvement of education, public and private health, maintenance of international peace, etc.

DOREL, Mme. NOEMI (*Paris*).—Scheme of instruction in "Self-Culture Générative," with statistics of the results of haphazard breeding, rules as to age at marriage, etc.

HERBERT, SYDNEY B. (London).—A letter urging the popular dissemination of eugenic teaching.

LADAME, Dr. P. L. (*Geneva*).—Report on "Alcoholism and Divorce," with statistics supplementary to those presented by MM. Magnan and Fillassier. The figures show that of 1,812 divorces pronounced at Geneva between 1901 and 1910, 676, or 37.3%, were due to alcoholism or drunkenness.

MARIE, Dr. (*Paris*).—Brochure containing description, with illustrations and plans, of the "Asile Agricole d'Aliénés" at Chezal-Benoit (Cher), and report of proceedings at its opening on November 3rd, 1911.

MASSIOTI, ANTONIO B. (*Buenos Ayres*).—Pamphlet containing seventeen resolutions to be submitted to the Fifth International American Scientific Congress at Washington.

RAIMONDI, Dr. R. (*Porchefontaine, France*).—Report on the influence of heredity upon certain affections of the digestive organs in the breast-fed child.

SCHREIBER, Dr. G. (*Paris*).—"Le Livret de la Famille": a text-book for married people, especially parents.

TERRE, Dr. (*Department of Cher, France*).—Report on the diminution of maternal lactation, with proposals for the control and improvement of artificial substitutes for the natural food of infants.

THULIE, Dr. H. (*Paris*).—Pamphlet, "La Lutte contre la Dégénérescence et la Criminalité." Second Edition. Published by Vigot Frères, 23, Pl. de l'Ecole de Médecine, Paris. Price one franc.

WILLIAMSON, R. P. (*London*).—Letter containing questions as to the practicability of eugenic measures.

Appendix.

THE CONTRIBUTIONS OF DEMOGRAPHY TO EUGENICS.

By Dr. Corrado Gini.

Professor of Statistics at the Royal University of Cagliari, Italy.

Chapter I.

Mortality during development in the human species and in that of the higher animals.

1. In the writings of biologists we often meet with the idea that the more evolved the species the less its mortality during development. Making use of a phrase unscientific, but to the point, they say that the more Nature perfects the type of organism, the more she feels the need of economising lives. For instance, thousands of tadpoles are necessary to ensure the production of one adult frog, but offspring of the eagle and the lion are able to reach maturity in practically all cases.

If this rule turned out to be well founded, we should certainly have to say that the human species provided a notable exception, compared with some species of the higher animals.

For the human species we are furnished with tables of mortality for a comparatively recent period relating to nearly all the countries of Europe, and some of those of America, Asia, and Oceania. The percentage of offspring who die before complete development, which in man may be put down at twenty years of age, varies from 55% in India and 50% in Spain, to 22% in Norway, Sweden, Denmark and Ireland, and 21% in Western Australia (Note 1).

For the equine species Caramanzana has worked out a table of mortality according to which not more than 9.4% of the offspring die before attaining four years of age, when the horse attains to complete development (Note 2). In the human species this percentage is exceeded only in the first year (Note 3). Caramanzana's table rests, indeed, upon a basis of hypotheses, which, however ingenious, are uncertain; but the reliable and extensive data published by the Scandinavian Society for the insurance of live-stock suggest that the co-efficients of mortality given by Caramanzana are very near the truth, and, if anything, rather too high (Note 4). These data are based upon decennial census figures relating to Swedish horses, and refer to the

ages from one to nineteen years. The co-efficient of mortality between o and one year of age is missing. If we suppose that from o to one year of age the mortality is represented by the calculations of Caramanzana, and that from one to four it is represented by the observations on Swedish horses, we shall be justified in saying that out of 10,000 horses born, 9,257 survive to maturity.

The data published by the Scandinavian Society for the insurance of live stock refer, no doubt, to a rather select equine population; for the insured horses are undoubtedly better cared for in general than those not insured; but in any case their mortality during development is still much less than that of human classes living under the best hygienic and economic conditions.

The following data, though not very recent, leads us to suppose that a survival of 93% to 94% at one year of age, and of 80% to 85% at 20 years of age constitutes in the human species a maximum not easy to improve upon.

TABLE I.

Survival of offspring among the higher classes of the human species (*Note* 5).

Numbers of survival at the age X. of every 1,000 *born.*

Age	Upper Classes (Ansell 1874)				English Peers (Bayley & Day) (1861)	Reigning Families of Europe 1841-90 (Sundbärg)
X.	Clergy	Legal Profession	Medical Profession	Other Families		
1	926	920	913	916	930	936
5	886	878	862	864	899	877
10	867	855	837	840	882	—
15	848	839	821	825	—	—
25	785	781	768	768	—	—

Moreover, the data for the general population which can be extracted from census figures, rough approximation though they are, confirm the fact that with increase of age the number of survivors in the equine species diminishes much less rapidly than in the human species (Note 6).

2. The absence of statistics relating to other species of the higher animals, in a wild state, leaves room for two main hypotheses; either the mortality is during development analogous to that shewn by the human species, and the low mortality in the equine species is due to eugenic measures taken in the breeding and rearing of the domestic horse: or the mortality is during development analogous to, and perhaps less than, that shewn by the domestic horse,

and the high mortality during development amongst the species of higher animals is a sad prerogative of the human race.

In the first hypothesis the utility of Eugenics would be demonstrated and the Eugenist could already think of using for the improvement of the human race those practices which are now in vogue amongst horse-breeders; in the second hypothesis it would remain to be decided before everything else whether the high mortality in the human species during development constitutes a natural and specific characteristic of its own, or whether instead it is a consequence of the more or less artificial conditions in which, so far as the civilized races are concerned, the breeding and rearing of man is accomplished.

Now, although the absence of statistical data prevents us from choosing with certainty between these two hypotheses, we may at least consider the second as being more likely than the first; for the experience of horse-breeders teaches us that mortality during development is greater in the most rigorously selected equine races than in the commoner ones which are more nearly in the wild state; and analogous differences are found according to common observation in dogs, cats, and other domestic species.

It becomes, therefore, of great interest to study the influence on the characteristics of individuals of circumstances by which the breeding and rearing of the offspring of civilized human races differ from the breeding and rearing of the offspring of the higher animals in a wild state.

These circumstances may be reduced essentially to three:

(*a*) The human species reproduces itself at all periods of the year, while the species of the higher animals reproduce themselves during one or few specific periods of the year.

(*b*) Animal species in a wild state reproduce themselves as soon as the organism is capable of reproduction, while in civilized human races there is a period, more or less long, between the moment when the organism is capable of reproduction and the moment when it actually does reproduce itself.

(*c*) In civilized human races, the high development of altruistic sentiment protects the weak and diseased from the weeding-out process of natural selection, and often enables them to take part in the production of future generations.

3. The study of the influence of these three factors becomes of much greater importance when it is seen that the work of Eugenists will have to be specially directed towards their control.

In fact we can think of several means of improving the human race, especially:

(1) Selecting the reproducers;

(2) Placing the reproducers in the most favourable environment;

(3) Regulating in the best way the circumstances in which the unions are consummated, both as regards the absolute and relative ages of the reproducers,

and as regards the season in which the unions take place, and the interval between successive conceptions ;

(4) Placing the offspring in the most favourable environment.

Improvement of the environment in which the reproducers live and their offspring develop undoubtedly has beneficial effects upon the human race ; to realize its importance it is only necessary to reflect that the higher classes differ from the rest of the population chiefly in respect of the quality of their environment ; we must also bear in mind the enormous differences which have been discovered between the two classes so far as mortality during development is concerned.

But the self-interest of individuals and family affection seem sufficient to make certain of this improvement so far as it is possible, while as far as means 1 and 3 for improving the race are concerned, sexual instinct, social habits and individual ambition are in a position to cause results diametrically opposed to those desired by Eugenists. On means 1 and 3 therefore the attention of Eugenists ought to be concentrated. Now such means especially consist in the control of the circumstances by which the breeding and rearing of human offspring differ from the breeding and rearing of the species of higher animals in a wild state.

4. This paper is specially devoted to bringing new contributions to bear on the study of these circumstances, based upon data obtained mainly from the most accurate vital statistics, and partly from investigations specially made, or caused to be made, by the writer in the offices of Municipal Statistics at Rome and Cagliari, and the lying-in Hospitals of several Italian towns.

Chapter II.

Offspring in relation to the month of conception.

5. The phenomenon of the periodicity of births according to months has been investigated for some time, using data relating to many States in Europe. In these States the number of births gives two maxima: one, covering the longer period, extends in most of these countries between January and April, corresponding to conceptions occurring between April and July ; the other, shorter and as a rule less marked, is reached in September, and corresponds to conceptions occurring in December. This is usually attributed to social causes, especially to the return of many absentees at the feasts of Christmas and the New Year, and to the consequent resumption of interrupted conjugal intercourse ; the other is attributed exclusively or chiefly to natural causes ; that is to say, to a greater capacity of the human organism for reproduction in the spring. The fact that illegitimate births shew a longer and higher maximum during the

TABLE II

Number of births in relation to months in Europe.
Daily mean of births in each month, having made the average daily mean for the whole year = 1,000.

Month of birth	Ireland (2) 1891-900	England and Wales (2) 1838-903	Norway (2) 1896-1900	Sweden (3) 1898-902	Finland (3) 1878-80	Denmark (3) 1895-900	Holland (2) 1900-904	Germany (3) 1903	Western Austria (3) 1871-80	Switzerland (3) 1871-90	Belgium (2) 1841-900	Luxembourg (3) 1901-903	France (3) 1872-80	Italy (2) 1907-909	Spain (2) 1878-901	Roumania (2) 1880-94	Bulgaria (3) 1902	Servia (3) 1901	Croatia and Slavonia (2) 1900-902	Galicia and Bukowina (3) 1871-80	Hungary (2) 1900-902	Probable months of conception
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23
January			*1013*	*1026*	*1078*	977	*1030*	*1007*	*1043*	*1010*(4)	*1049*	*1011*	*1006*	*1107*(5)	*1095*	884	*1194*	*1135*	955	*1175*	992	April
February	*1048*	*1034*	*1045*	*1025*	*1047*	*1044*	*1096*	*1045*	*1075*	*1030*	*1110*	*1133*	*1077*	*1125*	*1198*	*1105*	*1199*	*1305*	*1057*	*1153*	*1094*	May
March			*1026*	*1080*	*1063*	*1065*	*1064*	*1030*	*1051*	*1040*	*1107*	*1109*	*1080*	*1072*	*1151*	*1021*	971	*1189*	*1064*	*1065*	*1092*	June
April			*1025*	*1042*	*1008*	*1042*	*1026*	*1023*	*1026*	*1020*	*1055*	*1036*	*1059*	*1026*	*1049*	*1069*	933	*1035*	*1109*	*1007*	*1041*	July
May	*1061*	*1028*	*1020*	979	*1028*	*1011*	990	*1025*	*1005*	1000	*1002*	*1057*	*1006*	959	979	*1083*	798	*1005*	*1025*	945	980	August
June			*1002*	976	*1041*	992	951	968	970	1000	965	957	966	913	907	*1016*	827	977	994	913	951	September
July			995	959	*1049*	973	950	978	975	*1010*	935	922	963	936	881	*1076*	927	989	924	921	951	October
August	970	974	987	929	947	*1011*	987	994	959	1000	945	946	969	959	910	973	*1032*	*1010*	*1048*	942	*1005*	November
September			*1102*	*1097*	*1023*	*1047*	*1018*	*1023*	989	*1010*	970	934	985	*1024*	974	957	*1178*	*1008*	*1114*	926	*1057*	December
October			977	969	877	974	958	950	984	970	947	946	958	994	961	*1211*	*1315*	*1046*	*1018*	987	*1007*	January
November	923	965	888	941	885	939	956	976	983	970	951	*1026*	971	984	945	961	979	707	902	984	952	February
December			926	981	956	927	980	984	945	960	969	936	965	905(5)	960	651	661	609	795	991	884	March

(1) These data are the result of the investigations of the author, except as regards France, Western Austria, Switzerland, Finland, Galicia and Bukowina, where they are taken from MAYR (*Statistik und Gesellschaftslehre* Freiburg I B. Mohr, 1897. II. Band. Pag. 172) and for Luxembourg and Germany where they are taken from *Mouvement de la population dans la Grand Duché de Luxembourg pendant l'anné, 1903* (Luxembourg Worré-Martens, 1905) Page 132-133. The original data was taken from official statistics, except in the case of Bulgaria and Spain, the data for which I received in MSS. from the general department for statistics in those two countries. (2) Still-born excluded. (3) Still-born included. (4) The last figure is approximate. (5) The daily mean of births for Italy is lowered in December and raised in January by the delay which in many districts ensues between the actual births and their notification during the last days of the year. See R. BENINI, *Le Denunzie di nascite in alcuni compartimenti italiani.* Proceedings of the Regia Accademia dei Lincei. Vol. XIX. Section 12. Rome. Press of the R. Acc. dei Lincei 1911, also for other States, F. CORRIDORE, *Denunzie ritardate di nascite in Italia e in altri Stati (1872-1909)*, Roma, Loescher, 1912.

TABLE III.

Number of births in relation to months (1).

Daily mean of births in each month, having made the average daily mean for the whole year = 1,000.

Month of birth in the Northern Hemisphere	North America				South America	Oceania			Asia				Africa	Month of birth in the Southern Hemisphere
	West Greenland (2) 1851-90	District of Columbia (3) 1908-909	Town of Providence (4) 1856-904	Mexico (3) 1895-901	Town of Buenos Ayres (3) 1906-907	New South Wales (3) 1896-905	Victoria (3) 1900-905	Western Australia (3) 1898-904	Japan (3) 1899-903	Bengal (3) 1900-905	Madras (3) 1903-905	Bombay (3) 1903-905	Isle of Mauritius (3) 1903-905	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
January	*1130*(5)	*1033*		942	*1075*	*1016*		*1065*	*1284*	984				July
February... ...	*1100*	*1109*	985	956	*1031*	*1046*	*1170*	*1044*	*1218*	*1027*	859	926	974	August
March	*1080*	*1096*		*1011*	*1016*	*1032*		*1057*	*1213*	*1036*				September
April	990	856		997	*1032*	*1009*		*1009*	*1034*	*1001*				October
May	*1020*	878	977	980	981	986	919	998	865	942	994	858	*1086*	November
June	960	*1021*		*1024*	921	941		901	748	877				December
July	*1010*	*1013*		*1078*	948	987		943	822	873				January
August	920	*1016*	*1021*	*1010*	938	986	938	958	843	969	*1093*	*1001*	*1004*	February
September ...	970	*1028*		*1005*	948	*1000*		969	975	*1065*				March
October	910	963		*1089*	*1002*	978		*1016*	961	*1077*				April
November ...	940	989	*1018*	963	*1063*	*1003*	970	*1011*	*1033*	*1081*	*1055*	*1215*	935	May
December ...	970	999		943	*1040*	*1004*		*1026*	*1018*	*1073*				June

(1) These data are the result of the investigations of the author, except Greenland, in which case they were taken from *Sammendrag of statistiske Oplysninger om Grœnland*, Kiobenhavn, Bianco Lunos, 1912. The original data was taken from official statistics, except in the case of Bengal, when they were sent in MSS. to the author by the Director-General of Commercial Intelligence (31/5/06). (2) Native population. (3) Still-born excluded. (4) Still-born included up to 1896, excluded in later years. (5) The last figure is approximate.

winter months, and that they usually shew the maximum of September either slightly or not at all, is regarded as a confirmation of this explanation.

If this be admitted, it is reasonable to compare the greater fecundity of the human species during spring with the period of heat which, in the greater part of those animal species which have a single period, falls in the same season. The much greater frequency of conception in spring represents in fact, according to the views of several authors (Westermarck, Ewart, Grünspan), an atavistic survival of an original season of reproduction.

Having reached this point it is natural to ask ourselves whether individuals conceived in spring, and thus following, one might say, the primordial custom of our species, might not be found to shew particularly favourable characteristics. Starting from this point, Ewart appears to have ascertained that children born in the months January to March, and after them children born in the months April to June, seem to be, at the age of eleven years, as regards stature and weight, in a particularly favourable condition. In the seventh and twelfth year the number of the survivors of those born in the first half of the year is clearly in excess of those born in the second half of the year (Note 7).

6. A close examination of materials relating to births according to months (Tables II. and III.) cuts at the very basis of this argument.

In Europe itself (see Table II.) we find countries (Denmark, Roumania, Croatia and Slavonia, Hungary) in which the births during January, corresponding to conceptions in the middle of spring, are found to be below the mean; in others, the conceptions during spring (births between January and March) are nearly equalled (England and Wales, Norway) or surpassed (Ireland) by those in the summer (births between April and June).

But the gravest doubts arise when we examine the phenomena in countries outside Europe. The data in Table III, the first of the kind, I think, to be published, although not numerous enough to shew for the other parts of the world a regularity like that found for Europe, are in any case more than adequate to show that the regularity found for Europe does not hold good for other countries. In North America we often see (districts of Columbia, City of Providence, Mexico), a well defined maximum of births during the summer and also in autumn, corresponding to conception during autumn and winter, while the maximum of conception in the spring sometimes fails to appear (Providence), and sometimes is just apparent (Mexico). In Greenland, besides the highly pronounced maximum between January and March, we observe others in May and July. In South America as in Australia, Japan, and Bengal there is a maximum of births in the winter, but the maximum begins to shew itself (except in Victoria), in September, October, and November; and in Bengal it is higher in these months than in the winter months. Finally in Madras, Bombay, and Mauritius, the quarterly data do not shew any maximum of conceptions in the spring, while the births corresponding to the

autumn and winter conceptions (for Bombay and Madras) and to the summer and autumn (Mauritius) rise above the mean.

These results for many non-European countries, while they differ notably among themselves, are at one in shewing a tendency, considering births according to months, rather different from that observed for some time past

TABLE IV.

*Numbers of Births according to months.**

Month of birth in Northern Hemisphere	Daily mean of births in each month having made the average daily mean for the whole year = 1000						Month of birth in Southern Hemisphere
	District of Columbia 1908-909		Island of Mauritius 1903-905		Japan 1899-903		
	White Population	Coloured Population	European Population	Indian Population	The whole State	Isle of Yeso	
1	2	3	4	5	6	7	8
January ...	*1034*	*1029*			*1284*	*1179*	July
February...	*1046*	*1260*	997	965	*1218*	*1141*	August
March ...	*1110*	*1066*			*1213*	*1171*	September
April ...	884	794			*1034*	*1091*	October
May ...	900	831	*1049*	*1100*	865	959	November
June ...	*1016*	*1029*			748	911	December
July ..	*1001*	*1039*			822	845	January
August ...	*1012*	*1023*	975	*1015*	843	856	February
September	*1023*	*1037*			975	987	March
October ...	990	903			961	951	April
November	983	*1002*	977	919	*1033*	*1010*	May
December	996	*1005*			*1018*	912	June

*Data worked out by the author from original figures of official statistics.

in Europe. We can therefore say that the idea of a natural maximum of conceptions during spring, as opposed to a natural depression during other seasons, cannot be upheld in view of the more extensive materials which the study of statistics can give us to-day.

7. We may say that difference of race has no decisive influence in some countries at any rate. The whites and blacks of the districts of Columbia; the descendants of the French and the Indian emigrants in the Isle of Mauritius; the Japanese and the inhabitants of the island of Yeso, who are more or less pure descendants of the primitive Aïnos—none of them exhibit any essential difference in the monthly periodicity of births. (See Table IV.). The Indians of Mauritius, so far as can be judged from quarterly data, more especially resemble, if we consider this characteristic, the European descendants of the same island than the populations of their Mother Country. (See Table III. data for Madras, Bombay and Bengal).

That climate should have some sort of influence seems very probable. In fact, in the most northern countries of Europe the maximum of births, instead of stopping in April or May, often goes on till June and July (Ireland, England,

Wales, Norway and Finland) and a similar phenomenon appears in mountainous Switzerland (see Table II). In the hotter countries, as Madras, Bombay, Bengal, and in Mexico, the maximum of conceptions coincides substantially with the coldest season. If in the cold countries we consider the most northerly regions, we find sometimes, for instance in the districts of Tromsöe and Finmarken in comparison with the whole of Norway (see Table V. Col. 4-7), that the maxima of conceptions move towards the hottest months; and if in the hot countries we consider the most southerly parts (for example the States of Yucatan, Campeche, Chiapas and Tobasco in Mexico, see Table V. Col. 10-11) we find that the maxima move instead towards the coldest months. Other comparisons however give negative results. In Sweden, for instance, the maximum of conceptions during the spring does not go on in summer, nor do we find a continuous maximum in summer in very cold Greenland (Note 8) (see Tables II. and III.). Northern Greenland compared with Southern Greenland, the Northern part of Sweden compared with the whole country, and the Faroe Islands compared with the whole of Denmark, shew, indeed, in the monthly periodicity of births notable differences, but these cannot be ascribed to the direct influence of climate (see Table V).

TABLE V.

Births according to months (1).

Daily mean of births in each month, after making the average daily mean for the whole year = 1,000.

Month of Birth	West Greenland 1851-900		Norway legitimate Births 1896-900		Norway illegitimate Births 1896-900		Sweden		Mexico		Denmark		Probable month of conception
	North Greenland	South Greenland	Tromsöe & Finmarken	The whole State	Tromsöe & Finmarken	The whole State	Noorbotten 1901-905	The whole State 1898-902	Yucatan, Campeche, Chiapas & Tobasco 1895-1900	The whole Confederation 1895-901	The Faroe Islands 1896-900	The whole of Denmark 1895-900	
1	2	3	4	5	6	7	8	9	10	11	12	13	14
January ...	*1190*(2)	*1100*(2)	824	*1013*	855	*1007*	*1076*	*1026*	926	942			April
February ...	*1200*	*1070*	861	*1044*	777	966	*1029*	*1025*	908	956	836	*1029*	May
March ...	*1140*	*1040*	*1027*	*1026*	*1011*	966	964	*1080*	899	*1011*			June
April	880	*1030*	*1181*	*1025*	*1100*	*1003*	974	*1042*	943	997			July
May	830	*1100*	*1318*	*1020*	*1361*	*1095*	983	979	909	980	864	*1015*	August
June	*1000*	960	*1231*	*1002*	*1420*	*1103*	964	976	*1015*	*1024*			September
July	*1030*	*1000*	*1147*	995	*1026*	980	*1004*	959	*1176*	*1078*			October
August ...	930	900	*1186*	987	*1086*	935	*1028*	929	*1021*	*1010*	*1268*	*1011*	November
September ...	950	990	*1122*	*1102*	*1086*	*1118*	*1112*	*1097*	*1035*	*1005*			December
October ...	960	890	866	977	937	943	913	969	*1115*	*1089*			January
November ...	900	950	654	888	647	894	907	941	*1051*	963	*1026*	947	February
December ...	990	970	579	926	684	993	*1049*	981	993	943			March

(1) Data collected by the author from the original official statistics, Greenland excepted, the data for which were taken from *Sammendrag af statistiske oplysninger om Groenland.*—Page 12.

(2) Last figure approximate.

Granting that climate does have some influence, we may imagine that in these countries it may be counteracted or even overcome by the effect of other circumstances. It is probable that among populations depending upon fisheries, as in the Faroe Islands and Greenland, the physical labour, and the more or less lengthy absences of the males from their families, may have a decisive influence. In general, it seems reasonable to admit that the diversity of occupation, migrations, journeys, feasts, periods of fasting and mourning, and the other civil and religious customs may have a notable influence on the greater or lesser frequency of conceptions. The influence of religious customs appears clearly if we compare the birth-rates in the Protestant districts of Germany with those of the Catholic and mixed. (See Table VI.)

TABLE VI.

Births according to months (1).

Daily mean of births in each month, after making the daily mean for the whole year = 1,000.

Month of Birth.	Roumania 1880-94		Germany, 1872-80 Legitimate Births			Germany, 1872-80 Illegitimate Births			Probable month of Conception
	Born in Towns	Born in Country Districts	Protestant Districts	Catholic Districts	Mixed Districts	Protestant Districts	Catholic Districts	Mixed Districts	
1	2	3	4	5	6	7	8	9	10
January	*1074*	847	*1017*	*1004*	*1025*	*1091*	*1077*	*1097*	April
February... ...	*1193*	*1092*	*1036*	*1043*	*1057*	*1136*	*1178*	*1158*	May
March	*1073*	*1012*	*1016*	*1043*	*1046*	*1077*	*1126*	*1115*	June
April	990	*1083*	982	*1024*	*1002*	*1025*	*1052*	*1064*	July
May	929	*1112*	958	996	970	988	*1019*	*1020*	August
June	932	*1032*	947	978	937	950	975	963	September
July	960	*1098*	965	982	951	903	942	927	October
August	968	974	*1003*	980	988	878	860	870	November
September ...	938	961	*1077*	*1017*	*1048*	*1018*	953	963	December
October	*1058*	*1240*	*1012*	993	*1001*	918	946	887	January
November ...	*1006*	955	998	988	997	965	928	937	February
December ...	893	605	993	955	983	*1061*	958	*1010*	March

(1) The data for Roumania were worked out by the author from the original official statistics; those for Germany are taken from MAYR, *Statistik und Gesellschaftslehre*. Page 172.

We may, perhaps, ascribe the differences between town and country which in Roumania for example are considerable (see Table VI.) to the influence of the different professions. But it is probable that here, as certainly in other cases, the influence of the frequency of marriages according to months comes into play.

I do not know upon what data the assertion is founded which is at present taken for granted by statisticians, that the monthly oscillations in the frequency of marriages have no sensible influence on the monthly oscillation in the frequency of births. The explanation of this fact should be found in the variation in the interval between marriage and first birth.

However, it is clear that this variation may shew well marked differences from country to country according to the greater or less diffusion of Neo-Malthusian practices, the relative ages of those marrying, and especially, the greater or less frequency of conception before marriage. Owing to this, it may

TABLE VII.

Marriages and births according to months in Luxemburg, 1901-1903.*

Daily mean of births for each month, after making the daily mean of births for the whole year = 1,000.

Month of Birth	Legitimate Births			Illegitimate Births	Illegitimate and legitimate births, excluding legitimate first-born	Month of Marriage
	Marriage	First-born	Following Births			
1	2	3	4	5	6	7
January	*1314*	*1024*	998	*1059*	*1000*	April
February	*1202*	*1197*	*1108*	*1290*	*1117*	May
March	820	*1173*	*1091*	*1245*	*1099*	June
April	699	909	*1068*	*1191*	*1073*	July
May	716	985	*1075*	*1232*	*1083*	August
June	935	893	974	903	971	September
July	870	864	943	781	935	October
August	*1258*	996	934	781	927	November
September	772	915	936	931	936	December
October	*1412*	895	967	768	958	January
November	*1715*	*1210*	983	903	979	February
December	367	955	932	940	932	March

* Data taken from *Mouvement de la population dans les Grand Duché pendant l'année, 1903*.
See pages 123, 124, 125, 132.

well be that this assertion is well founded for one State and incorrect for another. The decisive proof of its truth or falsity for a given country, may be established by comparing the frequency of marriages in each month with the frequency of conceptions, considering the legitimate first-born and the other births separately. We may make this comparison in the case of Luxemburg (see Table VII). The monthly frequency of first-born (see Col. 3) differs markedly from that of the other legitimate births (see Col. 4) and from that of the other total births (see Col. 6). Now these differences appeared to be due to the influence of marriages of nine or ten months before. In fact, when the marriages of nine or ten months before shew a frequency greater than the yearly mean, the frequency of first-born is relatively higher than that of other births; the contrary happens in the opposite case. Between the frequency of first-born in a certain month

TABLE VIII.

Legitimate and Illegitimate births according to months (1).

Daily mean of births in each month after making the daily mean for the whole year = 1000.

Month of Birth.	Norway (2) 1896-900		Sweden (2) 1898-902		Denmark (3) 1895-900		Germany (3) 1903		Switzerland 1876-90		Luxemburg (3) 1901-903		Bologna (2) 1877-900		Hungary (2) Kingdom of 1900-902		Mexico (3) 1895-901		Probable month of conception.
	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	legitt.	illegitt.	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
January ...	*1013*	*1007*	*1022*	*1038*	974	*1002*	*1006*	*1022*	*1010*(4)	*1100*(4)	*1009*	*1059*	*1041*	986	979	*1062*	964	924	April
February ...	*1044*	966	*1025*	*1014*	*1043*	*1056*	*1037*	*1135*	*1020*	*1130*	*1126*	*1290*	*1081*	*1044*	*1084*	*1139*	981	929	May
March	*1026*	966	*1075*	*1110*	*1066*	*1058*	*1025*	*1082*	*1030*	*1080*	*1103*	*1245*	*1032*	*1090*	*1087*	*1106*	*1004*	996	June
April	*1025*	*1003*	*1038*	*1068*	*1040*	*1066*	*1017*	*1080*	*1020*	*1060*	*1030*	*1191*	998	*1029*	*1050*	*1049*	*1013*	962	July
May	*1020*	*1095*	971	*1055*	*1008*	*1037*	*1020*	*1076*	1000	*1050*	*1050*	*1232*	950	946	986	988	995	950	August
June	*1002*	*1103*	965	*1082*	991	*1007*	967	982	1000	970	959	903	922	949	957	947	*1046*	*1017*	September
July	995	980	960	963	978	926	983	923	*1010*	920	927	781	974	941	953	892	*1082*	*1074*	October
August ...	987	935	943	814	*1023*	906	*1006*	860	*1010*	880	952	781	*1005*	980	*1016*	957	*1005*	*1022*	November
September ...	*1102*	*1118*	*1103*	*1072*	*1052*	*1002*	*1026*	*1001*	*1010*	950	934	931	*1064*	*1030*	*1068*	*1034*	983	*1005*	December
October ...	977	943	975	923	976	951	957	878	970	890	953	768	*1008*	*1032*	*1012*	970	*1011*	*1145*	January
November ...	888	894	946	884	934	985	978	960	960	980	*1031*	903	966	978	947	930	944	979	February
December ...	926	993	981	984	919	*1003*	982	*1016*	960	990	936	940	971	*1005*	866	932	928	976	March

(1) Data worked out by Author from original official statistics, except in the case of Germany and Luxemburg, for which the data were taken from *Mouvement de la population dans le Grand Duché du Luxembourg*.—Pages 132-133, and of Switzerland, for which the data were taken from PRINZING, *Handbuch der Medizinischen Statistik*, Jena, Fischer, 1906, Page 63.

(2) Stillborn excluded. (3) Stillborn included. (4) Last figure approximate.

and that of marriages nine or ten months before we find an undoubted parallelism which would probably be even more marked if we were in a position to consider fortnightly rather than monthly periods.

Traces of an influence caused by the monthly variation in the number of marriages on the monthly variation in the number of births can also be found in another way. If that maximum of births which occurs in autumn should be found to depend solely upon the resumption of conjugal intercourse owing to the feasts of Christmas and New Year, it should be confined to September, or at the farthest to the first days of October. If we consider illegitimate births in those countries where we observe an autumnal maximum (Norway, Sweden, Denmark, Germany, Bologna and Hungary) (see Table VIII.) it falls in these two months; if instead we consider the legitimate births (see Table VIII.) or the total births (see Table II.) it not rarely shows itself and often markedly even in August (Denmark, Germany, Switzerland, Bologna, Hungary, Bulgaria, Servia, Croatia and Slavonia). We certainly have little reason to suppose that the number of eight month gestations should be so great that those conceived at the end of December should increase sensibly the number of those born in August. It rather points to the influence of marriages which are contracted in great numbers during November.

TABLE IX.

Frequency of multiple births according to seasons.

Month of Birth,	Born of Multiple Deliveries per 100 births				Multiple Deliveries per 100 bths	Multiple Deliveries per 100 dlvs	Deliveries of twins per 100 births
	Amsterdam 1850-904	Bologna 1877-900	Florence 1906-909	Servia 1901	Luxem-burg 1901-903	Spain 1901	Berlin 1899-904
1	2	3	4	5	6	7	8
December to February	2·28	2·24	2·37	*3·33*	*1·58*	0·88	1·090
March to May ...	2·28	2·53	2·28	2·97	1·27	0·86	*1·091*
June to August ...	2·20	*2·72*	*2·77*	2·58	1·18	*0·97*	1·005
September to Nov. ...	*2·43*	2·35	2·23	1·71	1·16	0·79	1·080

* Data worked out by author from official statistics.

We may say in conclusion that the variations which we find in the different months caused by climate, professions, civil and religious customs of the people, migration, the number of marriages, have no doubt a distinctly marked influence on the monthly variation of births. This influence is of such a nature that it is quite impossible to decide whether independently of these

circumstances a natural maximum of conceptions should exist in one rather than in another season of the year owing to a greater capacity of the human organism for reproduction.

8. On the other hand, the examination of the frequency of multiple births and of the vitality of the offspring according to the season of conception does not suggest in any way for the human species the existence of an atavistic survival of an original season of reproduction.

In multiple births also (at least if we consider those caused by more than one egg) many persons have tried to find an atavistic survival. We should therefore expect to find, according to this idea, that their frequency is greatest in the conceptions during that period of the year which was the original season for the reproduction of our species, that is to say, in the conceptions of the spring, and therefore in the births of the winter.

TABLE X.

*Season of Conception.**

Budapest 1903-1905.

State of offspring	Probable season of conception				Total
	Spring	Summer	Autumn	Winter	
1	2	3	4	5	6
Legitimate Births.					
Miscarriages	1411	1418	1480	1418	5727
Stillborn	348	377	322	304	1351
Born alive	11703	12713	11708	11481	47605
% Miscarriages on those born alive	*12·1*	*11·2*	*12·6*	*12·4*	*12·0*
% Stillborn on those born alive ...	*3·0*	*3·0*	*2·7*	*2·6*	*2·3*
% Miscarriages and Stillborn on those born alive	*15·1*	*14·2*	*15·3*	*15·0*	*14·8*
Illegitimate Births.					
Miscarriages	477	544	448	506	1975
Stillborn	201	190	155	178	724
Born alive	4636	4569	4138	4358	17701
% Miscarriages on those born alive	*10·3*	*11·9*	*10·8*	*11·6*	*11·2*
% Stillborn on those born alive ...	*4·3*	*4·2*	*3·7*	*4·1*	*4·1*
% Miscarriages and Stillborn on those born alive	*14·6*	*16·1*	*14·5*	*15·7*	*15·3*
Legitimate and Illegitimate Births.					
Miscarriages	1888	1962	1928	1924	7702
Stillborn	549	567	477	482	2075
Born alive	16339	17282	15846	15839	65306
% Miscarriages on those born alive	*11·56*	*11·35*	*12·17*	*12·15*	*11·79*
% Stillborn on those born alive ...	*3·36*	*3·28*	*3·01*	*3·04*	*3·18*
% Miscarriages and Stillborn on those born alive	*14·92*	*14·63*	*15·18*	*15·19*	*14·97*

* Data worked out by author from official statistics.

The data, which I have been able to work out (see Table IX.) on the frequency of multiple births according to seasons, do not shew any such regularity; in two countries (Servia, Luxemburg) the maximum frequency

is found amongst the births of December to February; in three (Bologna, Florence and Spain) among those of June to August; in one (Berlin) among those of March to May; in one (Amsterdam) among those of September to November.

9. Nor does the season of conception seem to have any influence on the vitality of the embryo. For some countries the vitality of the embryos can be followed even from the early stages of their development after conception. In fact the yearly returns from Vienna and Budapest shew the month of delivery and the duration in months of gestation for miscarriages, so that it is possible to work back to a rough approximation of the month of conception. I say a rough approximation, because, on the one hand, the determination of the period of gestation in abortions cannot be made with certainty, and on the other, even when we know the month of delivery and the number of the month of gestation, it is impossible to work back to a determination of the month of conception with any precision (Note 9). In order that the calculation may not be too uncertain, we must group the figures according to seasons. Tables X. and XI. shew the results obtained. These, indeed, do not show any great regularity. Considering the legitimate births of Budapest, the minimum frequency of miscarriages is found amongst those conceived in summer, and considering

TABLE XI.

Abortions and Still-born according to probable season of conception, Vienna, 1902-903.

State of offspring	Probable season of conception				Total
	Spring	Summer	Autumn	Winter	
1	2	3	4	5	6
Miscarriages	1187	1312	1259	1272	5030
Stillborn †	441	504	480	412	1837
Born alive	25·363	27·257	25·653	25·162	103·435
% Miscarriages on those born alive	*4·68*	*4·81*	*4·91*	*5·06*	*4·86*
% Stillborn on those born alive ...	*1·74*	*1·85*	*1·87*	*1·64*	*1·78*
% Miscarriages and Stillborn on those born alive	*6·42*	*6·66*	*6·78*	*6·70*	*6·64*

* Data worked out by Author, from Official Statistics.

† Embryos of a period of gestations of 8 months or more.

the illegitimate births of Budapest, and all the births of Vienna, it is found amongst those conceived in spring; the maximum frequency for Vienna is found in winter; in Budapest for the legitimate it is in autumn, and for the illegitimate in summer.

Tables X. and XI. give also data on the frequency of the still-born according to seasons; Table XII. gives similar data for a greater number of countries and Table XIII. gives more detailed data according to months. We generally find one high maximum of the still-born among the winter

TABLE XII. *Stillborn per* 100 *births according to Season* (1)

Month of Birth in Northern Hemisphere.	Norway. Kingdom(2) 1866-85 Legitimate births	Norway. Kingdom(2) 1866-85 Illegitimate births	Norway. Tromsoe & Finmarken (3) 1896-900 Legitimate births	Norway. Tromsoe & Finmarken (3) 1896-900 Illegitimate births	Sweden. Kingdom(3) 1898-902 Legitimate births	Sweden. Kingdom(3) 1898-902 Illegitimate births	Sweden. Noorbotten (3) 1901-905	Denmark(3) 1896-900 Denmark properly called	Denmark(3) 1896-900 Faroe Islands	Amsterdam (2) 1850-904	Prussia (2) 1872-81 Legitimate births	Prussia (2) 1872-81 Illegitimate births	Saxony (2) 1891-900	Austria (2) 1898-900	Kingdom of Hungary (3) 1900-902 Legitimate births	Kingdom of Hungary (3) 1900-902 Illegitimate births	Budapest (2) 1882-90	Luxemburg (2) 1901-903	Italy (3) Kingdom 1907-909	Italy (3) Piedmont 1900-909	Italy (3) Sicily 1900-909	Spain (3) 1878-901	Mexico (4) The whole confederation 1895-901 (3)	Mexico (4) States of Yucatan, Campeche, Chiapas & Tobasco 1895-900 (3)	Bengal 1900-905 (3)	Mauritius (3) 1903-905 White population	Mauritius (3) 1903-905 Indian population	Month of Birth in Southern Hemisphere.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29
Dec. to February	3·41	5·50	3·27	5·63	2·58	3·64	2·67	2·69	3·46	5·42	4·2	5·7	3·7	2·9	2·24	3·12	5·5	3·05	4·97	4·67	4·39	1·78	2·00	2·10	2·56	7·58	11·22	July to September
March to May	3·40	5·43	2·32	4·76	2·54	3·52	2·66	2·55	2·13	5·33	4·0	5·5	3·6	2·8	2·03	3·03	4·9	3·29	4·49	4·25	4·38	1·69	1·97	2·09	2·21	5·86	7·50	October to December
June to August	3·19	4·75	2·57	4·26	2·35	3·40	2·26	2·44	3·12	5·26	3·8	5·2	3·3	2·7	1·94	2·78	4·7	2·68	4·28	3·91	4·66	1·76	1·99	2·10	2·53	6·52	7·44	January to March
Sept. to November	3·10	4·87	3·22	4·56	2·38	3·64	2·59	2·29	3·96	5·45	3·8	5·3	3·2	2·8	1·90	2·77	4·9	3·08	4·30	3·96	4·68	1·75	1·96	2·11	2·82	7·51	9·90	April to June

(1) Data worked out by the Author, except in the case of Norway, for which they are taken from *Folkmaengdens Bevaegelse*, 1866-1885. Kristiania. Aschehoug & Co., 1890, Page 184. The percentages for the four seasons given for Prussia, Saxony, Austria and Budapest are the mean of the monthly percentages given by PRINZING, *Handbuch der medizinischen Statistik.*—Page 57 and shown in Table XIII. The data for the other percentages were taken by the Author from the Official Statistics, except those for the Stillborn according to months in Amsterdam, which were sent in MS. to the Author by the Amsterdam Office of Statistics.

(2) % of Stillborn on total born alive and dead.

(3) % of Stillborn on total born alive.

(4) Sillborn at the later months of gestation.

TABLE XIII. *Still-born per* 100 *births according to Months.* (1)

Month of birth.	Norway (2) 1866-85		Sweden (3) 1898-902		Denmark (3) 1896-900	Amsterdam (2) 1850-904	Prussia (2) 1872-81		Saxony (2) 1891-900	Austria (2) 1898-900	Kingdom of Hungary (3) 1900-902		Budapest (2) 1882-90	Italy (3)			Spain (3) 1878-901	Mexico (4)		Bengal (3) 1900-905	Month of birth.
	Legitimate births	Illegitimate births	Legitimate births	Illegitimate births			Legitimate births	Illegitimate births			Legitimate births	Illegitimate births		Kingdom 1907-909	Piedmont 1900-909	Sicily 1900-909		The whole Confederation (3) 1895-901	States of Yucatan, Campeche, Chiapese and Tabasco (3) 1895-900		
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
January	3·46	5·74	2·73	3·71	2·90	5·55	4·3	5·8	3·7	2·9	2·26	3·14	5·4	4·82(5)	4·69	3·90(5)	1·77	1·89	1·90	2·47	January
February	3·47	5·68	2·51	3·93	2·54	5·28	4·2	5·5	3·7	2·8	2·18	3·08	5·2	4·84	4·68	4·07	1·65	2·03	2·11	2·30	February
March	3·47	5·71	2·61	3·43	2·63	5·30	4·2	5·6	3·8	2·9	2·08	2·97	4·9	4·66	4·54	4·23	1·67	1·93	2·13	2·19	March
April	3·40	5·55	2·58	3·57	2·45	5·32	4·0	5·5	3·6	2·8	2·00	3·20	4·7	4·43	4·16	4·30	1·70	2·02	2·08	2·22	April
May	3·34	5·07	2·41	3·58	2·57	5·37	3·9	5·4	3·4	2·8	2·01	2·92	5·2	4·36	4·04	4 64	1·68	1·97	2·06	2·24	May
June	3·24	4·36	2·17	3·22	2·42	5·39	3·9	5·2	3·4	2·8	1·95	2·79	5·2	4·42	4·19	4·61	1·73	1·95	2.20	2·37	June
July	3·13	4·95	2·32	3·40	2·51	5·17	3·7	5·3	3·2	2·6	2·01	2·81	4·5	4·28	3·81	4·66	1·71	2·00	1·97	2·52	July
August	3·20	5·01	2·26	3·62	2·38	5·23	3·7	5·2	3·2	2·7	1·87	2·76	4·4	4·14	3.76	4·72	1·75	2·03	2·14	2·67	August
September	3·94	4·28	2·21	3·53	2·23	5·17	3·5	4·9	3·0	2·7	1·83	2·53	4·8	3·96	3·67	4·63	1·68	1·99	2·06	2.65	September
October	3·16	4·90	2·40	3·35	2·21	5·53	3·8	5·6	3·3	2·8	1 84	2·79	5·1	4·30	4·00	4·75	1·71	1·85	2·08	2 81	October
November	3·25	5·55	2·55	4·10	2·43	5·66	4·0	5·5	3·4	2·9	2·03	3·03	4 9	4·63	4·23	4·65	1·85	2·05	2·17	2·29	November
December	3·30	5·10	2·50	3·30	2·61	5·41	4·2	5·7	3·6	3·0	2·29	3·015	5·8	5·31(5)	4·63	5·52(5)	1·95	2·08	2·29	2·85	December

(1) Data worked out by the Author, except for Norway, for which they are taken from *Folkemaegdens Bevaegelse 1866-1885*.—Kristiania, Aschehoug & Co., 1890, Page 184, and for Prussia, Saxony, Austria and Budapest, for which they are taken from PRINZING, *Handbuch der medizinischen Statistik*. P. 57. The original data were taken by the Author from official statistics except those for the still-born according to months in Amsterdam, which were sent in MS. to the Author from the office of municipal statistics. (2) % of still-born on total born alive and dead. (3) % of still-born on those born alive. (4) Still-born at the later months of gestation. (5) Delay of notification of births occurring at the end of the year (Cfr. Note 5, Table II.), referring to those born alive only has considerable influence on the % of still-born in January and December, raising the % in January and lowering it in December.

births, sometimes equalled in the autumn period, and another maximum less marked in the hottest months of summer. The still-born then are seen to be most numerous precisely in connection with spring conceptions, in complete contradiction to what one would expect were spring regarded as the original season of reproduction for the human species.

TABLE XIV.

Mortality during first month of life according to month of birth (1).

On 100 *born alive died in the first month.*

Month.	Upper Italy.	Central Italy.	Lower Italy.	Italy.	Trieste.	Rome.	Florence.	Cagliari	Sassonia	Budapest.
	1872-80	1872-80	1872-80	1872-80	1909-11	1887-1911	1904-05 1907-09	1905-11	1880-84	1896-1900
1	2	3	4	5	6	7	8	9	10	11
January	17·4	15·9	9·3	13·2	8·7	6·6	11·4	7·5	5·7	5·0
February	16·3	14·2	8·3	12·1	8·6	6·9	11·2	9·4	5·3	4·3
March	15·7	13·8	8·4	12·0	8·4	5·4	8·9	6·2	6·0	5·6
April	10·4	9·2	6·5	8·5	7·7	4·7	6·6	6·0	6·3	4·6
May	9·0	7·5	5·7	7·4	5·3	4·1	7·3	3·8	7·2	4·9
June	7·6	5·8	5·3	6·5	6·1	4·7	6·9	4·3	7·3	4·3
July	8·1	6·8	6·5	7·2	4·6	4·9	9·0	6·1(2)	9·6	5·6
August	7·5	6·1	6·4	6·8	6·0	4·6	9·4	5·0(2)	9·2	6·4
September	6·9	6·0	5·8	6·4	6·1	4·1	5·8	4·9	8·4	4·8
October	8·2	7·5	6·4	7·3	5·4	4·5	5·5	6·0	7·1	4·8
November	11·7	10·6	7·2	9·4	6·9	5·3	7·1	5·0	5·7	4·3
December	14·8	13·6	8·3	11·5	8·1	6·3	8·5	8·3	5·7	4·8

(1) Data worked out by the writer for Trieste, Rome, Florence, and Cagliari; taken from PRINZING, op. cit. for other countries. The original data for Trieste and Cagliari are taken from the monthly *Bollettini demografici* of those cities; for Florence from the *Annuario Statistico del comune di Firenze;* those for Rome were given to the writer in manuscript by the Director of the Office of Municipal Statistics. To obtain the mortality during the first month of life, PRINZING has divided those dying in a given month by half the number of births in that month and the preceding month; the writer has, instead, divided the number of deaths by the number of births in the same month. This latter method seemed preferable both on account of its greater simplicity, and also because the number of those dying at an age from 0 to 30 days in a given month, is in a great part derived from the births in the same month, the diminution in mortality with the increase in age in the first stages of development being rapid.

(2) These two percentages refer to the six years, 1905-7, 1909-11.

We might allow this, were it not that it is most probable that the most decisive factor here is not the season of conception, but the season of delivery, and the variation in the number of still-born in the different months is due to the more or less favourable external conditions rather than to a greater or less degree of vitality of the organisms. A proof of this may be found in the fact that in hot countries (such as Sicily, Spain, Mexico, Bengal) the summer maximum for the still-born nearly reaches, and sometimes exceeds, the winter maximum, while it disappears altogether in colder countries.

10. The month of birth also has a decisive influence on the mortality during the first days of life; but, what *a priori* seems strange, it has a contrary influence as regards the number of the still-born. I say a contrary influence,

because while the number of still-born is a maximum in winter in cold countries, and is nearly as great or even greater in summer in hot countries, mortality during the first day of life appears to be greatest in the cold months of some countries relatively hot, and in the hot months of some countries

TABLE XV.

Mortality during first month of life according to month of birth (1).

Month.	Making the daily mean for the whole year = 100, the daily mean for each month is =								
	Denmark (1901-905).			Saxony (1901-905)					
		Died during			Day of Death				
	Births	First day of Life	Rest of the Month	Births	1	2-7	8-14	15-21	22-30
1	2	3	4	5	6	7	8	9	10
January ...	98	93	96	99	93	99	85	72	83
February...	103	102	*104*	103	95	101	85	78	88
March ...	107	104	91	100	97	98	78	73	63
April ...	107	102	106	101	*102*	*102*	83	80	80
May ...	103	*115*	99	101	*118*	99	85	86	80
June ...	100	*107*	100	103	*115*	*108*	*104*	*107*	*104*
July ...	97	*106*	99	103	*115*	*113*	*127*	*132*	*129*
August ...	100	98	*117*	100	*108*	*105*	*152*	*171*	*179*
September	102	90	*117*	103	95	99	*145*	*154*	*141*
October ...	95	96	93	96	88	89	*104*	*103*	*105*
November	94	93	88	95	90	88	81	75	79
December	94	94	90	96	92	*99*	71	69	69

(1) Data taken from Rœsle, *Die Sterblichkeit im ersten Lebensmonat*, Leipzig, Vogel, 1910, pp. 200 and 201.

relatively cold. This phenomenon is clearly shewn by Tables XIV. and XV. In Denmark and in Saxony the mortality during the first month of life appears to be greatest in summer, or at the beginning of autumn; at Budapest, besides the summer maximum, there is another not quite so marked in winter; in Italy, the winter months are by far the most unfavourable to the newly born, while one can only just notice the slight increase in mortality during July and August. Such differences are probably due to several causes: on the one hand, in colder countries the children are better sheltered from the rigours of the winter than in hotter countries; on the other hand, a different proportion in the number of the artificially fed may have a decisive influence (Note 10), as this practice increases infant mortality especially in hot seasons. (See Table XVI.) (Note 11).

It is not hard to find a reason for the monthly variation in the numbers of still-born throughout the year; the number of the still-born depends in fact on the influence that the climate exercises, not upon the organisation of the

child, but upon that of the mother, and adults cannot be protected from the inclemency of the weather so easily as the newborn: therefore, for adults the

TABLE XVI.

Mortality in the first year of life (1).

Daily mean of deaths for each month making daily mean for the whole year = 1,000.

Month of Death	Paris 1905-909 The children who died were		Berlin 1892-96 The children who died were		
	Naturally Fed	Artificially Fed	Naturally Fed	Fed on Animal Milk	Fed on Substitutes for Milk
1	2	3	4	5	6
January	*1207*	927	*1170*	688	480
February	*1255*	823	*1046*	759	569
March	*1114*	888	998	777	530
April	*1130*	877	853	722	432
May	*1011*	860	865	877	505
June	953	800	884	*1074*	980
July	824	*1148*	*1044*	*1872*	*2082*
August	783	*1838*	*1221*	*2093*	*2821*
September	884	*1245*	932	*1176*	*1680*
October	820	941	942	718	690
November	934	840	979	574	637
December	*1086*	810	*1066*	671	591

(1) Data worked out by the author. The original data for Paris were taken from *Annuaire Statistique de la ville de Paris;* those for Berlin were taken from Westergaard, *Die Lehre von der Mortalität und Morbidität*. Jena, Fischer, 1901. Page 305.

mortality is greatest in summer for hot countries, and in winter for cold ones, and the number of still-born is affected in the same way month by month.

We are able to say in conclusion that the variations shewn in the numbers both of still-born and of children expiring in the first month of life according to their month of birth, if they do not exclude the idea that the month of conception may exercise some influence on the vitality of the child, allow us to assert that such influence, if it exists, is totally obscured by the influence of the season of delivery.

11. An interesting problem still remains to be solved: whether the month of birth, besides having a direct influence on mortality during the first days of life, has also an indirect influence on the resisting powers of the organism in after life.

Is mortality in after life independent of the season of birth? And, if so, is there in after life any difference in resisting powers according to the season of conception?

Or does mortality during the first months of life possess a selective character, so that the stronger organisms, who have been able to survive a more unfavourable environment, will shew a smaller mortality, which will slowly establish an equilibrium in the number of survivors?

Or does the unfavourable or favourable influence of the season of birth, besides causing immediately a greater or less mortality, make itself felt by rendering those organisms which have survived weaker or stronger as the case may be, so that even in after life those born in unfavourable seasons will shew a greater mortality?

This, as everyone will understand, is a problem that touches not only Eugenics, but also upon actuarial calculations. We must remember, however, that just as in different countries the direct influence exercised by the season of birth on mortality in the first months of life may differ, so its influence exercised upon mortality in after life may differ.

I have caused special investigations to be made relating to the age of death according to the month of birth, in the municipal office of statistics at Rome and Cagliari.

TABLE XVII.

Mortality according to the month of birth (Rome 1908-1910*).*
On every 10,000 *dead the number, according to month of birth, who died at an age exceeding X.*

Month of Birth	Age (*x*)				
	1 year	5 years	20 years	40 years	60 years
1	2	3	4	5	6
January...	7534	*5314*	*4467*	*3543*	*1940*
February	7628	5633	4958	3829	2102
March	7823	*5954*	*5168*	*4203*	*2548*
April	*7854*	5790	4952	4038	2235
May	7829	5847	5150	4028	2216
June	*7280*	*5523*	4847	3856	2280
July	7436	5528	*4723*	*3725*	*2101*
August	7564	5628	4923	3750	2167
September	*7857*	*5766*	*4957*	*3895*	2177
October	7621	5748	4935	3869	2201
November	7530	5601	4795	3699	2081
December	*7433*	5511	4790	3708	2022

In Rome the data were worked out from the schedules of deaths in the City during the three years, 1908 to 1910. The work of selection was done by the kind permission of Comm. E. Pelissier, director of the office, under the careful direction of Avv. A. Mancini, superintendent of the statistical works for census of the city. Very often the month of birth is not in the schedules either because they refer to people who were only temporarily resident at Rome and of whom there was no trace either in the registers of "Stato civile" or in the census records, or through lacunae in the records themselves, or through incomplete compilation of the schedules. It is therefore impossible to map out a really accurate table of survival according to month of birth; but we can determine how many of the dead whose month of birth is known were of an age exceeding x. The results of this calculation are shown in Table XVII. We must remember that there is no reason to

suppose that the lacunae found in the mortality schedules have any relation to the month of birth, and therefore we should expect that, if a sufficiently large number of observations had been taken, the error would probably be the same for those born in different months. If the age-groups under which the dead are classified be arranged, as we took care to do, in such a way that the number of observations included in each of them is not too small, we may rightly assume that the survivals at an age x of those born in a month a, will be greater than in the case of those born in a month b, so long as the dead who are known to have been born in the month a shew a percentage above an age x greater than those known to have been born in a month b.

Table XVII. shews that survival depends to a considerable extent upon the month of birth; it shews two maxima referring to the mild months of March to April, and September to October, and two minima referring to the months having extremes of temperature, December-January and June-July. The regularity which these figures present is too marked to be considered accidental.

In Table XVIII. these data have been grouped according to seasons of birth, which has enabled us to deal with smaller limits of age without reducing too much the number of cases included in each. Again the results of this table shew a really striking regularity. At all ages, starting from three months, survival is a minimum for those born in winter; and at all ages, starting from nine months, it is a maximum for those born in spring.

TABLE XVIII.

Mortality according to season of birth (*Rome* 1908-1910).

In every 10,000 *dead the number, according to month of birth, who died at an age exceeding X.*

Age (X)	Season of Birth.			
	Winter	Spring	Summer	Autumn
1 month	8624	8914	8676	9012
3 months	8244	8614	8352	8640
6 ,, ...	7973	8370	8115	8332
9 ,, ...	7742	8184	7842	8011
12 ,, ...	7532	7835	7431	7669
2 years	6328	6620	6252	6470
3 ,, ...	5859	6228	5842	6039
5 ,, ...	5481	5868	5561	5705
9 ,, ...	5229	5541	5352	5372
12 ,, ...	5106	5418	5255	5310
15 ,, ...	4829	5304	5123	5201
20 ,, ...	4730	5093	4831	4895
25 ,, ...	4446	4840	4565	4605
30 ,, ...	4213	4608	4278	4329
40 ,, ...	3689	4095	3775	3820
50 ,, ...	2994	3383	3102	3122
60 ,, ...	2020	2343	2180	2152

With increase of age the differences do not diminish at all, but become greater, leading us to think that not only early but also later in life mortality

TABLE XIX.

Mortality according to season of birth (*Rome*, 1908-1910).

Probable number of deaths at an age X., according to season of birth, having made the probable number of deaths, considering the total number of offspring, = 1,000.

Season of birth	Age X				
	0-1 year	1-5 years	5-20 years	20-40 years	40-60 years
1	2	3	4	5	6
Winter	1036	1054	1011	1033	1040
Spring	909	972	975	919	983
Summer	1079	975	969	1025	971
Autumn	979	993	1047	1030	1004

is above the mean for those born in winter, and below it for those born in spring. Those born in autumn shew at all ages up to fifty a greater number of survivals than those born in summer; but these differences, very marked to begin with, gradually decrease, until at 60 years of age the number of survivals is greater for those born in summer, leading us to believe that, contrary to what happens in the earlier period of life, mortality in later years is greater for those born in autumn than for those born in summer.

These inferences are confirmed by the data of Table XIX. which shews the relative degree of mortality at different ages according to season of birth (Note 12). In all the age groups, mortality for those born in winter is found to be above, and for those born in spring below, the average. For those born in summer the mortality appears very high in the first group from 0 to one year, and usually low in later years; for those born in autumn, on the contrary, the mortality is below the mean for the first two age groups, and above it in later years.

Summer and winter appear to have an entirely different kind of deleterious influence on the organisation of the child: the unfavourable influence of summer seems, as a rule, to possess a selective character, eliminating the weakest organisms and allowing organisms to survive which will afterwards shew a mortality below the mean; the bad influence of winter, however, appears to have a permanent character, for not only does it kill many children, but it weakens the constitution of the survivors. This difference is explained by a consideration of the causes of the illness and death of children during summer and winter. In summer the danger is caused essentially by maladies of the

digestive system, which, though dangerous, usually leave no permanent weakness. The danger in winter is due to the graver nature of other maladies, especially those closely connected with the incomplete development of the child (Note 13). It is therefore natural that among those born in winter, at least in countries where they are not properly sheltered from the inclemency of the season, not only should there be a high mortality, but that recovery in the case of those who manage to survive should not be so complete as it would have been had they been born in other seasons.

The seasons favourable to the life of the newly-born during their earlier stages shew analogous differences to those found for the unfavourable seasons. The favourable influence of spring seems permanent, that of autumn *counter-selective.* Does the influence of the season of conception come into play here? It seems to me rather rash to assert that it does. Or does the influence of the different seasons in which natural feeding usually ceases for those born in spring, as compared with those born in autumn, come into play?

It is known that the change in diet which takes place when natural feeding ceases is a matter of great importance as regards the health of the child. If, then, those born in autumn should cease to be naturally fed in summer (the dangerous season for maladies of the digestive system), usually or more frequently than those born in spring, we might find in this a state of affairs dangerous to their health; but I am not in a position to decide whether in Rome this really is so, and to what extent it may affect the vitality of the organism in later life.

The data for Cagliari, both as regards quantity and quality, are much less important than those for Rome. They were taken from the registers of births extracted by the employees of the "Movimento dello Stato civile" under the direction of Cav. Medda Sechi, secretary to the "Stato civile."

In the register of births for the town of Cagliari, the date of death is entered opposite that of the birth, no matter whether the person concerned died in the town or outside. In many cases, however, this circumstance had to be disregarded. The number of dead of different ages resulting from the figures is in fact incompatible with that shown by the mortality statistics.

However, since the lacunae are certainly independent of the month of birth, it will not be uninteresting to shew the result obtained.

Those born during the years 1902-11, who died before March 7th, 1912, were taken into consideration. The dead were divided into eight age groups, according to whether they died before the 6th of the third month after birth, during the year following this date, or during the 2nd, 3rd, 4th, 5th, 6th or 7th years after. For instance those born in December, 1902, dead before 7th March, 1912, were classified according to whether they died before the 6th of March, 1903, or between the 7th of March, 1903, and the 6th of March, 1904, or between the 7th March, 1904, and the 6th of March, 1905, or between 7th March, 1905, and the 6th of March, 1906, ... or

from 7th of March 1911, to 6th of March, 1912. Obviously the more recent the year of birth the smaller is the number of age classes for which data can be

TABLE XX.

Deaths according to seasons of birth.

Births in Cagliari during the years 1902—911.

Annual average of births and deaths in each season.

	Years	Season of birth				Total number of observations
		Winter	Spring	Summer	Autumn	
Born (living and dead)	1905-911	421	381	368	396	10,963
Born in month x and dead before 6th day of month x + 3 ...	1902-911	24·5	14·2	15·4	18·3	724
Dead 1 year after	1902-910	37·2	35·2	34·2	36·0	1284
,, 2 years ,, ...	1902-909	22·1	17·0	15·9	18·9	591
,, 3 ,, ,, ...	1902-908	7·0	8·1	6·1	7·0	198
,, 4 ,, ,, ...	1902-907	4·2	5·0	2·3	3·8	94
,, 5 ,, ,, ...	1902-906	1·8	2·8	1·8	2·8	46
,, 6 ,, ,, ...	1902-905	2·0	2·7	2·2	2·2	37
,, 7 ,, ,, ...	1902-904	1·3	2·3	2·7	1·3	23

TABLE XXI.

Mortality according to season of birth.

Births in Cagliari during the years 1902—911.

Daily mean of births or deaths, according to the season of birth, having made the daily mean of births or deaths for the year = 100.

	Season of birth			
	Winter	Spring	Summer	Autumn
1 Born	109	97	93	101
2 Dead before 6th day of 3rd month after birth	136	78	84	101
3 Dead during 1st year following	106	98	95	101
4 Dead during 2nd year following	121	91	85	103
5 Dead during 3rd to 7th year following ...	95	120	86	99
6 Dead between 1st and 7th years following ...	107	102	91	101
7 Dead in all 4 periods	116	95	89	101

obtained. The births of 1902 will furnish data for the eight classes, those of 1911 for one class only.

Table XX. gives the yearly mean of births (1905-11) and deaths for different age classes according to season of birth; and Table XXI. gives the daily mean of births and deaths for each age class, according to the season of births, having made the daily mean for the whole year = 100. In this table it seemed advisable, considering the scarcity of data, to combine the last five age classes into one.

From Table XXI. we see how amongst those born in winter the number of deaths before the 6th day of the 3rd month after birth (line 2) is more than proportional to the number of births (line 1); in the following years (lines 3-5) the number of deaths is sometimes more and sometimes less than proportional to the number of births; but on the whole (line 6) the results turn out to be less than proportional.

The contrary happens to those born in spring. For those born in summer the number of deaths is less than proportional to the number of births; for those born in autumn it is practically proportional in all seasons.

If we consider the number of deaths in the four periods taken together (line 7), they turn out to be proportional to the number of births for those born in autumn, more than proportional for those born in winter, and less than proportional for those born in spring and summer.

Generally speaking, considering those born in all seasons, there seems to be some sort of a balance between the mortality during the first three months of life and that during the seven following years. But it is not sufficient at any rate to make the survival at the end of this period equal for those born in the different seasons.

These results for Cagliari differ in several points from those for Rome. But we should not expect, as I said before, that the influence of the season of birth on mortality in after life should manifest itself in the same way and to the same extent in all countries. The violent winds which disturb the spring, and the breezes which greatly diminish the summer heat, may well explain why summer is the most favourable season of the year for Cagliari. But in any case we consider that the limitations on our observations, and the numerous lacunae in our data, warn us to take the results for Cagliari with considerable reserve.

12. The question of the influence of month of birth could be solved, not only in regard to survival, but also in regard to physical, intellectual and moral characters, by examining the month in which those people are born who depart far from the normal, either above or below (such as centenarians, scientists, artists, politicians, athletes, lunatics, criminals, etc.). The census list, conveniently verified by the data of the "Stato civile," the biographies of illustrious men, the registers of lunatic asylums and gaols, and the lists of Members of Parliament, could give us a large harvest of data for such research.

TABLE XXII.

Illustrious men and Italian Senators according to season of birth.

Nationality	Season of Birth: Winter	Spring	Summer	Autumn	Total.
Contemporary writers (De Gubernatis).					
1 Italy	*268*	240	*203*	243	954
2 France & Belgium	*433*	412	*354*	394	1593
3 Spain & Portugal ...	18	*24*	*14*	*24*	80
4 Austria-Hungary & Switzerland ...	*181*	144	*141*	144	610
5 Germany	*298*	296	262	*221*	1077
6 England & United States	*105*	77	84	97	363
7 Denmark, Holland, Sweden & Norway	*38*	30	29	38	135
8 Russia	*41*	23	22	25	111
Total	*1382*	1246	*1109*	1186	4923
Daily mean, after making the daily mean for the year = 1,000	*1136*	*1004*	*894*	*967*	*1000*
Illustrious men (Mantegazza).					
9 Different Nationalities	*1000*	747	*680*	828	3255
Italian Senators (1848-1912).					
10 Italy	377	380	*373*	*404*	1534 (1)
Total of observations.					
Total	2759	2373	*2162*	2418	9712
Daily mean, after making the daily mean for the whole year = 1,000	*1150*	*970*	*884*	*999*	*1000*

(1) Data missing for 37 Senators.

The results I can bring forward are intended rather to encourage others to engage in the pursuit of these enquiries with a larger and more varied collection of material than to explain very much by themselves (see Table XXII.).

Some of the results are derived from a careful search of the "Dictionnaire international des écrivains du jour," by de Gubernatis (Florence, Niccolai, 1891), kindly made by Dr. E. Porru. The data deal with about 5,000 writers, divided into eight groups according to the state in which they were born.

Another part of the result was obtained from an examination of the biographical records of Italian Senators, specially carried out at the secretary's office of the Senate by Dr. Luigi Ferrari, assistant librarian to the Senate. These records concern all persons raised to Senatorial rank from 1848 to 1912, whether they have accepted or whether they have refused the honour or their decree was suspended. We do not know the month of birth of 37 Senators.

Other data have been published by Mantegazza (Note 14); they referred to material rather heterogeneous but abundant enough (3,255 observations), referring to persons who for any reason could be considered illustrious.

We have, therefore, ten sets of data altogether. In eight of these the largest number of births occurred in winter, and in eight, too, the smallest number of births occurred in summer; where the maximum does not fall in winter, it falls in spring or autumn, never in summer; and where the minimum does not fall in summer, it falls in autumn or spring, never in winter. We may therefore conclude that the births of eminent people occur with the greatest frequency in winter, and least frequency in summer. If we put together the ten sets of data, a process entailing some repetition, we find that the births in winter are to those in summer as 1150 to 884.

The difference certainly depends mainly on the relative frequency of births in the different seasons. In Europe, to which most of our data refer, a maximum occurs in winter and a minimum in summer. But they seem higher than for births in general.

This, perhaps, depends upon the limited number of observations. Let us note, however, that the advantage of winter and the disadvantage of summer is uncertain for the Senatorial class, marked for the writers of the present day, and exceedingly marked in the case of highly illustrious persons. Does not this lead us to suspect that there is a relation between such a gradation and the gradations of rank of the three groups? Illustrious men are certainly those who emerge mainly owing to their intellectual powers; after them come the present-day writers, not all of whom will become famous; last in order I should put the Italian Senators, for though compared to the rest of humanity they always represent the results of selection, they are none the less very often chosen, as everyone knows, more for their administrative or political merits, or for financial reasons, than for high intellectual powers.

TABLE XXIII.

Influence of the Season of Birth on Physical Development at 11 years of age. (Middlesbrough.)

Month of Birth	Number of observations	Mean stature in inches	Mean weight in pounds
January-March	83	51·6	61·45
April-June	82	50·62	60·84
July-September	92	49·95	57·89
October-December	79	50·33	57·88

TABLE XXIV.

Influence of the Season of Birth on Survival at end of Sixth and Eleventh Year of Life (Middlesbrough).

Month of Birth	Born		Survivors at end of 6th year		Survivors at end of 11th year	
	Absolute number	per 1000	Absolute number	per 1000	Absolute number	per 1000
January to June	3600	*519*	2320	*559*	3040	*597*
July to December ...	3340	*481*	1860	*441*	2060	*403*

These results must be taken with great reserve, especially as they could not be foreseen, considering the opposite conclusion arrived at on our other lines of research as to the influence of the season of conception on the character of offspring.

If, however, more extensive investigations should confirm these facts, it would be quite right to say that in the season when conceptions are most frequent in Europe the conception of persons intellectually eminent is most likely and that the contrary happens for the season in which conceptions are less frequent.

Ewart, as quoted above, considered that he had discovered that spring, and in a less degree summer, exercised a favourable influence on the physical characters of those conceived. I here show his tables (Tables XXIII. and XXIV.)

The number of observations, as far as weight and stature are concerned, is certainly too small, and the classification of births as regards survival of offspring appears to be arbitrary. Let us add that it is not at all clear how the data in Table XXIV. are obtained. The absolute number given for survivors at 11 years of age is greater than that given for the survivors at six years of age, and this suggests that the people considered at birth are not those considered at six or 11 years of age. In this case a very much larger number of observations would be necessary to justify us in taking any notice of these results.

13. Let us briefly recapitulate the conclusions arrived at in this chapter. The idea that in spring there is a natural maximum of conceptions, owing to man's greater fertility at that time persisting as an atavistic survival of an original season of reproduction, though it seemed likely to explain the periodicity in the births throughout the months in Europe, finds no confirmation in the data which have been gathered from other countries.

The frequency in multiple deliveries, in miscarriages, in still-born, according to months, and mortality according to month of birth, makes it impossible to discover any influence caused by month of conception on the characteristics

of offspring. Some researches conducted by Ewart on the stature of children according to month of birth, and other researches on the month of birth of illustrious men, seem to show indeed the favourable influence of spring on the physical development and on the intellectual quality of those conceived. But Ewart's researches are founded on too small a number of observations, and the influence of the month of birth on the frequency of the appearance of illustrious men is not sufficiently defined to be admitted without other investigations.

It has, on the contrary, been ascertained that births occurring in those seasons of the year when extremes of climatic conditions are experienced are injuriously affected by that fact. Those conceived in spring, being born in winter, find themselves at the commencement of their lives subjected to an unfavourable environment which, at least so far as Rome is concerned, not only increases immediate mortality, but also seems to diminish vitality in after life. There is, therefore, no reason to think that the fact that the human species reproduces itself at all seasons of the year should have any directly deleterious consequences on the characteristics of offspring : it is, on the contrary, probable that if the human species reproduced itself only in spring, as is the case with many species of the higher animals, the offspring, being born in winter, would find themselves, at least in those countries where inadequate measures are taken to resist the rigours of the climate, in worse conditions than they are now.

CHAPTER III.

On the Interval between Successive Delivery.

14. If the possibility of generation at any season of the year cannot as has been shown, have any directly deleterious influence on the vitality of human offspring, it can none the less have indirect deleterious consequences, in so far as it allows pregnancies to succeed one another at too short intervals.

Another circumstance helps in many civilized races towards such a result; this is the habit of cutting short natural feeding before the natural period, a practice causing an earlier reappearance of the menstrual discharges, and therefore the possibility of a new conception (Note 15).

If the human species, like the species of higher animals, were mono-menstrual, and if we allowed natural feeding for as long as nature seemed to require it, all the births occurring at less than two years after the preceding one would be excluded. Pregnancy, in fact, lasts, as is commonly known, nine months, and the reappearance of the monthly discharges when natural feeding is not interrupted seems to occur regularly at a period of more than three months after delivery (Note 16).

In white races it seems, from the data to hand up to the present, that more than half the number of second births occur less than two years after

TABLE XXV.

Number of Births according to Interval after Preceding Birth(1).

Interval after preceding birth.	Chemnitz (1904-905)		England Upper Classes (1874) (2)		Employed at the central administrations of the ministries France (1905)		Roadmen in City of Paris (1905)		Paris workmen (1905)		Total of the French observations	
	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals	Number of births	Percentage and totals
1	2	3	4	5	6	7	8	9	10	11	12	13
1 year or less	514	*4·6*	1949	*9·1*	12	*1·1*	212	*1·9*	145	*2·2*	369	*2·0*
1-2 years	6118	*53·2*	12415	*58·3*	213	*19·5*	1945	*17·5*	1177	*18·1*	3335	*17·9*
Less than 2 years	6632	*57·7*	14364	*67·4*	225	20·6	2157	*19·5*	1322	*20·4*	3704	*19·9*
TOTAL	11498	*100·0*	21302	*100·0*	1094	*100·0*	11086	*100·0*	6477	*100·0*	18657	*100·0*

(1) The Data for Chemnitz were taken by the Author from *Monatliche Mitteilungen* of this town; those for England are taken from WESTERGAARD Page 371, and were taken by this Author from CH. ANSELL *Statistics of Families* 1874; those for France are taken by the Author from *Rapport préliminaire de la Commission statistique des fonctionnaires. Rapports au Conseil supérieur de statistique.* Bulletin numero 10, Paris. Imprimerie Nationale 1908.

(2) Year of publication of the figures.

the preceding birth : the percentage works out to 58% in Chemnitz, and to 67% in well-to-do English families. Much lower, on the contrary, is the percentage among French employés (20%), probably because of the demographic conditions peculiar to the French nation. (See Table XXV.)

TABLE XXVI.

Infant Mortality according to the Interval between a Birth and the Preceding Birth. Well-to-do English Families(1).

Order of birth	Interval between birth and preceding birth		
	1 year and less	1-2 years	more than 2 years
Number of deaths in first year of life per 100 born.			
2	16	7	6
3	15	8	6
4	15	9	6
5-6	16	9	7
7-9	12·5	10	9
10 and more	20	13	10
Total of others than first born	*15·3*	*8·9*	*7·2*
Number of deaths in first 5 years of life per 100 born			
2	20	12	11
3	19	12	11
4	20	14	10
5-6	21	14	11
7-9	18	15	14
10 and more	23	18	15
Total of others than first born	*19·9*	*13·6*	*11·8*
Number of deaths between 2nd and 5th year of life per 100 survivors at one year.			
Total of others than first born	*5·3*	*5·1*	*5·0*

(1) The Data for this table were taken from WESTERGAARD, Page 371, who took them from the material employed by CH. ANSELL in the *Statistics of families* (1874).

The deleterious consequences which too short a period after the preceding birth have upon the vitality of the child are indisputable, at least during the first year of life. This is shown by the data of Table XXVI., and I should not be surprised if a sufficiently large number of observations were found to confirm the results of Ewart (based upon too small a number of

observations to be accurate), according to which the height, weight, and mental capacity of children at six years of age are more or less sensibly inferior, as the period elapsing between one birth and another is shorter. (See Table XXVII.)

TABLE XXVII.

Physical and Intellectual Development of Children at 6 years of Age according to the Interval between their Birth and the Preceding Birth. (*Middlesbrough.*) (1)

Interval between a birth and the preceding birth	Physical characters			Intellectual characters			
				Children of parents between 25 and 35		Children belonging to well-to-do classes	
	Number of observations	Mean stature in inches	Mean weight in pounds	Number of observations	Percentage of children classified as above the average intelligence	Number of observations	Percentage of children classified as above the average intelligence
Less than 2 years ...	156	38·6	37·2	217	31	137	37
2—2·5 ,, ...	180	39·9	38·8				
2·5—3 ,, ...	172	40·3	39·1				
Three years and more	154	41·7	39·4	85	32	85	42

(1) Data taken from R. J. Ewart. *The influence of parental age on offspring.* (*The Eugenics Review*, Vol. III., No. 3, October, 1911). Pages 211 and 220.

It is not wise in any case to exaggerate the benefits which might accrue to the human race from a long interval between consecutive births: if this were always greater at two years, mortality in the first year of life would fall, according to Ansell's data, from 8·9 to 7·2%, and in the four following years it would only fall from 5·1 to 5% of survivors at the end of the first year.

Chapter IV.

Births according to the age of Parents.

15. The study of the influence which the age of parents has on the character of the offspring seems to be of the highest interest, when we consider the very great differences found in the age of married couples, and therefore of parents between country and country. Amongst the white races, we find (1887-1891) countries where not more than 4% (Württemberg) or of 6% (Sweden) of the brides are under 20 years of age, and countries where the percentage rises to 46% (Province of Buenos Ayres) and to 56% (Russia). Under 25 years of age, we have 78% of the brides at Buenos Ayres and 86% in Russia, and only 45% in Württemberg and 42%

in Sweden. In the same way, for the bridegrooms: the percentage under 20 years of age goes from 2 per 10,000 in Saxony to 32 per 100 in Russia; the percentage under 25 years of age goes from 17% in Austria and 18% in Württemberg, to 66% in Russia (Note 17).

The differences are even greater if we compare white races with coloured ones. Amongst those under 20 years of age, those married or widowed were in Germany (1900) 16 for every 100,000 males and 34 for every 10,000 females; in the Indian Empire (1901) they constituted the 12% of the males, and the 29% of the females (Note 18). Curr says, speaking of the native population of Australia, that he never heard of a woman, over 16 years of age, who (before the decline of the native customs, caused by the white immigrants) was not married (Note 19), and Hrdlicka states that amongst the tribe of the Apache (Red Indians) only few women reach this age without marrying (Note 20).

Differences in the precocity of development certainly accompany these differences in the ages of marriage: the age at which the first menstruation occurs rises from 11 years at Calcutta to 16 and more in Württemberg, in Austria and in Baden (Note 21), but it is certain, however, that they can only account for them in a small degree.

Nor are the differences between the age of the bride and that of the bridegroom smaller. Even in Europe they are very considerable: if we divide the married persons in five-year groups according to age we find that in England and Wales (1871-1880) in $485^0/_{00}$ husband and wife fall in the same five yearly group; in Italy (1872-1880) only $175^0/_{00}$. The group, in which both the bride and bridegroom are 20 to 25 years of age, contains in England one-third of all the marriages ($322^0/_{00}$), in Italy only $141^0/_{00}$ (Note 22).

Amongst primitive races the difference of age between the components of couples seems very often to be great; it is by no means a rare occurrence—Hrdlicka says of the Red Indians of the South-west of the United States and North of Mexico—for a young man to take a relatively old wife (Note 23); and Curr says of the Native Australians, that usually one sees men in the prime of their life marrying old widows, and old men marrying very young girls (Note 24); often men of 50 marry little girls of 8 (Note 25).

We can say, in a rough way, that with the increase in civilization, the age of marriage rises, and the difference of age between bride and bridegroom diminishes. If it were shown that the age of parents has a notable influence on the characters of progeny we could ask ourselves whether by chance this were not one of the factors of the evolution of nations.

Let us therefore see what statistics tell us. We shall first give the data relating to the physical qualities of the offspring (dimensions of the body, survival) and afterwards also those concerning their intelligence and temperament.

16. Table XXVIII. gives data on the weight of the new-born child according to the age of the mother. Some series (columns 17, 18, 22) do not show a regular relation between these two phenomena; but those founded on a greater number of cases (3, 5, 11, 19) show a nearly constant increase of weight in the child, as the age of the mother increases. Similar results are given by Table XXIX. concerning the stature of the new-born child, a character strictly related to the weight.

If we distinguish the males from the females (Table XXVIII., columns 7-9, 13-15, and Table XXIX., columns 5-7, 11-13) we can however ascertain that the increase in dimensions of the fœtus with the increase in the age of the mother only happens in the case of the males. At six years of age, according to Ewart (Table XXX.), the relation between the height of the child and the age of the mother is the same as at birth (columns 2-11), while at 13 (columns 13-14) the highest statures are found amongst the children of mothers of a mean age, and the smallest amongst those of old or young mothers.

The increase of the dimensions in the fœtus, related to the increase in the age of the mothers, must also be connected with the increased frequency of gigantic fœtuses (over 4,000 gr.), shown by Table XXXI. The fact that these are more often of male sex (on 3,991 gigantic fœtuses recorded in books, no less than 2,697 or 67·6% are of male sex) (Note 26) may explain also why, with the rise in the age of the mother, the mean dimensions of male offspring only regularly increase.

On the other hand, there are reasons to believe that when the age of the mother is high, not only exceptionally large fœtuses, but also exceptionally small ones occur more often, and fœtuses of normal dimensions are more rare. Table XXXII. shows how to fœtuses of greatest and least dimensions, correspond a higher mean age of the mother, and to fœtuses of mean dimensions, mothers with a lower mean age. These results suggest the idea that the children of young mothers are more homogeneous in weight and height, while those born of older mothers are more heterogeneous, that is to say, show stronger variations, both positive and negative. An investigation on the variability of offspring according to the age of the mother to test this suggestion would be most instructive. If it were shown to be well founded, we would have an explanation for the shorter life of those born of older mothers, a point we shall discuss later. For it appears established for several characters (Note 27) (and it is probable also in the case of the size of the fœtus) that excessive variations, positive or negative, are connected with a lesser vitality of the organism.

That the reduced size of the fœtus is usually to be found together with congenital weakness is a fact well known to everybody; we must, however, fight against the prejudice, which considers as particularly strong the children of exceptional size at birth. If we leave on one side hereditary causes, such as machrosomy of the mother and father, the occurrence of

TABLE XXVIII.

Weight of Newly-Born Children according to the age of the Mother.

Age of the mother.	Data of Sfameni.		Data of Fourman.		Data of the Obstetrical Clinic of Bologna. (4)						Data of Budin and Ribemont. (5)						Data of v. Schaetzel (6)	Data of v. Hecker (7)	Age of the Mother.	Data of Ewart (8).	
					Males.		Females.		Total Births.		Males.		Females.		Total Births.						
	No. of Cases.	Average Weight in gr. (1)	No. of Cases.	Average Weight in gr. (3)	No. of Cases.	Average Weight in gr.	No. of Cases.	Average Weight in gr.	No. of Cases.	Average Weight in gr.	No. of Cases	Average Weight in gr.	No. of Cases.	Average Weight in gr.	No. of Cases.	Average Weight in gr.	Average Weight in gr.	Average Weight in gr.		No. of Cases.	Average Weight in pounds.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22
Under 20	109 (2)	*3111·2*	198	*3241·7*	5	*2663·0*	8	*2962·5*	13	*2847·3*	14	*3448*	11	*3064*	25	*3279*	*3310·5*	*3169·9*	19—24	8	7·2
20—24	325	*3136·0*	687	*3266·6*	60	*3208·2*	56	*3034·3*	116	*3124·3*	35	*3221*	46	*2954*	81	*3069*	*3306·2*	*3229·8*	25—27	32	8·5
25—29	265	*3227·1*	325	*3327·5*	73	*3191·7*	63	*3088·7*	136	*3144·0*	35	*3112*	41	*3146*	76	*3130*	*3373·2*	*3283·1*	28—30	50	8·8
30—34	200	*3169·1*	95	*3346·1*	81	*3294·8*	68	*3183·0*	149	*3243·8*							*3454·6*	*3327·7*	31—33	25	8·6
35—39	172	*3325·5*	39	*3536·4*	54	*3432·4*	60	*3069·2*	114	*3241·2*							*3359·3*	*3337·2*	34—36	22	8·6
40—44	45	*3299·8*	9	*3757·3*	14	*3541·4*	18	*3016·7*	32	*3246·2*	9	*3485*	17	*3030*	26	*3188*	*3368·6*	*3339·9*	37—39	11	7·8
45 and over.	3	*3656·7*																*3035·7*	40 and over	9	8·4

(1) Averages calculated by the writer on the basis of the data collected by Dr. SFAMENI, Professor of the Obstetrical Clinic in the Royal University of Cagliari, in the Clinics of Pisa, Perugia and Cagliari. The data, not yet published, were communicated personally to the writer by Sfameni. They have already formed the subject of two papers by Professor SFAMENI, *Sul peso delle secondine e del feto a termine e sui loro rapporti reciproci, Annali di Ostetricia e Ginecologia*, Settembre, 1901. *Rapporti di sviluppo tra secondine e feto a termine nella specie umana. Ginecologia.* Anno VII., 1911.

(2) As regards the data of SFAMENI, the divisions for the ages are really up to 20, 21—25, 26—30, 31—35, 36—40, 41—45, 46 and upwards.

(3) Averages calculated by the writer on the basis of the separate data given for order of birth and age of the mother contained in F. FOURMAN, *Wovon ist das Gewicht der Neugeborenen abhängig?* Inaug. Dissert, Bonn, März 1901, page 42. It should be observed that the averages for single years of age, contained in the last column of the table on page 42 of the dissert. of FOURMAN, do not agree with the separate data for order of birth and age of the mother given in the preceding columns of the same table. The data were collected in the Clinic of Bonn.

(4) Data collected by the writer from the registers of the Obstetrical Clinic of Bologna and worked out by Dr. DETTORI.

(5) Averages worked out by Dr. DETTORI on the basis of the data contained in P. BUDIN, and A. RIBEMONT *Recherches sur les dimensions de la tête du foetus. Archives de Tocologie*, etc., Paris, 1879.

(6) Averages taken from H. VIERORDT, *Anatomishe, Physiologische und Physikalische Daten und Tabellen*, Jena, Fischer, 1906, page 21. No indication of the number of cases is given.

(7) Averages taken from F. FOURMAN, Op. Cit., page 41. The number of cases for the several age divisions is not shown. The total number of cases is 4,449.

TABLE XXIX.

Length of Newly-born Infants according to the age of the Mother.

Age of the mother.	Data of Sfameni. (1)		Data of the Obstetrical Clinic of Bologna. (3)						Data of Budin and Ribemont. (4)						Age of the mother.	Data of Ewart. (5)	
			Males.		Females.		Total births.		Males.		Females.		Total births.				
	Number of cases.	Average length in cent.	Number of cases.	Average length in cent.	Number of cases.	Average length in cent.	Number of cases.	Average length in cent.	Number of cases.	Average length in cent.	Number of cases.	Average length in cent.	Number of cases.	Average length in cent.		Number of cases.	Average length in inches
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18
Up to 19	109	48·4(2)	5	47·6	8	49·0	13	48·5	14	48·8	12	48·2	26	48·5	19—24	8	19·6
20—24	319	48·6	57	49·6	53	49·1	110	49·4	34	49·1	45	48·8	79	48·9	25—27	32	19·7
25—29	264	49·0	67	49·7	64	49·4	131	49·5	35	48·0	41	48·3	76	48·2	28—30	50	20·5
30—34	198	48·7	76	49·9	65	49·3	141	49·6							31—33	25	20·1
35—39	169	49·2	50	50·6	60	49·1	110	49·8							34—36	22	19·8
40—44	45	49·6	14	51·4	18	48·6	32	49·8	10	49·9	17	48·1	27	48·8	37—39	11	19·6
45 & over	3	50·8													40 & over	9	20·1

(1) Data collected by Sfameni and worked out by the writer. See Note 1, Table XXVIII.

(2) See Note 2, Table XXVIII.

(3) Data collected by the writer and worked out by Dr. Dettori. See Note 4, Table XXVIII.

(4) Data worked out by Dr. Dettori. Cfr. Note 5, Table XXVIII.

(5) See Note 8, Table XXVIII.

TABLE XXX.

Height of Children according to the age of the Mother at birth.

Data of Ewart for Middlesbrough. [1]

Age of the Mother at Birth.	Height of Children at Six Years of Age.										Height of Children at 13½ years of age.		
	Males.		Females.		Superior Artizan Classes.		Mixed Classes.		Inhabitants of Slum Property.		No. of Cases.	Males.	Females.
	No. of Cases.	Height in inches.	No. of Cases.	Height in inches.	No. of Cases.	Height in inches.	No. of Cases.	Height in inches.	No. of Cases.	Height in inches.		Height in inches.	Height in inches.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
20 and under	37	*40·52*	27	*40·37*	15	*41·6*	21	*39·5*	28	*40·5*	25	*55·9*	*56·2*
21—25	136	*40·99*	114	*40·83*	77	*41·8*	103	*40·9*	70	*39·8*	127	*56·0*	*57·3*
26—30	160	*41·09*	153	*40·63*	105	*41·6*	139	*40·6*	69	*40·3*	158	*56·6*	*57·0*
31—35	86	*40·93*	90	*40·59*	45	*41·4*	79	*40·6*	52	*40·5*	105	*56·8*	*56·6*
36—40	67	*40·58*	43	*40·76*	26	*40·7*	49	*40·3*	35	*40·3*	75	*55·6*	*56·8*
over 40	29	*41·50*	22	*40·44*	13	*40·5*	25	*41·5*	13	*41·7*	19	*55·6*	*56·0*

[1] See R. J. EWART, *The Influence*, etc., Op. cit. Pages 207, 208, 209.

TABLE XXXI.

Frequency of Giant Births (above 4,000 gr.) according to the age of the Mother.(1)

Age of the Mother.	BERLIN (Ettinghaus).		MANNHEIM (Jacoby).	
	No. of Cases.	Giant Births per 100 Births.	No. of Cases	Giant Births per 100 Births.
16—20	59	4·3	9	2·1
21—25	159	6·6	80	3·3
26—30	122	9·5	121	5·8
31—35	83	15·9	88	8·1
36—40	46	19·7	74	13·1
41—45	10	22·2	26	12.8

(1) Data taken from Prinzing, Op. cit., page 52.

TABLE XXXII.

Average age of the Mother at parturition according to the weight and length of the child.

Weight of the Child in grammes.	Data of the Obstetrical Clinic of Bologna.(1)		Data of Budin and Ribemont.(2)		Length of the Child in centi-metres.	Data of the Obstetrical Clinic of Bologna.(1)		Data of Budin and Ribemont.(2)	
	No. of Cases.	Average Age of the Mother at Parturition	No. of Cases.	Average Age of the Mother at Parturition		No. of Cases.	Average Age of the Mother at Parturition	No. of Cases.	Average Age of the Mother at Parturition
1	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1500—2000	4	29·0	4	29·8					
2000—2500	37	28·9	21	25·1	40—43	2	29·0	11	26·5
2500—3000	131	28·7	58	24·4	44—47	68	28·0	59	25·0
3000—3500	254	29·9	62	25·2	48—51	398	29·9	108	25·3
3500—4000	108	30·6	56	24·0	52 & over	69	31·7	31	25·5
4000 & over	26	32·3	8	31·1					

(1) See Note 4, Table XXVIII.
(2) See Note 5, Table XXVIII.

gigantic fœtuses appears to be related to a prolonged period of pregnancy, caused, according to some authorities, by a low degree of sensitiveness in the mother's womb; and it also seems to be favoured by the presence of syphilitic poisoning in the parents. Not only is the delivery of these gigantic fœtuses extremely dangerous both to the mother and the son on account of its lengthiness, laboriousness, and the irregularity with which

it takes place; but also later in life, according to some experts, and certainly, in any case, at the beginning, according to the observations of obstetrics, their development is less satisfactory than in the case of normal fœtuses (Note 28). Ewart's data, according to which the offspring of old mothers at birth are the tallest and at 13 years of age the shortest, might be used to support this theory.

The statistical data which we have, up to the present, concerning the dimensions of offspring according to the age of the mothers, can be read to mean that the dimensions are less favourable for the offspring of older mothers than for those of the younger ones.

17. But are these relations between the age of the mother and the dimensions of the fœtus *primary, direct*, due really to an influence of the mother's age on the size of the fœtus? Or are they—instead—*secondary, indirect* relations, due, that is to say, to the influence which some other circumstance, closely connected with the mother's age (as for instance the order of birth), has on the size of the fœtus?

Tables XXXIII. and XXXIV. show that, with the increase of the number of deliveries, the size of offspring increases also fairly regularly.

TABLE XXXIII.

Weight of child according to the order of birth.

Order of Birth.	Data of Sfameni. (1)		Data of Fourman. (2)		Data of the Obstetrical Clinic of Bologna. (3)				Data of Budin and Ribemont. (4)	
					Males.		Females.			
	No. of Cases.	Average Weight.	No. of Cases.	Average Weight.	No. of Cases.	Average Weight.	No. of Cases.	Average Weight.	No. of Cases.	Average Weight.
1	2	3	4	5	6	7	8	9	10	11
1	378	*3096·2*	904	*3215·5*	71	*3057*	62	*3018*	105	*3111*
2	202	*3197·8*	341	*3355·4*	103	*3246*	87	*3071*	84	*3080*
3	143	*3230·1*	51	*3427·1*						
4	102	*3173·1*	13	*3447·5*						
5	71	*3269·2*	14	*3505·7*	92	*3413*	87	*3139*		
6	56	*3234·5*	12	*3655·5*					20	*3290*
7	56	*3416·4*	18	*3670·0*						
8—10	85	*3350·4*		*3900·8*	21	*3569*	37	*3157*		
11&over	26	*3367·8*								

(1) See Note 1, Table XXVIII.

(2) Data taken from the paper of FOURMAN, *Wovon ist das Gewicht der Neugeborenen abhängig?* Op. cit.

(3) See Note 4, Table XXVIII.

(4) See Note 5, Table XXVIII.

TABLE XXXIV.

Length of Children according to the Order of Birth.

Order of birth.	Length at Birth.								Height at 6 Years of Age.	
	Data of Sfameni. (1)		Data of the Obstetrical Clinic of Bologna. (2)				Data of Budin and Ribemont. (3)		Data of Ewart. (4)	
			Males.		Females.					
	No. of cases.	Average length in centimetres.	No. of cases.	Average length in centimetres.	No. of cases.	Average length in centimetres.	No. of cases.	Average length in centimetres.	No. of cases.	Average height in inches.
1	2	3	4	5	6	7	8	9	10	11
1	373	48·6	66	49·1	61	49·2	105	48·4	225	41·4
2	198	48·8	98	50·0	87	48·9	82	48·2	186	41·3
3	143	48·9							140	40·7
4	101	48·9							100	40·2
5	70	49·1	84	50·4	85	49·4			89	39·9
6	55	48·8					20	48·4		
7	56	49·3							203	9·7
8–10	85	49·0	21	50·9	35	49·5				
11 & over	26	49·2								

(1) See Note 1, Table XXVIII.
(2) See Note 4, Table XXVIII.
(3) See Note 5, Table XXVIII.
(4) Data taken from R. J. Ewart, *The influence*, etc. Op. cit., page 213.

We have, therefore, to decide whether the factor which influences the size of the child is the age of the mother or the order of birth.

It is of the greatest importance for our research to decide between these alternatives, because they lead to contrary conclusions as to the consequences of the mother's age at marriage.

If what determines the variation in the size of offspring is the age of the mother, and *not* the order of birth, then lowering the age of the woman at marriage will have the direct result of diminishing the size of the offspring. If what matters is the order of birth, and not the mother's age, lowering the age of the mother at marriage will have the direct effect of increasing the number of births, and the indirect effect of increasing the average dimensions of the offspring.

Tables XXXV. and XXXVI. give the mean weight of the offspring according to the age of the mother and the order of birth. Considering an equal number of deliveries, the mean weight of the fœtuses does not show

TABLE XXXV.

Weight of Offspring according to the age of the Mother and the order of Birth.

Data of Sfameni, 1,119 Cases [1].

Age of the Mother at Birth.	Order of Birth.									
	1	2	3	4	5	6	7	8	9—12	13 & upwards.
15—20	*3114·0*	3077·7	3161·0	...	...	...	...	...	...	...
21—25	3078·0	3223·8	3283·4	2927·4	3095·0	3202·5	...	...	...	...
26—30	*3139·7*	*3240·7*	3220·0	*3305·3*	3298·9	*3214·7*	3341·4	2931·0	...	...
31—35	3080·6	3052·6	3174·0	3079·9	*3375·6*	3137·4	3260·6	*3149·6*	3400·7	...
36—40	3043·5	*3228·7*	3197·5	3178·8	3089·1	3315·4	*3503·3*	*3332·3*	*3543·7*	*3245·0*
41—45	...	3015·0	*3323·3*	*3493·5*	...	*3352·9*	3498·1	3068·2	3241·8	3212·2
46 & over	...	...	*3890·0*	...	*3385·0*	...	*3695·0*	...	...	...

[1] Data worked out by the writer.

any notable relation to the age of the mother; the highest means, printed in italics, occur now in this, now in that class of age, without any appreciable regularity.

For this vague and uncertain impression as to the influence which, independently from the number of deliveries, the mother's age has, we must substitute a synthetic and precise measure. We must therefore compare the actual mean weight of the children of mothers belonging to a given age class with the theoretical mean weight which they would have, if the mother's age did not have, of itself, any influence; that is to say, if after

TABLE XXXVI.

Weight of Offspring according to the age of the Mother and the order of Birth.

Data of Hecker, 4,449 cases. (1)

Age of the Mother at birth.	Order of Birth.			
	1	2	3	4 and upwards.
15—19	3177 6	2987·5	...	...
20—24	3185·6	3298·4	*3366·1*	3285·2
25—29	3174·2	*3325·3*	3339·0	3268·9
30—34	*3186·6*	*3342·1*	3340·6	*3341·3*
35—39	3177·4	3270·4	3338·9	*3417·9*
40—44	*3570·3*	*3208·3*	*3389·7*	3242·2
45 and upwards	...	...	3281·3	2650·25

(1) Monatschrift f. Geb. h. VI. p. 348, cit. by Fourman, op. cit.

an equal number of deliveries, the mean weight of the fœtuses is the same whatever the age of the mother.

A simple example will show how easy it is to make this comparison—

Sfameni's series concerns 109 fœtuses of mothers between 15 and 20 years of age, with a mean weight of 3111·2 grammes. Of these 96 were first deliveries, 11 second, and two third deliveries. The fœtuses of all mothers at the first delivery at any age had a mean weight of 3096·2 grammes; those of mothers at second delivery, of any age, 3197·8 grammes; and those of mothers at third delivery, of any age 3230·1 grammes. If the age of the mother had no influence on the size of the fœtus the 96 fœtuses of first delivery of mothers between 15 and 20 would be expected to weigh 3096·2 grammes, the 11 of second delivery of mothers between 15 and 20, 3197·8 grammes, and the two of third delivery of mothers between 15 and 20, 3230·1 grammes. Altogether, all the fœtuses of mothers between 15 and 20 would weigh on an average

$$(3096{\cdot}2 \times 96 + 3197{\cdot}8 \times 11 + 3230{\cdot}1 \times 2)/109 = 3108{\cdot}9 \text{ grammes.}$$

The actual weight (3111·2) results therefore nearly identical with the theoretical weight (3108·9), their proportion being 1·001.

Table XXXVII. gives the proportions of the actual to the theoretical weights, thus calculated, for the series of Sfameni, of Fourman, and of the Clinica Ostetrica of Bologna. They show how the dimensions of the fœtus vary with the age of the mother after correcting for the influence of the order of birth. They vary slightly from unity without showing any regular relation to the age of the mother. This works out true both for the weight (columns 2-6) and for the length of the fœtus (7-10). We can, therefore, conclude that the age of the mother has no decisive influence of its own on the dimensions of the fœtus; the increase which is found in these dimensions

is simply due to the fact that the greater the age of the mother the greater is the number of previous deliveries, and it follows that if women married

TABLE XXXVII.

Influence of the Age of the Mother on the Dimensions of the Offspring. (1)

Age of the mother at Birth.	Relation between the actual average weight of the offspring and the theoretical average weight calculated on the hypothesis that the age of the mother had no influence on the weight of the child.					Relation between the actual average length of the offspring and the theoretical average length calculated on the hypothesis that the age of the mother had no influence on the length of the child.			
	Data of Sfameni.	Data of Fourman	Data of the Obstetrical Clinic of Bologna.			Data of Sfameni.	Data of the Obstetrical Clinic of Bologna.		
			Males.	Females.	Total Births.		Males.	Females.	Total Births.
1	2	3	4	5	6	7	8	9	10
Under 20	1·001(2)	1·000	0·874	0·983	0·942	0·995(2)	0·969	0·996	0·986
20—24	0·997	1·000	1·020	0·998	1·010	0.997	1·002	1·001	1·002
25—29	1·010	1·001	0·989	1·004	0·996	1·004	0·997	1·006	1·002
30—34	0·981	0·997	0·997	1·025	1·009	0.996	0·997	1·008	1·002
35—39	1·010	0·999	1·008	0·967	0·995	1·003	1·004	1·002	1·003
40—44	0·995	1·003	1·004	0·962	0·981	1·010 / 1·035	1·016	0·984	0·998
45 and upwards	1·106								

(1) Data worked out by the writer. For the sources, see Table XXVIII., Notes 1, 3 and 4.
(2) The divisions as to age are in the data of Sfameni, up to 20, 21-25, 26-30, 31-35, 36-40, 41-45, 46 and upwards.

as soon as they were capable of bearing children we should expect, with a rise in the fertility, an increase in these dimensions of the fœtuses.

18. To measure the physiological development the mother's age should be taken not from birth but from the date of the first menstruation. The data we possess allow us to make in respect to this only few investigations.

Table XXXVIII. shows how, with the increase of the interval between puberty and delivery, the weight of the fœtus first increases, then diminishes. Our data do not enable us to decide the important point as to whether a

relation between these two phenomena exists, even after correction had been made for the order of birth.

The absolute age at the first menstruation does not show any regular relation to the weight of the fœtus (Table XXXIX., columns 3, 7, and 11), nor does any direct influence appear when one eliminates the age of the mother at delivery (columns 5, 9, 13).

19. On the variation of the dimensions of children according to the age of the father, we only have Ewart's data for six-year-old children. They yield

TABLE XXXVIII.

Weight of offspring according to the interval between the first menstruation and the Birth.

Obstetrical Clinic of Bologna. (1)

Interval of time between the first menstruation and the birth of the offspring.	Males.		Females.		Total births.	
	No. of cases.	Average weight.	No. of cases.	Average weight.	No. of cases.	Average weight.
1	2	3	4	5	6	7
1— 5 years	14	*2898·9*	11	*2730·0*	25	*2821·2*
6—10 ,,	58	*3189·5*	54	*3055·9*	112	*3124·4*
11—15 ,,	79	*3223·5*	67	*3089·3*	146	*3161·9*
16—20 ,,	70	*3307·9*	64	*3241·8*	134	*3276·3*
21—25 ,,	53	*3389·4*	54	*3064·3*	107	*3225·3*
26—30 ,,	9	*3517·8*	22	*3018·6*	34	*3187·8*
31—35 ,,	3	*3470·0*	...	...		

(1) Data collected by the writer and worked out by Dr. Dettori.

a result (Table XL., columns 3 and 6) similar to that of the data of the height according to the age of the mother (Table XXX., columns 3 and 5). But this seems due to the connection between the ages of the two parents. If we eliminate the influence of the mother's age, the father's age appears to have no sensible influence on the stature of the children (Table XL., columns 4 and 7).

20. With regard to the influence on the vitality of the offspring of the age of the parents, we have data even from the beginning of life at conception; many yearly statistics give us data on the frequency of *still-births* according to the age of the father and mother, and some give us the frequency of *abortions*.

TABLE XXXIX.

Weight of Offspring according to the age of the Mother at the first Menstruation.

Data of the Obstetrical Clinic of Bologna (1).

Age of the mother at the first menstruation.	Males.				Females.				Total Births.			
	No. of Cases.	Actual Average Weight. (a)	Theoretical Average Weight (2) (b)	*1000 a* / b	No. of Cases.	Actual Average Weight. (c)	Theoretical Average Weight (2) (d)	*1000 c* / d	No. of Cases.	Actual Average Weight. (e)	Theoretical Average Weight (3) (f)	*1000 e* / f
1	2	3	4	5	6	7	8	9	10	11	12	13
10—12	63	3250·2	3277·8	*992*	71	3174·3	3166·2	*1003*	134	3210·0	3218·7	*997*
13—15	132	3306·6	3239·8	*1021*	140	3043·5	3109·8	*979*	272	3171·2	3172·9	*999*
16—18	84	3191·0	3285·0	*971*	58	3129·6	2966·5	*1055*	142	3165·9	3154·9	*1003*
19—22	7	3447·9	3332·5	*1035*	3	2773·3	3025·2	*917*	10	3245·5	3240·3	*1002*

(1) Data collected by the writer. The data of columns 2-3, 6-7, 10-11 were worked out by Dr. Dettori and those of columns 4-5, 8-9, & 12-13 by the writer.

(2) Calculated on the hypothesis that the age at the first menstruation has no influence, correction being made for the age of mother at birth of the offspring.

(3) Averages based on the theoretical weights (b) and (d).

TABLE XL.

Height of Children at six years of age according to the age of the Father at Birth. (1)

Age of the Father at the birth of the Child.	No. of Cases.	Males.		No. of Cases.	Females.	
		Average height in inches.	Taking the theoretical height (calculated on the hypothesis that the age of the father has no influence) to equal 1000, the actual height works out at		Average height in inches.	Taking the theoretical height (calculated on the hypothesis that the age of the father has no influence) to equal 1000, the actual height works out at
1	2	3	4	5	6	7
20 and less	12	39·69	*976*	9	(2)	...
21—25	103	40·93	*1001*	79	40·71	*1000*
26—30	136	41·01	*1000*	132	40·68	*1000*
31—35	120	41·20	*1005*	109	40·73	*1002*
36—40	75	40·70	*997*	71	40·63	*999*
above 40	69	40·99	*1000*	49	40·98	*1010*

(1) The data of columns 2–3 and 5–6 are taken from R. J. EWART, *The Influence*, &c. Op. cit., page 207 ; those of columns 4 and 7 are calculated by the writer.

(2) No indication is given by EWART.

Table XLI. gives the percentages of abortions and still-births per 100 born arranged according to the age of the mother for Paris, Budapest, Middlesbrough ; Table XLII. gives for Paris the percentages of abortions and still-births together, according to the age of the mother and father, both for all marriages (columns 5 and 9) and for the marriages which have lasted one year or less, three years, and five to nine years ; Table XLIII. gives the percentages of still-births according to the age of the mother ; and Table XLIV. the percentages of still-births according to the age of the father for other European countries.

All the columns show an increase in the number of still-births with the increase in age of the father and mother ; it is not more notable for the legitimate than for the illegitimate children (see Table XLI., columns 2 and 5, 3 and 6, 11 and 14, 12 and 15 ; Table XLIII., columns 2 and 3, 9 and 10 ; Table XLIV., columns 2 and 3). It is stronger in the case of the males than of the females (Table XLIII., columns 11 and 12). The class of the youngest mothers and fathers is an exception, showing (Table XLI., columns 2 and 8 ; Table XLII., columns 2, 5, and 8) Table XLIII., columns 2, 3, 4, 5, 7, 9, 10, 11, 12, 13, and 14 ; Table XLIV., columns 2 and 3) a greater frequency of still-births and abortions than the next class by age of marriages.

The increased frequency of abortions in relation to the age is found often to be irregular, especially for illegitimate children, and in any

TABLE XLI.

Miscarriages and Still-births per 100 *Children born alive according to the age of the Mother.* [1]

Age of the mother.	Paris, 1903-1909.									Budapest, 1903-1905.									Middlesbrough, 1909-10.
	Legitimate births.			Illegitimate births.			All births.			Legitimate births.			Illegitimate births.			All births.			
	Miscarriages [2]	Still-births.	Total.	Miscarriages.	Still-births.	Total.	Miscarriages.	Still-births.	Total.	Miscarriages.	Still-births.	Total.	Miscarriages.	Still-births.	Total.	Miscarriages.	Still-births.	Total.	Miscarriages and Still-births.
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Up to 20	5·03	1·72	*6·75*	*5·14*	2·41	*8·15*	5·41	2·09	*7·50*	6·25	1·61	*7·86*	6·39	3·11	*9·50*	6·34	2·54	*8·88*	*6·3*
20—24	4·68	2·37	*7·05*	6·21	2·88	*9·09*	5·16	2·53	*7·69*	8·05	1·90	*9·95*	11·03	3·73	*14·76*	9·17	2·59	*11·76*	*6·8*
25—29	5·46	2·62	*8·08*	7·05	3·68	*10·73*	5·78	2·84	*8·62*	11·42	2·61	*14·03*	10·98	4·37	*15·35*	11·32	3·00	*14·32*	*6·9*
30—34	6·15	3·51	*9·66*	8·23	3·80	*12·03*	6·51	3·56	*10·07*	14·09	3·45	*17·54*	9·62	4·95	*14·57*	13·36	3·69	*17·05*	*8·4*
35—39	7·39	4·33	*11·72*	6·83	4·14	*10·97*	7·29	4·30	*11·59*										*9·3*
40—44	6·65	6·07	*12·72*	9·21	5·07	*14·28*	7·10	5·89	*12·99*	17·49	5·39	*22·88*	8·20	6·61	*14·81*	16·17	5·56	*21·73*	*10·3*
45 and upwards	11·77	6·67	*18·44*	8·76	9·49	*18·25*	11·28	7·13	*18·41*										(*7·2*) [3]
For all ages	5·63	2·99	*8·62*	7·03	3·29	*10·32*	5·99	3·07	*9·06*	12·03	2·84	*14·87*	11·16	4·09	*15·25*	11·79	3·18	*14·97*	...

[1] The percentages for Paris and Budapest were calculated by the writer on the basis of the data of the annual statistics of those cities; those for Middlesbrough are taken from R. J. EWART, *The Aristocracy of Infancy and the Conditions of its Birth. The Eugenics Review*, Vol. III., No. 2, July, 1911.

[2] By miscarriages is understood those born dead having had a period of gestation less than 8 months.

[3] Number of instances small.

TABLE XLII.

Legitimate Offspring born dead (Miscarriages and Still-born) per 100 of Legitimate Offspring born alive according to the age of the Father and Mother.

Paris, 1895-1909. (1)

Age of the Parents.	According to the age of the Mother. Length of married life.				According to the age of the Father. Length of married life.			
	1 year and less.	3 years.	5–9 years.	Any length.	1 year and less.	3 years.	5–9 years.	Any length.
1	2	3	4	5	6	7	8	9
Under 20	9·30	5·08	3·85(2)	8·05	8·28	3·88	8·97	6·66
20—24	8·98	5·92	7·71	7·34				
25—29	9·38	7·17	9·74	8·10	9·45	7·28	8·69	7·95
30—34	9·52	8·40	10·56	9·49	9·11	6·78	10·13	8·36
35—39	12·86	9·48	10·73	11·53	10·06	7·62	10·05	9·56
40—44	14·46	15·29	13·09	13·41	11·28	7·94	9·81	11·13
45—49					14·19	10·70	12·42	12·23
50—59					14·33	11·18	12·44	11·93
60 and upwards							16·81	13·57

(1) The percentages were calculated by the writer on the basis of the data which Dr. E. PORRU extracted from the Annual Statistics of the City of Paris.

(2) Number of cases observed very small; 26 born alive and 1 dead.

case it is less marked than that of still-births (see Table XLI.). This can be explained by the fact that with the increase of age, not only the mother's capability for successful delivery diminishes, but also the elasticity of her tissues diminishes, the duration of the delivery increases, the percentage of gigantic fœtuses increases; all circumstances which increase the frequency of still-births, without affecting the number of abortions.

21. The data of Tables XLI. to XLIV. show only the *apparent* relation between the age of one of the parents and the frequency of abortions and still-births; not the *causal* relation. Perhaps the increase in the percentage of still-births related to the age of one of the parents (say, the husband) may depend not directly on his age, but on the rise in the age of the other parent (in our case, the age of the wife, to which the husband's age is related) or on the increase of the number of previous births.

The statistics of Saxe-Meiningen, of Luxemburg and of Berlin, enable us to examine the influence of the mother's age, after eliminating the influence of the order of birth. The real influence of the mother's age is thus found to be less strong in Berlin, and in Saxe-Meiningen and Luxemburg stronger than its apparent influence (see Table XLV.).

TABLE XLIII.

Still-births per 100 of Births according to the age of the Mother. (1)

Age of the Mother.	Norway, 1899-1900. (3)		Amsterdam, (3)	Berlin, (2)	Oldenburg, (2)	Brunswick, (2)	Saxe-Meiningen, (2)	Austria, 1898-1900. (2)				Luxemburg, (3)	France, (2)
	Legitimate.	Illegitimate.	1899-1900.	1894-1902.	1876-85.	1881-85.	1878-89.	Legitimate.	Illegitimate.	Males.	Females.	1901-1903.	1893-95.
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Under 17	2·09	4·52	4·26	3·5	2·4	3·6	3·15	2·1	4·0	3·6	2·3	2·51	6·9
17—20								1·7	3·0	2·5	1·9		
20—25	1·66	2·97	3·50	3·3	2·9	3·1	3·26	1·9	3·4	2.5	2·1	2·12	4·7
25—30			3·90	3·2	3·3	3·0	3·23	2·2	3·9	2·6	2·2	2·26	4·2
30—35	2·39	4·86		3·6	3·9	3·8	3·84	2·8	4·2	3·2	2·6	2·90	4·2
35—40			5·77	4·6	5·0	4·9	4·78					3·71	4·3
40—45	4·17	10·14		5·2	6·2	5·8	6·03	3·9	4·9	4·3	3·5	5·16	4·8
45—50			8·85	7·6	10·2	8·4	8·00					6·29	6·9
50 and upwards				(26·0) (4)								...	6·6

(1) The percentages for Norway, Amsterdam, Saxe-Meiningen and Luxemburg were calculated by the writer from the data of the official publications of the respective countries; those for the other states are taken from PRINZING, *Handbuch für Medizinischen Statistik*. Op. cit., pages 55-56.

(2) Still-births per 100 born alive or dead.

(3) Still-born per 100 born alive.

(4) Only 40 births with 8 still-born.

Table XLVI., which shows the influence of the order of birth on still-birth, independently of the mother's age, gives the reason of these results.

TABLE XLIV.

Still-born per 100 *born alive according to the age of the Father* (1)

Age of the Father.	Norway, 1899-1900.		Amsterdam, 1899-1900.
	Legitimate Offspring.	Illegitimate Offspring.	
1	2	3	4
Under 20	2·22	5·04	3·49
20—24	1·97	3·36	
25—29			3·83
30—34	2·14	3·88	4·07
35—39			4·55
40—49	2.85	4·83	5·57
50 and upwards	3·53	5·34	7·80

(1) Percentages calculated by the writer on the basis of the data drawn from the statistical publications of the respective countries.

Still-births are very frequent in the case of first deliveries, but the frequency diminishes with the increase in the number of deliveries up to a certain point where it begins to increase again; but both with regard to the lowest point and the highest reached at the later deliveries, Berlin is very different to Saxe-Meiningen and Luxemburg. In Berlin the minimum is reached already at the third delivery, and the frequency of still-births in the last deliveries is nearly equal to or exceeds that of first deliveries; in Saxe-Meiningen and in Luxemburg the minimum is reached at a later number of delivery, and the frequency in the last deliveries is much below that found in the first.

Private observations, made on a large scale in Denmark and published by Ditzel, confirm and complete the results obtained from the data given in the official publications.

Table XLVII. shows the influence of the age of the mother and of the order of birth on the frequency, amongst those born at the end of gestation, of still-births, and of deaths in the first 24 hours. Table XLVIII. shows the influence of the age of the mother and of the order of birth on the frequency of instrumental help needed for delivery. Thus the mortality at birth or during the first hours of life, as well as the frequency of artificial deliveries, increases with the age of the mother; it diminishes up to a certain point with the rise in the number of deliveries, to increase again afterwards.

TABLE XLV.

Index numbers of the Birth-mortality according to the age of the Mother, eliminating, and not eliminating, the influence of the order of Birth.

Age of the Mother.	Saxe-Meiningen (1878-89). (1)		Luxemburg (1901—1903). (1)		Berlin (1893-97).	
	Taking the birth mortality when the mother is 35 to 40 years old as 100, the birth-mortality for other ages works out at :—		Taking the birth-mortality when the mother is 35 years old and upwards as 100, the birth-mortality for other ages works out at :—		Taking the birth-mortality for all births as 100, the birth-mortality according to the age of the mother works out at :—	
	Not eliminating the influence of the order of birth.	Eliminating the influence of the order of birth.	Not eliminating the influence of the order of birth.	Eliminating the influence of the order of birth.	Not eliminating the influence of the order of birth. (2)	Eliminating the influence of the order of birth. (3)
Under 20	66	*32*	60	*42*	57	*61*
20—25	68	*42*	50	*38*	73	*80*
25—30	68	*54*	54	*44*	83	*94*
30—35	80	*77*	69	*63*	97	*102*
35—40	100	*100*	88	*87*	120	*114*
40—45	210	*119*	123	*127*	157	*128*
45 and upwards.			150	*157*	227	*165*

(1) Index numbers worked out by the writer on the basis of the data drawn from the official statistics of the respective States.

(2) Index numbers calculated on the basis of the percentages of birth-mortality given by WESTERGAARD. Op. cit., page 333.

(3) Index numbers taken from WESTERGAARD. Op. cit., page 333.

It is to be noted that, if we correct for the order of birth, the mothers under 20 years of age are, in regard to the frequency of artificial deliveries and still-births, in much better position than it otherwise appears. Only the column for Luxemburg shows, for mothers under 20, a frequency in still-births slightly greater than that found among mothers between 20-25; the columns for Berlin, Saxe-Meiningen, and Denmark agree in showing

TABLE XLVI.

Index numbers of birth-mortatity according to the order of Birth, eliminating the influence of the age of the Mother.

Order of birth.	The Birth Mortality in the various categories of Births works out at—		
	In Saxe-Meiningen (1878–1889), taking the birth mortality among the first-born as 100. (1)	In Luxemburg (1901-1903), taking the birth mortality among the first-born as 100. (1)	In Berlin (1893-1897), taking the birth mortality of all births as 100. (2)
1st birth	100	100	112
2nd ,,	57	70	90
3rd ,,	51	62	82
4th ,,	47		90
5th ,,	46		
6th ,,	44	59	94
7th ,,	34		
8th and 9th birth	42		107
10th and upwards	50	72	126

(1) Index numbers calculated by the writer on the basis of the official statistics of the respective states.

(2) Index numbers taken from Westergaard. Op. cit., page 333.

that, both in regard to the number of still-births, and to the mortality in the first 24 hours, and to artificial delivery, the condition of the youngest mothers is highly favourable.

With regard to the frequency of abortions, we cannot deduct the influence of the mother's age from that due to the order of birth. There are reasons for believing that the correction for the order of birth is much less important in the case of abortions than of still-births; the influence of the order of birth is due especially to the high proportion of still-births at the first delivery; now, for abortions (duration of gestation 0-7 months) the percentage of first deliveries appears to be smaller than for the still-

births (8-9 months). Table XLIX. shows this difference for Paris, both for legitimate and illegitimate births.

22. For several States we can study the influence that the age of one of the parents has on the percentage of still-births and abortions, after having eliminated the influence due to the age of the other parent. Since the ages of the two parents are related in a positive way, one would expect that

TABLE XLVII.

Index Numbers of the frequency of Still-born Children in all Births at end of gestation(1) (*including those dying within the first* 24 *hours*) *according to the age of the mother, eliminating the influence of the order of birth, and according to the order of birth, eliminating the influence of the age of the mother.*

39,000 observations of Ditzel in Denmark, published in 1882. (2)

According to the age of the mother.		According to the order of birth.	
Age of mother.	Index numbers. (3)	Order of birth.	Index numbers. (3)
Under 20	43	1	142
20—24	60	2	89
25—29	79	3	87
30—34	107	4—5	86
35—39	116	6—7	97
40—44	135	8—9	109
45 and upwards	144	10 and upwards	106

(1) Not counting the still-born whose deaths took place a considerable time before birth.

(2) Index numbers taken from WESTERGAARD. Op. cit., pp. 343-344.

(3) Taking the frequency of still-born children, together with those dying within the first 24 hours, in all births at end of gestation, as 100.

after this correction has been made the influence of the age of the first parent should appear to be less. And so it happens, but the correction for the age of the father does not influence much the apparent effect of the mother's age (Table L., columns 2-7, and Table LI., columns 2-3), whilst the correction for the mother's age greatly alters the apparent influence of the age of the father (Table L., columns 8-13; Table LI., columns 7-8).

The conclusions to be drawn from the data relating to the influence of the father's age are very similar for Amsterdam and Paris; from 30 years of age onwards still-births and infant mortality increase with the age; under this age they decrease regularly, except that they are higher when the

TABLE XLVIII.

Index numbers of the frequency of artificially assisted Births.

(*a*) According to the age of the mother eliminating the influence of the order of birth, and (*b*), according to the order of birth, eliminating the influence of the age of the mother. 39,000 observations of Ditzel in Denmark published in 1882. (1)

According to the age of the mother. (*a*)		According to the order of birth. (*b*)	
Age of mother.	Index numbers. (2)	Order of birth.	Index numbers. (2)
15—19	35	1	168
20—24	65	2—3	79
25—29	88	4—5	79
30—34	88	6—7	96
35—39	86	8—9	103
40—44	126	10—11	106
45 and upwards.	131	12 and upwards.	152

(1) Index numbers taken from WESTERGAARD. Op. cit., pp. 342-343.
(2) Taking the frequency of artificially assisted births in all births as 100.

TABLE XLIX.

Miscarriages and still-born Children according to the order of Birth. (1)

Paris, 1903-1909.

Period of Gestation.	Of 100 Cases of which the order of birth is known, the first-born number—			
	In legitimate births.		In illegitimate births.	
0—4 months	24·3		47·3	
5 ,,	30·9	30·8	60·0	55·9
6 ,,	36·8		61·7	
7 ,,	39·7		58.5	
8 ,,	37·9	41·0	58·3	57·4
9 ,,	42·3		56·9	
All periods (2)	34·3		56·4	

(1) Percentages calculated by the writer from the data taken from the Annual Statistics of the City of Paris.
(2) Includes cases of which the period of gestation is not known.

TABLE L.

Index numbers of birth mortality (a) *according to the age of the Mother, eliminating the influence of the age of the Father, and* (b) *according to the age of the Father, eliminating the influence of the age of the Mother.* (1)

Age of the Parent.	According to the Age of the Mother. (a)						According to the Age of the Father. (b)						
	Norway, 1899-1900.				Amsterdam, 1899-1900. (4)		Norway, 1899-1900.				Amsterdam, 1899-1900.		
	Legitimate. (2)		Illegitimate. (3)				Legitimate. (5)		Illegitimate. (6)				
	Not eliminating.	Eliminating.	Not eliminating.	Eliminating.	Not eliminating.	Eliminating.	Not eliminating.	Eliminating.	Not eliminating.	Eliminating.	Not eliminating.	Eliminating.	Eliminating the influence of the difference in age of the Parents. (8)
	The Influence of the Age of the Father.		The Influence of the Age of the Father.		The Influence of the Age of the Father.		The Influence of the Age of the Mother.		The Influence of the Age of the Mother.		The Influence of the Age of the Mother. (7)		
1	2	3	4	5	6	7	8	9	10	11	12	13	14
Under 20	126	*119*	86	*75*	74	*71*	104	*134*	150	*147*	85	*93*	*80*
20—24	100	*100*	54	*53*	61	*57*	92	*120*	100	*100*	93	*101*	*89*
25—29					67	*66*							
30—34	144	*155*	88	*89*			100	*100*	116	*99*	104	*100*	*95*
35—39					100	*100*							*107*
40—44							133	*97*	144	*105*	138	*105*	*130*
45—49	251	*243*	183	*175*	155	*142*							
50—54							165	*108*	159	*102*	214	*145*	*164*
55 and upwards													

(1) Index numbers calculated by the writer on the basis of the data taken from the official statistics of the respective countries.
(2) Taking the birth mortality when the mother was 20—29 years of age as 100.
(3) Taking the birth mortality when the mother was 30 and upwards as 100.
(4) Taking the birth mortality when the mother was 35—44 years of age as 100.
(5) Taking the birth mortality when the father was 30—39 years of age as 100.
(6) Taking the birth mortality when the father was 20—29 years of age as 100.
(7) Taking the birth mortality when the father was 25—39 years of age as 100.
(8) Taking the birth mortality for all births as 100.

father is between 25 and 29 than when he is in the age class above. In Norway, on the other hand, infant mortality is higher amongst the youngest and oldest couples than amongst those of mean age. More research on this subject is greatly needed, on data allowing for correction to be made for the influence of the mother's age, not only for five yearly groups but also for single years.

The statistical results obtained appear, however, to be in harmony with the data of physiology and medicine; the increase in the number of still-births when the father over 30 years of age might be attributed to the decay in

TABLE LI.

Index Numbers of the frequency of Still-births.

(a) according to the age of the mother, eliminating the influence of the age of the father, and (b) according to the age of the father, eliminating the influence of the age of the mother.(1)

PARIS, 1895-1909. Legitimate Offspring.

Age of the Parents.	According to the age of the mother. (a)					According to the age of the father. (b)				
	All Marriages(2)		Marriages which have lasted			All Marriages		Marriages which have lasted		
	Not eliminating	Eliminating	1 year(3)	3 years (4)	5-9 years (5)	Not eliminating	Eliminating	1 year(7)	3 years(8)	5-9 years (9)
	the influence of the age of the father.		Eliminating the influence of the age of the father.			the influence of the age of the mother. (6)		Eliminating the influence of the age of the mother.		
1	2	3	4	5	6	7	8	9	10	11
Under 20	93	103	103	51	(39) (10)	80	86	91	61	94
20—24	85	91	98	62	81					
25—29	94	95	100	77	99	95	100·2	103	101	
30—34	110	107	98	98	105	100	100	97	100	103
35—39	133	124	123	106	105	114	108	103	102	98
40—44						133	118	109	97	93
45—49	155	134	126	166	122	151	126	129	119	114
50—59						145	121	128	120	120
60 and upwards.						162	143			155

(1) Numbers calculated by the writer on the data which Dr. E. PORRU has gathered from the annual statistics of Paris.
(2) Taking the frequency of still-births when the mother is from 25—34 years of age as 100.
(3) ,, ,, ,, ,, ,, in all marriages as 100.
(4) ,, ,, ,, ,, ,, when the mother is from 30—39 years of age as 100.
(5) ,, ,, ,, ,, ,, in all marriages as 100.
(6) ,, ,, ,, ,, ,, when the father is from 30—34 years of age as 100.
(7) ,, ,, ,, ,, ,, in all marriages as 100.
(8) ,, ,, ,, ,, ,, when the father is from 30—34 years of age as 100.
(9) ,, ,, ,, ,, ,, in all marriages as 100.
(10) One still-birth and 26 born alive.

the sexual functions which begins at this age, while the great number of still-births (Norway) in the earlier years, or the increase corresponding to the period between 25 and 29 (Paris, Amsterdam), might find an explanation in the fact that amongst people of this age in particular syphilitic disease, the chief cause of infant mortality, is common.

23. To measure exactly the *causal* relation between one parent's age and still-birth, one would have to correct both for the age effect of the other parent and for the effect due to the order of birth. We do not as yet possess data which enable us to do this; the data for Paris, however, allow us to make an analogous calculation, as they give the number of infants born alive and of still-births, grouped not only according to the age of each parent, but also according to the length of time after marriage to which the order of birth is closely allied. There is, however, in these statistics another cause of imperfection, namely, that the length of time after marriage is given up to the birth, not up to the conception. Now the duration of gestation is longer in the case of the children born alive than in the case of still-births; therefore the still-births from marriages of duration of x years cannot be compared strictly to the children born alive from marriages of the same duration. This circumstance will have the result of attributing a number of still-births greater than occurs in reality to the later marriages, and a smaller one to the earlier marriages. But I cannot say whether this has any influence on the relation between the parents age and frequency of still-births for an equal duration of marriage.

The relation between the age of the parents and still-births is found to be, in any case, for the marriages of one year, three years and five to nine years' duration, quite similar to that for the marriages of any length of duration (Table LI.).

The rise in the number of still-births for fathers between 25-29 is found to be distinct in marriages of one year's and three years' duration; in the marriages of 5-9 years' duration this rise is found in the age group above. It appears that the important factor is not the age of the father at birth but his age at marriage, which observation fits in well with the explanation given. Syphilis is, in fact, as a rule, caught during unmarried life; but its effects on the vitality of the offspring are felt during the whole reproductive period.

24. In conclusion, we can say that the statistics which we have at hand allow us to investigate only very roughly the influence on still-births and abortions, due to the age of one or other parent, and to the order of delivery. It seems possible, however, to conclude that even from conception the products exhibit notable differences in the degree of vitality according to the age of the parents. With the rise in the age of the parents the number of still-births and abortions increases. The mother's age has certainly much more influence than the father's: this is easily explained by the earlier decline of the woman's reproductive organs, and by the intimate relation-

ship between the physiological conditions of the mother's organism and the organism of the child during gestation. The frequency of deliveries which require surgical help increases also with the mother's age. The positive relationship between the father's age and the frequency of still-birth is upset by the increase in still-births amongst the offspring of fathers who married at about 25, which is probably due to the greater frequency of syphilitic poisoning among this class.

The results which I shall give now on the vitality of those born, in their post-natal life, agree to the letter with the above-mentioned conclusions.

25. Valuable data are given on this subject by the demographic statistics for New South Wales and by the yearly returns of Budapest. The statistics for New South Wales give separately for both husband and wife, the number of children they have had, the number of children still living, the age at marriage, and the duration of life after marriage. It is, therefore, possible to tabulate the life duration of the parents and percentage of children who survived their father and mother, according to their age at marriage.

Table LII. gives the results of this calculation. The younger the parent at marriage the longer is the mean duration of life after marriage (columns 6 and 12). Other things being equal, the longer the life after marriage the greater is the proportion of children dying before their parents (see Table LIII. for Budapest). The younger the parents at marriage the greater would be the proportion of children who die before their parents, if the age at marriage had no effect on the vitality of the offspring. In practice, with the rise in the age of the father at marriage, the proportion of children who die before him decreases regularly (Table LIV., column 11), on the contrary, the proportion of children who die before their mother decreases with the rise in the mother's age at marriage up to 20 years, then it increases quite clearly (column 5). The women who marry between 20 and 24 witness the death of only 26·6% of their progeny in the 32 years of existence which are left to them. The women who marry at 45 or later witness the death of no less than 35·7% of their progeny in the 18 years of life which are all that are left to them.

These data prove how the duration of the life of offspring decreases rapidly with the rise in the age of the mother at marriage when it is more than 20 years; they do not exclude the possibility of a negative relationship between the duration of the life of the children and the age of the mothers under 20, or between the duration of life of the children and the age of the fathers; they only prove that if a relationship of such a kind exists it is so much weaker that it does not override the positive relationship between the percentage of children dying before their parents and the duration of marriage.

Considering that the amount of life left in the father decreases rapidly and continuously with the rise in his age at marriage, and that on the other

TABLE LII.

Predecease of the offspring to the Mother or to the Father according to the age of the parents at marriage.

New South Wales. Married persons who died in the 12 years 1895-1906. (1)

Age of the mother at marriage. (x)	Predeceased the mother. Number of women married at age x who have died.	Number of offspring. (a)	Number of offspring who predeceased the mother. (b)	Percentage of predeceased cases. *100 b / a*	Duration of life of the woman after marriage in years.	Age of the man at marriage. (x)	Predeceased the father. Number of men married at age x who have died.	Number of offspring. (c)	Number of offspring who predeceased the father. (d)	Percentage of predeceased cases. *100 d / c*	Duration of life of the man after marriage in years.
1	2	3	4	5	6	7	8	9	10	11	12
Less than 15	10,561	558	163	*29·2*	*37·3*	Less than 20	1,537	10,196	2,794	*27·4*	*39·2*
15—19		72,921	19,813	*27·2*		20—24	12,476	78,552	20,062	*25·5*	*34·6*
20—24	14,762	84,223	22,372	*26·6*	*32·5*	25—29	12,473	71,217	16,396	*23·0*	*31·9*
25—29	7,013	30,650	8,430	*27·5*	*31·8*	30—34	6,789	33,897	7,456	*22·0*	*29·8*
30—34	2,461	7,334	2,083	*28·4*	*30·3*	35—39	3,290	14,478	3,205	*22·1*	*28·0*
35—39	925	1,584	520	*32·8*	*28·2*	40—44		6,159	1,379	*22·4*	
40—44	408	250	82	*32·8*	*25·6*	45—49		2,151	439	*20·4*	
45 and upwards	240	14	5	*35·7*	*18·6*	50—54	3,226	755	162	*21·5*	*23·3*
						55—59		195	48	*22·3*	
						60 and upwards		105	19		

(1) The percentage of predeceased cases and the average duration of life after marriage were calculated by the writer. The actual data were taken from *Vital Statistics* of New South Wales by Dr. E. Porru.

hand the percentage of children who die before him decreases slowly and irregularly, especially when he marries at an age lower than 25 years, we can affirm the existence of some negative relationship between the age at marriage of the father and the length of life of the children. The data for New South Wales do not enable us to find out to what extent this is due to the direct influence of the age at marriage of the father,

TABLE LIII.

Predecease of the Offspring to the Parents according to the duration of the married life of the Parents.

Budapest, 1903-1908.(1)

Duration of Married Life in years.	Offspring who predeceased their parents per 100 born.(2)		
	1903-1905	1906-1908	1903-1908
Up to 5	31·1	26·0	*28·6*
5—10	31·9	28·7	*30·4*
10—15	37·0	32·7	*34·8*
15—20	40·5	35·5	*38·1*
20—25	40·5	38·4	*39·4*
25—30	44·6	41·0	*42·8*
30 and upwards	46·4	44·1	*45·2*
TOTAL	41·7	38·8	*40·3*

(1) Percentages worked out by the writer on the basis of the original data drawn by him from the yearly returns of Budapest.

(2) Including the still-born.

or if it is simply due to the indirect influence of the mother's age, to which the father's is closely linked.

Even more interesting are the data given in the annual statistics of Budapest; they give us the number of children born and surviving the death of one of the parents classed according to the age of the father and of the mother at marriage. We can, therefore, calculate the relation between the percentage of children who predecease the parent who dies first and the age at marriage of the two parents. Table LIV. gives the result of these calculations. Looking at the columns we see how, as a rule, the percentage of the children who die before either of their parents increases with the increase of the age at marriage of the mother. Looking at the horizontal lines, we see instead how it diminishes with the rise of the

age at marriage of the father. The last line and the last column can be compared with the data in columns 11 and 5 of Table LII. for New South Wales. The percentages themselves are greater for Budapest than for New South Wales, but their relations to one another are very similar; the mother's age at which the percentage is at its minimum is earlier at Budapest than in New South Wales (17-20, instead of 20 to 24).

If we examine the survival of the children according to the age at marriage of the mother, after correcting for the influence of the father's age, we find that the percentage who survive rises continuously with the decrease of the age at marriage of the mother, till it reaches a maximum

TABLE LIV.

Decease of Offspring prior to the dissolution by death of the marriage of their Parents according to the combined ages of their Parents at marriage.

Budapest. Marriages dissolved by death in the period 1903-1910. (1)

Age of the wife at marriage.	Out of 100 born (including still-born) the deaths prior to the dissolution of the marriage are—							
	Age of the husband at marriage.							Whatever the age of husband at marriage.
	under 20	20—25	25—30	30—40	40—50	50—60	60 and upwards.	
under 17	43·4	39·1	38·1	35·4	28·3	27·0	...	38·7
17—20	53·5	41·6	37·8	34·8			...	38·5
20—25	48·1	44·0	38·6	36·3	33·3		19·3	39·1
25—30		43·8	42·4	39·0	33·7	30·4		40·5
30—40	...	44·5	52·0	42·2	39·6	29·4		41·9
40—50	...			53·6	44·3	33·5	32·5	43·3
50 & upwards	...	...				43·0		47·6
Whatever the age of the wife at marriage	48·6	43·0	39·6	38·2	37·1	32·5	25·9	39·7

(1) Percentages calculated by the writer on the actual data, in part (years 1903-1908) published, in part communicated to him in manuscript (years 1909-1910) by Prof. THIRRING, Director of the Municipal Office of Statistics of Budapest.

for the mothers married at 17 and under (see Table LV., column 2). Although the duration of marriage, for brides under 17, is longer by several decades than for brides of 50 or over, the survival of the children of the former, after correcting for the age of the father, is to the survival of the children of the latter as four to three.

Vice versa, if we examine the relation between the survival of the children and the age at marriage of the father, after correcting for the mother's age, we find that the survival diminishes continuously with the decrease of the age at marriage. We cannot say whether, if the influence of the duration of marriage were subtracted, the survival of children would

TABLE LV.

Index numbers of the Offspring surviving the dissolution by death of the marriage of their Parents.

(a) According to the age of the mother at marriage, eliminating the influence of the age of the father, and *(b)* according to the age of the father at marriage, eliminating the influence of the age of the mother. Budapest. Marriages dissolved by death in the period 1903-1910. (1)

According to the age of the mother. (*a*)		According to the age of the father. (*b*)	
Age of the mother at marriage.	Taking the number of offspring who would survive if the age of the mother had no influence on their survival as 1,000, the actual number of offspring who survived works out at—	Age of the father at marriage.	Taking the number of offspring who would survive if the age of the father had no influence on their survival as 1,000, the actual number of offspring who survived works out at—
1	2	3	4
Under 17	1042	Under 20	838
17—20	1034	20—25	936
20—25	1014	25—30	997
25—30	977	30—40	1030
30—40	941	40—50	1069
40—50	891	50—60	1176
50 & upwards.	774	60 & upwards.	1313

(1) Index numbers calculated by the writer.

be less for fathers who married later, but we can affirm with certainty that, if such a relationship existed, it would be infinitely weaker than that found between the mother's age at marriage and the survival of the children.

26. There remain now to be seen what are the probable causes of the smaller vitality of the children of older brides.

The hereditary influence of a longer duration of life in the women who marry earlier seems to be excluded by Table LVI. The probability of survival, up to the age of 70, among wives, increases with the rise in the age at marriage, till it reaches a maximum for the women who marry between 25-29, then it diminishes, to rise later in relationship with marriages at a later age. When the diversity of development of the sexual organs of the two sexes is taken into account, corresponding facts are shown in the percentages for husbands (Table LVII.) (Note 29).

TABLE LVI.

Probability of survival up to the age of 70 according to age at marriage.

New South Wales. Married women who died in the three years (1901–1903).(1)

Age at Marriage.	For 1,000 married women who died at an age equal to or greater than X the numbers who reach at least 70 years of age are— Age X =									
	20	25	30	35	40	45	50	55	60	65
Under 20	259·8	269·9	288·3	308·8	344·4	383·8	423·9	472·1	550·6	702·7
20—24	...	*280·5*	305·3	331·5	369·0	413·1	462·6	524·3	599·2	726·2
25—29	...	...	*375·0*	*411·1*	*456·9*	*498·0*	*541·3*	*586·7*	*661·8*	*795·0*
30—34	...	...	...	404·8	448·2	487·7	530·1	574·9	645·0	777·8
35—39	...	...	...	...	*467·3*	507·6	531·9	574·7	657·9	787·4
40—44	...	...	...	...	...	*489·4*	*547·6*	589·7	*686·6*	793·1
45—49	...	...	...	...	...	...	516·1	*592·6*	666·7	*800·0*

(1) Percentages calculated by the writer on the actual data which Dr. E. Porru drew from the official publications of New South Wales.

TABLE LVII.

Probability of Survival up to the age of 70 according to the age of marriage.

New South Wales. Married men who died during the three years (1901–1903). [1]

Age at Marriage.	For 1,000 married men who died at an age equal to or greater than X those who were at least 70 years old numbered— Age X =								
	25	30	35	40	45	50	55	60	65
Under 25	266·4	278·9	294·1	322·1	356·1	403·2	456·4	542·4	686·1
25—29	...	*300·4*	319·1	348·7	386·6	436·2	504·2	589·3	716·3
30—34	...	...	*360·7*	*390·5*	*429·8*	*474·2*	*523·8*	598·2	738·3
35—39	...	...	...	383·8	423.2	468·9	523·1	*610·8*	742·4
40—44	...	...	...	...	421·8	463·6	523·0	591·1	*760·8*
45—49	...	...	...	...	...	412·4	459·8	533·3	640·0
50—54	...	...	...	...	...	...	*489·8*	564·7	676·1
55—59	...	...	...	...	...	...	...	*603·8*	711·1
60—64	...	...	...	...	...	...	...	...	*764·7*

[1] Percentages calculated by the writer on the actual data which Dr. E. Porru drew from the official publications of New South Wales.

One might suppose that the longer period during which the sexual organs of the brides who married late, have been left inactive, might impair, even in the later period of life, their regular working. If this hypothesis were true we should find that with the rise of the mother's age the dangers in delivery for the mother should increase especially for those who are at their first delivery. Now the statistics for New South Wales exclude this. The percentage of mothers who died in childbirth is greater at all ages for mothers at their first delivery than for others (Table LVIII., columns 4

TABLE LVIII.

Mortality according to the age of the Mother and the Order of Birth.

Legitimate births. New South Wales, 1893-1900. (1)

Age of the mother at birth.	Primiparae.					Multiparae.				
	No. of confinements.	No. of mothers who died at childbirth.	Mothers dead per 1,000 confinements.		Taking the mortality from 19—21 years of age as 100, the mortality at the respective ages becomes—	No of. confinements.	No. of mothers dead at childbirth.	Mothers dead per 1,000 confinements.		Taking the mortality from 19—21 years of age as 100, the mortality at the respective ages becomes—
1	2	3	4		5	6	7	8		9
18 years and less	4,053	32	7·90	7·636	122 / 114 — 118	592	2	3·38	3·517	123 / 131 — 128
19 years	3,935	29	7·37			1,398	5	3·58		
20 ,,	4,408	23	5·218	5·218	80 — 80	2,740	7	2·555	2·555	93 — 93
21 ,,	5,676	39	6·87	7·144	106 / 114 — 110	4,632	12	2·59	3·551	95 / 154 — 130
22 ,,	5,942	44	7·40			6,634	28	4·22		
23 ,,	5,621	46	8·18	7·761	126 / 112 — 120	8,956	27	3·01	3·316	110 / 130 — 121
24 ,,	4,816	35	7·27			10,644	38	3·57		
25 ,,	4,188	35	8·36	8·131	129 / 121 — 125	11,422	36	3·15	3·615	115 / 147 — 132
26 ,,	3,560	28	7·87			12,647	51	4·03		
27 ,,	2,897	24	8·28	9·145	128 / 157 — 141	13,063	65	4·98	5·553	182 / 223 — 203
28 ,,	2,461	25	10·16			13,769	84	6·10		
29 ,,	1,835	28	15·26	14·825	235 / 226 — 228	13,073	62	4·74	6·436	173 / 249 — 235
30—34 ,,	4,843	71	14·66			59,953	408	6·81		
35—39 ,,	1,623	22	13·56	16·932	209 / 480 — 261	44,055	401	9·10	9·820	332 / 423 — 359
40 and upwards	385	12	31·17			17,963	208	11·58		
Unknown	4	...	...	...	... ...	11	...	...	...	... ...
Total	56,247	493	8·76	...	... ...	221,552	1434	6·47	...	.. ...

(1) Cfr., for the original data, *Vital Statistics of New South Wales, 1900.* Pages XXIV.–XXV.

and 8), but, with the increase in years, the percentage rises more rapidly for the latter than for the former (as shown by the data of columns 5 and 9). We might also expect, according to the above-mentioned hypothesis, that, were the mother's age the same, the mortality of the children would be greater for the first-born than for the others; now this is true for the mortality during the life between conception and birth (as we have seen, examining the influence of the order of birth on still-birth), but it is not proved for post-natal life. Methorst's data for the Hague (Table LIX.) show instead, for the same age of the mother, a higher mortality in the first year of life among the later born than among the first-born.

The hypothesis left is that what has an influence on the duration of life of the children is the age of the mother at their birth, and that the age at the time of marriage has especially, if not solely, an indirect influence, because of its relationship with the age at the time of delivery.

TABLE LIX.

Mortality of Offspring 1 year and under according to the age of the Mother at birth and according to the order of birth.

The Hague. Born in 1908. (1)

Age of the mother at birth.	Mothers of children other than first-born.	Out of 100 children other than first-born there die under one year of age.	Mothers of first-born.	Out of 100 first-born there die at an age under one year.
15—19 years.	24	*25·00*	72	*9·72*
20—29	2,118	*9·02*	1,176	*5·61*
30—39	2,546	*10·21*	235	*6·38*
40—49	476	*10·50*	12	*8·33*
TOTAL (2)	5,169	*9·81*	1·528	*5·87*

(1) Data taken from the communication of W. METHORST, *Mortalité et morbidité des nourissons à la Haye*, &c., read at XIII. Session (September, 1911) of the Int. Institute of Statistics.

(2) Including the mothers of unknown age.

Tables LIX. and LX. acquire therefore a special interest; they show the variation in the mortality of the offspring, according to the age at delivery of the mother. The offspring in the most favourable conditions are, for Table LIX. those born from mothers between 20 and 29; according to Table LX., those of mothers between 21 and 35 (Note 30). Below and above these boundaries the mortality is above the mean. These results agree with those obtained for the frequency of still-births and abortions, which frequency was found to be in most cases higher among children of

very young mothers than of those who were rather older; on the other hand they do not disagree with the results got for Budapest, according to which the percentage of children who died before either of their parents was least for the youngest mothers; but they complete them rather, and explain them. The women who marry at 17 will produce most children between 20 and 30, precisely during the period most favourable to their

TABLE LX.

Survival of Offspring according to the age of the Mother at birth.

Middlesbrough. (1)

Age of the mother at birth.	Births.		Children living.					
			At the end of the 1st year.		At the end of the 6th year.		At the end of the 14th year.	
	Actual No.	Per 1,000 of the total.	Actual No.	Per 1,000 of the total.	Actual No.	Per 1,000 of the total.	Actual No.	Per 1,000 of the total.
20 years and less	57	*77*	45	*75*	43	*71*	38	*64*
21—25	185	*249*	156	*260*	151	*250*	148	*251*
26—30	210	*283*	178	*296*	186	*308*	181	*307*
31—35	168	*226*	130	*216*	135	*224*	138	*235*
36—40	90	*121*	68	*113*	64	*106*	60	*101*
41 and upwards	33	*44*	24	*40*	25	*41*	25	*42*
TOTAL	743	*1,000*	601	*1,000*	604	*1,000*	590	*1,000*

(1) Data taken from the article by R. J. EWART, *The Influence of Parental Age on Offspring. The Eugenics Review.* Vol. III. No. 3. Page 224.

longevity; whilst the women who marry between 20 and 30 will procreate children oftener in a period in which their reproductive organs are already beginning to decline.

27. We have few data on the influence exerted on the vitality of offspring by the difference of age between the two parents. These few are gathered together in Table LXI., and show a slight decrease in the percentage of still-births (Udine, Amsterdam) or of still-births and abortions (Paris), when the age of the two parents is nearly the same (Udine) or when the father's age is slightly greater (Paris, Amsterdam). But we cannot decide whether this is due to a real influence of the difference in age, or whether it is due to an indirect influence of the parents' absolute ages, arising perhaps from the fact that the difference of age is small, when both parents are young. If we correct for the influence of the father's age, the difference of age becomes the direct consequence of the absolute age of the mother; this

is indicated in column 5, which shows that, after correction for the father's age, the frequency of still-births increases rapidly with the increase of the mother's age relative to that of the father.

TABLE LXI.

Frequency of Still-born Children and Miscarriages according to the difference in the ages of the Parents.

When the father's age differs from the mother's by :—	Paris, 1892–1909. (1)	Udine, 1872–1882. (2)	Amsterdam, 1899–1900. (3)	
	Miscarriages and still-born children per 100 legitimate births.	Still-born per 100 legitimate births.	Still-born per 100 legitimate born alive.	Index numbers of the frequency of still-born children and miscarriages, eliminating the influence of the age of the father.
1	2	3	4	5
Years.				
At least + 25	8·48			
From + 20 to + 24	8·12	3·35 (4)	4·61	*736*
From + 15 to + 19	7·60			
From + 10 to + 14	8·49	3·56 (5)	4·59	*859*
From + 5 to + 9	7·65	3·68 (6)	4·32	*942*
From + 1 to + 4	*7·54*	3·46 (7)	*4·04*	*958*
From + 1 to — 1	8·28	*3·08*	4·63	*1137*
From — 1 to — 4	8·15		4·26	*1059*
From — 5 to — 9	8·48	4·30	5·12	*1309*
From — 10 to — 14	6·79		8·55	*2268*
At least — 15	2·77			
Together	7·85 (8)	3·61	4·30	*1000*

(1) Percentages calculated by the writer on the actual data gathered from the Annual Statistics of Paris by Dr. DETTORI.

(2) Percentages taken from F. BRAIDOTTI, *Nuove ricerche sulla natalità ed in ispecie sulla sessualità dei nati* (Nella popolazione di Udine, 1872–1882) Udine. Poretti e soci—1885.

(3) Percentages calculated by the writer on the basis of the data drawn from official publications.

(4) This percentage refers really to the fathers who are at least 16 years older than the mothers.

(5) Fathers who are 11—15 years older than the mothers.

(6) ,, ,, 6—10 ,, ,, ,,

(7) ,, ,, 1— 5 ,, ,, ,,

(8) Includes births of which the difference in the parents' ages is unknown.

28. The relation between the intelligence of children and the age of their parents is the subject of interesting researches made in Italy, by Marro, on children of 7 to 10 years of age; the percentage of intelligent children

was found to be higher, and that of the dull children lower, the younger the parents were (Table LXII.) (Note 31). The influence of the mother's age seems stronger than the father's.

TABLE LXII.

Intelligence of Children (7—10 years) according to the ages of the Parents at Birth. (1)

Age of the Father.	Per 100 Children.		Age of the Mother.	Per 100 Children.	
	Good Intelligence.	Poor Intelligence.		Good Intelligence.	Poor Intelligence.
Up to 25 years	46 (44) (2)	26 (28) (2)	Up to 21 years	43·4	28·3
26—40	38 (247)	28 (181)	22—36	39·8	28·5
41 and upwards	37 (71)	30 (58)	37 and upwards	31·0	34·4

(1) From the Preface of C. LOMBROSO to *L'eredità nelle famiglie malate* di I. ORCHANSKY, Torino, Bocca, 1895, Page VIII.

(2) The numbers in parentheses indicate the actual number of children with good or poor intelligence respectively.

Similar researches, carried out by Ewart in England, give the greatest frequency of intelligent children when either the mother or the father is between 26 and 30 (Table LXIII., columns 3 and 6); if we separate the influence of the age of one parent from that of the other's (columns 4 and 7) the results are the same. Some irregularity is found, especially for the fathers, in the later ages. Perhaps the cause of it is the rather unsuitable standard used by Ewart to test the degree of intelligence of the children. He classified as intelligent those children who at six could read and understand stories; but this standard is better suited to test precocity than intelligence in the children examined, and the results may have been affected by the different ages at which, in the different classes of society, intellectual education of the children begins. Intellectual education is begun earlier, and marriage, especially for the man, is contracted at a later age in the higher classes of society: to this, perhaps, can be attributed the rather great frequency of children classified as intelligent when the father is above 40. The frequency of feeble-mindedness varies with the mother's age, according to Ewart's results, inversely with the frequency of intelligent children (Table LXIV.); it is smallest when the mother is between 21 and 25, and it rapidly increases above and below these limits.

Marro has also investigated what effect the increase of the father's age has on the temper of the children, and has found that as the father's age rises the percentage of gay natures diminishes (it was of 83% amongst the children of young fathers, 68% when the father was middle aged, and

TABLE LXIII.

Intellectual Development at the end of the sixth year according to the ages of the Parents at birth.(1)

Age of the Parents in years.	According to the Age of the Mother.			According to the Age of the Father.		
	No. of observations.	Percentage of children with superior intellectual development.	Index numbers of the frequency of children with superior intellectual development, eliminating the influence of age of the father.	No. of observations.	Percentage of children with superior intellectual development.	Index numbers of the frequency of children with superior intellectual development, eliminating the influence of age of the mother.
1	2	3	4	5	6	7
Up to 20 years	61	*24·6*	*84*	20	*27·7*	*102*
21—25	243	*27·1*	*90*	175		
26—30	304	*37·5*	*116*	260	*36·5*	*110*
31—35	171	*28·1*	*100*	222	*28·8*	*90*
36—40	106	*23·6*	*88*	141	*25·5*	*91*
41 and upwards	49	*24·5*	*89*	116	*27·6*	*108*

(1) The percentages and index numbers were calculated by the writer on the basis of the actual data of R. J. EWART, *The Influence of Parental Age on Offspring. The Eugenics Review*, Vol. III., No. 3, October, 1911, pag. 218.

TABLE LXIV.

Number of Feeble-minded amongst children of 7—10 years according to the age of the Mother. (1)

Age of the mother in years.	Number of children born and surviving at 7—10 years.	No. of feeble-minded surviving at 7—10 years.	Feeble-minded per 1,000.
20 and under.	650	5	*8*
21—25	2550	7	*3*
26—30	3050	17	*5*
31—35	2370	19	*8*
36—40	1140	10	*9*
41 & upwards	220	5	*23*
TOTALS	9980	63	*56*

(1) Data taken from R. J. EWART, *The Influence*, etc. Op. cit.

66% when the father was old). These results agree with and complete those worked out on the vitality of children according to the age of the fathers, as a gay disposition is one of the surest signs of a high vitality.

29. All the data examined as to the characters of the children according to the age of the parents—their weight and length, their longevity, their intelligence and temper—agree in showing that, the younger the mother at delivery the better are found to be the characters of the offspring. There is only one exception, not of a constant character, namely, that the children of very young mothers (below 20 or 17), according to some observations, are found to be not quite so well gifted as those of slightly older ones. The father's age seems to have an influence similar to that of the mother's, though much lighter, and only for few characters. One cannot affirm from the scanty data we possess that any influence is exerted by differences in the ages of the two parents.

The age of the parents at marriage is linked to their age at the birth of the children. The youngest couples will produce the greater part of their children during that period of life (20-25 for the woman; 25-35 for the man) which seems most favourable to the characters of the chilldren; therefore we must expect the children to be the better, the younger their parents are at marriage; the results obtained concerning the influence of the age at marriage of the mother confirm this conclusion.

When we think that marriages contribute the more to increase the population, the earlier they are, on account of the greater fertility of early marriages and their less frequent sterility, also because of the shorter interval between two generations, we must recognize that in this field the interests of society harmonize with those of the individual. And if we remember that marriage is usually contracted at a very early age among the less civilized nations, and that the age of marriage rises with the rise in civilization, we cannot help wondering whether it may not be a demographic character (one cannot say how important a one) which rules the evolution of nations (Note 32). Nations would produce, at the beginning of their civilization, stronger, more intelligent, and happier children; but these advantages would slowly be lost with the progress of the nation and with the rise in the marriageable age. Progress in medicine and hygiene, greater care at home, a higher and more intensive and rational education would be more than sufficient to compensate for such physiological impoverishment of the race; but the latter would show itself when progress of this kind came to a standstill, and would contribute towards the decadence of the nation. It is a common custom to speak of young populations and of old populations; and we all feel that in such a phrase there is more than a simple metaphor. The different age at which marriages are contracted can give us a reason, although partial, for such a contrast (Note 33).

Chapter V.

Social factors of counter-selection.

30. The strengthening of the sentiment of social fellowship, caused by natural selection and social education, has brought with it the diffusion and intensification of pity for the weak and the degenerate. This has now increased to a dangerous extent, and has led to measures which give cause for serious thought to sociologists. By means of special care and treatment, the weak and degenerate are, among modern civilized nations, saved from the selective action of nature, and placed in a position to live and multiply.

We have, doubtless, here one of the factors of counter-selection, which, according to some authors, threatens to bring our civilizations to the ground.

Another factor of counter-selection would be found in the diminished fertility of the higher classes, which, generally speaking, represent in every respect, the flower of the population.

31. These fears are founded on the idea that the good or bad characters of the parents are transmitted to the children; especially the greater or less amount of vitality.

That robust or weak people produce respectively robust or weak children is a well-known phenomenon. Pearson (Note 34), Westergaard (Note 35), Ploetz (Note 36), have tried to measure the amount of vitality inherited.

Pearson's data, given in Table XLV., refer to well-to-do Quaker families; they show how, bar slight irregularities, the mortality of the females under 21 diminishes with the increase of the age of the father and mother at death. Similarly Ploetz, working with two lots of data, one relating to the middle classes, and the other to reigning families, has ascertained that mortality of the children during infancy (before 5) diminishes with the rise of the parents' age at death. Westergaard, working on Ansell's data, for well-to-do English families, has found that, when the mother dies over 70, the actual number of deaths is to the theoretical one, calculated on the mortality of all families, as 950 to 1,000: this proportion becomes 943 to 1,000 when both the parents died over 70. The results are similar for reigning families: when the mother died over 70, the actual number of deaths is to the theoretical one as 926 to 1,000 in the marriages contracted between 1750—1795, and 901 to 1,000 in those between 1800 and 1839 (Note 37).

These researches are certainly worthy of serious consideration, but we must not forget that they refer to the middle and higher classes. Now the causes of death due to want of care for the children on the part of their parents, and to the ignorance of the rules of hygiene, and therefore quite independent of the amount of vitality of the organisms, have a much greater importance amongst the lower classes, which constitute the bulk of the population. Therefore, we cannot apply these results—obtained by the above-mentioned authors for the higher classes—to the whole population.

TABLE LXV.

Mortality of offspring according to the duration of life of the parents. (1)

According to the duration of life of the mother.			According to the duration of life of the father.		
Age of the mother at death.	No. of observations.	Out of 100 daughters the number who die before the age of 21 is—	Age of the father at death.	No. of observations.	Out of 100 daughters the number who die before the age of 21 is—
19—29	49	*73·5*	24—34	47	*72·3*
29—39	185	*65·9*	34—44	126	*65·9*
39—49	216	*56.9*	44—54	218	*54·1*
49—59	188	*59·0*	54—64	312	*46·2*
59—69	295	*39·0*	64—74	511	*39·5*
69—79	453	*35·8*	74—84	559	*34·7*
79—89	374	*24·3*	84—94	213	*33·3*
89 and upwards	86	*25·6*	94 and upwards	23	*30·4*
TOTAL	1,846	*42·4*	TOTAL	2,009	*42·5*

(1) Data taken from K. PEARSON. *The Groundwork of Eugenics. Eugenics Laboratory Lecture Series II.* London, Dulau and Co., 1909. Pages 25-26.

It is highly probable nevertheless that, if similar researches are conducted for whole populations, the results will only differ in degree from those already obtained. A proof of this can be obtained from Tables LXVI. and LXVII., which deal with the proportion of children who survive their parents, classed according to the age of these at death, for New South Wales. With the increase of the age at death of the parents, the percentage of children (Table LXVI., columns 5 and 9) who predecease them naturally rises; but not as much as we would expect from the increased duration of marriage (columns 4 and 8). The phenomenon is particularly notable for centenarians; in 64 years (the average duration of life after marriage for centenarian males), only 28·5% of their children die, and in 74 years (the average duration of life after marriage for the centenarian women), only 38·7% (see Table LXVII.).

Researches of this kind will only give us the amount of resemblance between the longevity of the parents and that of their children: not the measure of the physiological heredity of vitality. Community of surroundings, similiarity of economical conditions and profession, family traditions as to hygiene and diet would lead one to expect some kind of resemblance between

the duration of the parents' life and that of their children, quite independently of any physiological inheritance of vitality. In practice it is impossible to ascertain how much of the resemblance between duration of life of parents and that of their children shown by statistics is due to physiological, and how much to social, factors.

TABLE LXVI.

Frequency of cases in which the children survive the parents and length of life of the parents after marriage according to the age of the parents at death.

New South Wales.

Age of the Parent at death.	Mothers.				Fathers.			
	Average age at death.	Average age at Marriage.	Average length of life after marriage.	Percentage of children who survive their mother. (Mothers who died in the three years 1898–1899.)	Average age at death.	Average age at marriage.	Average length of life after marriage.	Percentage of children who survive their father.
	Mothers who died in the three years 1901–1903.				Fathers who died in the three years 1901–1903.			
1	2	3	4	5	6	7	8	9
Under 25 years	22·0	19·8	*2·2*	*84·6*	22·8	21·0	*1·8*	*88·9*
25—29 ,,	27·1	21·4	*5·7*	*85·1*	27·5	23·7	*3·8*	*86·9*
30—34 ,,	32·0	22·6	*9·4*	*83·6*	32·3	25·3	*7·0*	*86·6*
35—39 ,,	37·1	22·5	*14·6*	*83·0*	37·1	26·2	*10·9*	*87·6*
40—44 ,,	41·9	22·4	*19·5*	*79·0*	42·0	27·1	*14·9*	*83·1*
45—49 ,,	46·8	23·0	*23·8*	*76·0*	47·0	27·4	*19·6*	*82·2*
50—54 ,,	51·9	22·5	*29·4*	*76·7*	52·1	27·9	*24·2*	*80·6*
55—59 ,,	57·2	23·0	*34·2*	*74·0*	57·0	28·3	*28·7*	*79·7*
60—64 ,,	62·1	22·8	*39·3*	*71·4*	62·0	28·7	*33·3*	*78·0*
65—69 ,,	67·0	22·7	*44·3*	*69·7*	67·0	28·7	*38·3*	*75·0*
70—74 ,,				*68·5*				
75—79 ,,				*65·8*				
80—84 ,,	...	23·8	...	*63·7*	...	29·2	...	*71.4*
85—89 ,,				*61·2*				
90—94 ,,				*55·4*				
95 and upwards				*57·9*				

(1) Data taken from *Vital Statistics* and worked out in part by the writer, in part by DR. E. PORRU.

In any case, even though the inheritance of vitality cannot be statistically measured, we can with certainty admit (both by analogy with what has been ascertained in regard to other characters, and from what we know through biology, as to the causes of the duration of life and as to the

mechanism of heredity) that, to some extent, it exists. There can be no doubt therefore as to the danger for the race caused by all measures, which have the result of allowing the weak and the feeble-minded to live and multiply, more than nature would itself have allowed.

TABLE LXVII.

Frequency of cases in which the Children survive the Parents, and length of life of the Parents after marriage in Centenarians.

New South Wales. Centenarians who died in the twelve years 1895-1906. (1)

	Sex of the Centenarians.	
	Males.	Females.
No. of Centenarians who died	60	33
Average age at death	102·0	101·7
Average age at marriage	37·7	27·5
Average length of life after marriage	*64·3*	*74·2*
No. of offspring	277	150
No. of surviving offspring	198	92
Percentage of survivors	*71·5*	*61·3*

(1) Data taken from *Vital Statistics* and worked out by the writer.

The doubt can only arise as to the importance of such measures, and, therefore, to the amount of damage caused. Pearson has published data which prove that fertility is greater among pathological than among normal families. They are given in Table LXVIII. The data for normal families, however, refer too often to middle and higher class families, universally known to be less prolific; further, there is no explanation as to the way in which, for each single case, the statistical data have been obtained, so that there is some doubt as to the fairness of the comparison (Note 38).

The data we give in Table LXIX. seem to us free from any such objection. They are based on a very large number of observations (see column 2); they concern all the dead belonging to the whole of a country (New South Wales). They are taken from official publications, and thus any possibility of bias arising through the method of collecting the data is excluded; they give for the different categories of deceased, the average number of their children, and of the children surviving at the death of every married individual, so that the results obtained for the different categories are strictly comparable.

TABLE LXVIII.

Fertility in Pathological and in normal stocks. (1)

PATHOLOGICAL FAMILIES.

Description of the families.	Authority.	Nature of Marriage.	Average No. of offspring per marriage.
Deaf mutes, England	Schuster	Probably completed	6·2
,, ,, America	,,	,,	6·1
Tuberculous Stock	Pearson	,,	5·7
Albinotic Stock	,,	,,	5·9
Insane Stock	Heron	,,	6·0
Degenerates, Edinburgh	Eugenics Laboratory	Incomplete	6·1
Mentally defectives, London	,, ,,	,,	7·0
Mentally defectives, Manchester	,, ,,	,,	6·3
Criminals	Goring	Complete	6·6

NORMAL FAMILIES.

Description of the families.	Authority.	Nature of Marriage.	Average No. of offspring per marriage.
Middle Class, England	Pearson	At least 15 years, begun before 35	6·4
Family Records, England	,,	Completed	5·3
Intellectual Class, England	,,	,,	4·7
Working Class, New South Wales	Powys	,,	5·3
Professional Class, Denmark	Westergaard	Duration of at least 15 years	5·2
Working Class, Denmark	,,	Duration of at least 25 years	5·3
Ordinary Artisans, Edinburgh	Eugenics Laboratory	Incomplete	5·9
Ordinary Artisans, London	,, ,,	,,	5·1

(1) Data taken from K. PEARSON, *The Scope and Importance to the State of the Science of National Eugenics. Eugenics Laboratory Lecture Series I.* London, Dulau & Co., 1911.

For consumptives, for suicides, for insane, the average number of their children and of those surviving (this last datum is missing for the suicides) is clearly less than that of the whole of the married deceased. On the other hand, the averages for people who died of cancer and of heart disease are slightly higher. But we must avoid considering people who died of these two last ailments as weak or unsuited to life, because both illnesses attack people usually advanced in years, who have already

successfully battled against the traps that death lays for youth and early middle age; in fact, the average age at death of married people who died of cancer or heart disease is somewhat higher than that of all the deceased married people (column 6).

In conclusion, we can say that the data for New South Wales show, for people physically (consumptives), intellectually (insane), morally (suicides) weak or degenerate, a productivity at marriage below normal, and for some kinds of married people (with cancer, heart disease, etc.) who show a duration of life over the mean, a productivity above normal. We cannot exclude the possibility that the state of things is different in England from that in New South Wales; but one cannot see any reasons for such a difference, and it would not be prudent to assert it, until we have data safer than those given by Pearson, or until the way in which these data were collected and used is made more clear.

Column 5 of Table LXIX. gives the percentages of children who predeceased their parents grouped according to the sex and cause of death of the latter. The percentage is higher throughout for the mothers, because of their longer duration of life after marriage in comparison with the fathers. For the children of those who died from heart failure and of the insane, the percentages of those who died before their father, 24·1 and 23·6 respectively, and their mother, 27·7 and 27·0 respectively, are not substantially different from the percentages for the children of all deceased married people (for the males 24·0, for the females 27·3). They are found to be slightly lower for the children of parents dying from cancer or consumption. The age at death of the fathers is, for those who died of cancer or of heart failure, much higher, and for the insane, and especially for the consumptive, lower than for the whole of the married deceased. Assuming that all these categories of married people were married at the same mean age, we might conclude that the children of parents who die of cancer are perceptibly above the average in surviving their parents, although the latter live a little longer than the average; that the children of parents who die of heart failure survive their parents to about the same extent as the average, while the latter live to well beyond the average age; that the children of consumptive parents are perceptibly above the average in surviving their parents, while the latter have shorter lives than the average, and that the children of the insane, survive their parents to about the average extent, while the latter have perceptibly shorter lives than the average. These results would point to the conclusion that the children of consumptive and insane parents have a shorter life, and those of parents deceased through cancer or heart failure a longer life, than the average; this would confirm the similarity between the vitality of parents and their children which we have ascertained by other means.

32. Another factor in the degeneration of our civilization would be found in the smaller fertility of our higher classes, as compared with the lower

ones. That such a difference exists there is no doubt whatsoever. I have been able to calculate that during the period of one generation the relative number of employers in the French population diminishes by 20% whilst the total population increases by 5%. In Italy this class increased during one generation by 14%, while the whole population grew by 34% (Note 39). Similarly, in New South Wales, 100 people of the higher classes left at

TABLE LXIX.

Frequency of cases in which the Children predecease their Parents, and cause of the death of the Parents.

New South Wales.

Cause of Death and Sex of the Parent.		Total No. of offspring.	Average No. of offspring.	Average No. of surviving offspring.	Percentage of children who predeceased the parent.	Average age of the married persons who died during the years 1904-1906.
		Married persons who died during the years 1895-1906.				
1		2	3	4	5	6
Died of Cancer	Males	22,372	5·99	4·60	*23·2*	57·1
	Females	22,949	5·66	4·23	*25·3*	55·4
	Total	*45,321*	*5·82*	*4·41*	*24·2*	*56·2*
Died of diseases of the heart	Males	28,163	5·51	4·19	*24·1*	58·0
	Females	25,081	5·85	4·23	*27·7*	56·5
	Total	*53,244*	*5·67*	*4·20*	*25·8*	*57·3*
Died from Phthisis	Males	14,710	3·99	3·10	*22·2*	44·3
	Females	11,879	3·92	2·99	*23·7*	40·6
	Total	*26,589*	*3·96*	*3·05*	*22·9*	*42·7*
Insane d'ths from any cause	Males	3,936	4·08	3·12	*23·6*	53·6
	Females	2,510	3·80	3·77	*27·0*	53·8
	Total	*6,446*	*3·97*	*2·98*	*24·9*	*53·7*
Suicides	Males	3,519	4·59	—	—	—
	Females	825	3·80	—	—	—
	Total	*4,344*	*4·42*	—	—	—
All married	Males	221,488	5·27	4·01	*24·0*	56·5
	Females	199,983	5·31	3·86	*27·3*	54·4
	Total	*421,471*	*5·29*	*3·94*	*25·6*	*55·5*

(1) Data taken from *Vital Statistics*, and worked out by the writer.

their death (1895-99) 111 descendants; 100 people belonging to the lower classes left 120 (Note 40). If we could allow accurately for the difference in length between a generation in the higher classes and one in the lower, the difference in fertility would probably be somewhat higher (Note 41).

Amongst well-to-do people the richest, and amongst the higher classes the most exceptional are again those who reproduce least (Note 42).

One easily understands why this difference in fertility should be prejudicial to the welfare of the race. The higher classes are constituted mainly of people who have either risen above the others by intelligence, strength of will, or hard work, or are relatives or descendants of such people. If their descendants are destined to a progressive reduction of number, absolute or relative, this means that the representatives of the best components of the race are also doomed to a progressive reduction; and the lower strata from which the higher classes continue to renovate themselves will be left in time quite destitute of their better elements, and will end by supplying them only with more and more inferior people. It is deemed advisable, in conclusion, to stimulate the reproductivity of the higher strata of society.

We must not forget, however, that it is not proved that the phenomenon of the smaller productivity of the leading classes is peculiar to the more civilized societies of our times, but it seems likely that it happened to some extent in all ages. There are reasons for believing that, when society has reached a certain degree of economic evolution and shows phenomena of demographic arrest, the difference of reproductivity between the different classes reaches a certain intensity (Note 43) (thus, in our time, in France, it is stronger than in Italy and New South Wales), and causes a serious uneasiness in the social organism. But to account for such uneasiness, we have only to think that, when the difference of reproductivity between the different classes is too great, the ascent from the lower to the higher strata becomes too rapid, so that many enter the governing classes without having received, in their familiar surroundings, the mental and moral training necessary for their new position; it is not necessary to admit that they are physiologically inferior. To-day in France, as at the time of Imperial Rome, the *homines novi* may be accused by the descendants of the ancient governing classes of lack of ideals, not of lack of intelligence nor of physical degeneracy.

On the other hand, to affirm that a smaller reproductivity of the governing classes constitutes to a certain extent a normal phenomenon of the human societies is to deny that it represents, at least as long as it remains within these bounds, a factor of degeneracy.

To judge, however, with certainty of the effects which it may have on the race, it would be necessary to have a deeper knowledge than science has yet provided of the circumstances that determine the individual characters, and on their relative importance. At the present stage of our knowledge one can only put forward suggestions and formulate opinions.

That heredity constitutes one of the factors determining the characters of the individuals is quite certain, and we must therefore admit that there is a *tendency* in the germ-plasm of the lower classes to impoverish itself owing to the calling into the higher classes of their better elements. But it

is just as possible that such a tendency is balanced, at least normally, by opposite tendencies. One of such tendencies might find its origin in the different life "régime" of the lower and higher classes. It is a fact of common observation, and it is confirmed by medical authorities that a life of manual labour, which is the life of the lower classes, is more apt to strengthen the reproductive functions than the life of intellectual work led by the governing classes; and it is not at all absurd to suppose that the germ-plasm of the working classes, either through direct influence of the organic replacement, or by a more active germinal or seminal selection, might go on improving, and that on the contrary, because of the opposite conditions, the germ-plasm of the intellectual classes might slowly deteriorate. One can understand therefore that it does not necessarily follow, from what we know of heredity, that the children of the higher classes—if they were subjected from birth, or better, even from conception, to the same life "régime" to which the children of the lower classes are subjected—would succeed better than these, or, on the other hand, that the children of the lower classes would turn out inferior to the children of the higher ones, if even from conception they benefited by the same conditions of life. There are, on the other hand, facts in favour of the contrary conclusion; thus there is more sterility and a percentage of still-births not regularly lower, amongst the higher classes, in spite of the fact that they can avail themselves much more of the rules of hygiene and of the discoveries of medicine (Note 44).

Now, until it is shown that the children of the lower classes—if they were brought up from conception in the same surroundings as the children of the higher classes—would turn out inferior to these, it is not proved that, by stimulating the reproductivity of the higher classes, one would improve the race more than by leaving their place to be occupied by the children of the people.

In this connection the attention of the Eugenist should be called to some biological theories, from which the phenomenon of replacement among the social classes might appear in a totally different light. The theories I am alluding to are not, in truth, very recent, but are meeting nowadays with greater and greater favour (Note 45). They go back to Nägeli and in part also to Lamarck. According to these, the germ-plasm of the species, like the somatic cells of the individual, has a life of its own, it would, that is to say, evolve through internal forces, even if the surroundings did not change; but such specific evolution, like the individual evolution, would have some limits, above which the species would become stationary, to lastly move towards decadence and extinction.

He that accepts this theory must ask if it is possible that the evolution of the germ-plasm goes on in all individuals in perfect synchronism; or if, instead, it is not much more probable that it goes on with different velocity in the different individuals. The individuals in which the germ-plasm

is most evolved would be leading the progress of the nation; in the human species, they would, in other words, constitute the leading classes of this population. The fact shown by history, that the higher classes forerun the population in the evolution of the tastes and thoughts, would find its reason in a profound biological cause. On the other hand, however, those germ-plasms which have a more rapid progress, would also have a more rapid decadence; and thus the evolution of the germ-plasm would resemble that of the soma, as in the latter case individuals who have a precocious maturity have also a precocious senility.

Whether this supposition fits in with the truth it is difficult to decide in the present state of our knowledge, and because of the disturbing influence sometimes introduced, in single cases, by the combination of differently evolved germ-plasms: certainly, however, on one side it fits in with the statistical results obtained on the normal transmission of characters; on the other, it explains what we know on the inheritance of genius.

The researches of the biometric school have removed all doubt as to whether intellectual and artistic tendencies, as well as physical characters, are inherited to some extent; but on the other hand history shows to any cultured person, and special researches confirm, that those people who most distinguished themselves for brain power, the real geniuses, though often children of intelligent people, hardly ever left descendants worthy of themselves (Note 46). One might say, in fact, that they represent the top of the parabola described by the development of the germ-plasm, which, after them, rapidly falls off and degenerates. And often even in them already one finds signs of degeneracy, a fact which has led a famous anthropological school to assert the association of genius with insanity. Very often from the same stock rise other eminent persons; but they are not, except in very few cases, direct descendants of the genius, but collaterals or descendants of collaterals; they represent tops of other parabolæ in the evolution of the germ-plasm of the same stock, but belonging to other branches.

These suggestions are put forward not as a new theory on the consequences of the replacement of the classes of society, but as tending to show that the state of ignorance in which we find ourselves as to the biological factors in the production of human characters, allows the formulation of many new hypotheses, and especially of optimistic ones. For, one understands how, if the theory mentioned above corresponds to the truth, it is providential that the descendants of the higher classes, whose germ-plasm is destined to precocious decadence, should gradually become extinguished, to make room for the new stocks whose germ-plasm is approaching the summit of the parabola of evolution. Artificially to stimulate reproduction in the higher classes, and check that of the lower ones, would be equivalent to trying to improve society by increasing the duration of the life of the old and preventing new generations from taking their place.

33. In conclusion, on the subject of the factors in counter-selection, which, according to some sociologists, is undermining modern societies, we say :—

(*a*) That the systematic defence of the weak and degenerate beings must certainly lead to consequences deleterious to the race, but it does not appear that such consequences have as yet reached such a dangerous level that the reproductivity of the weak and degenerate is greater than that of normal people. One must add however that, independently of their greater or less fertility, the actual presence of these weak beings, where they are not strictly isolated, is a danger in itself, for they constitute a favourable field for the development of illnesses, and can become, one might say, actual cultures of microbes, to the manifest danger of healthy people.

(*b*) That the constant renewing of the leading classes from the lower strata of society seems a normal phenomenon of human societies; that it can become dangerous to the balance of the society when it reaches a certain intensity; but that it is in no way proved that it is deleterious to the physical and intellectual characters of the race.

Chapter VI.

Conclusions.

34. In the course of this work we have ascertained :—

(*a*) That the peculiarity shown by the human race of reproduction at all seasons of the year cannot have, of itself, any deleterious influence on the character of the offspring. It can, however, have a deleterious influence, in that it makes it possible for deliveries to follow each other at a distance of less than a year, and it favours those with an interval of less than two years.

(*b*) That the habit of marrying only at an age more or less advanced has certainly a very deleterious influence on the characters of the offspring. The younger the father, and especially the younger the mother, at marriage, and greater is the vitality, and the better the physical and intellectual characters of the offspring, not because the earlier part of life seems to be, in all ways, the most suited to successful reproduction, but because the youngest couples will procreate most of their children during the period in which the sexual functions are in their prime, and during which the characters of the offspring turn out to be best.

(*c*) That the systematic defence of the weak and degenerate, which prolongs their life and allows them to reproduce, is certainly deleterious to the vital resistance of the race, both directly by leading to the procreation of a greater number of beings of inferior quality, and indirectly by causing what one might call "microbe cultures" to be formed, from which disease spreads to the healthy also.

There is no doubt that if civilized societies went back, in the procreation and nurture of the offspring, to the primitive customs, putting no checks to the work of natural selection, not retarding the marriage age, putting between two consecutive deliveries an adequate interval (one must not think of going back to a yearly season of procreation, provided it ever existed), and limiting, at least in some countries where it is used without need, artificial feeding, human mortality during development might be notably diminished.

This does not necessarily mean that the high mortality—which our species shows in comparison with the higher animals—is essentially due to its having departed from the rules which nature seems to have dictated on the subject of procreation and nurture of the products.

Among the Indian tribes of the South-Western United States and Northern Mexico, studied by Hrdlicka, feeding is always natural, and lasts as long as possible, so that the possibility of a sequence of deliveries at short intervals is excluded (see Note 16); women and men marry at a very early age (see § 15); and the work of natural selection, instead of being hindered, is favoured by man, who destroys the deformed (rarely born) children (Note 47). The mortality during development is, however, much higher among such tribes than among our civilized societies, and enormously high, therefore, in comparison with that shown by the higher animals. From the data gathered by Hrdlicka, it appears that 37 women of the tribe of San Carlos Apache of advanced age (45 years and more) gave birth to 258 children, of whom only 103 (39·92%) were still alive; similarly 35 women of the tribe of Pima gave birth to 246 children, of whom only 83 (33·74%) were still alive (Note 48). If one thinks that in New South Wales 71·5% of the children of male centenarians, and 61·3% of the children of female centenarians, survive their parents, one sees how the keeping to some of the natural laws of procreation and nurture of the offspring is more than compensated for by the action of other circumstances, such as the fewer comforts in life, and the absence of hygiene and medical knowledge.

If the high mortality during development is therefore a phenomenon common to all human populations for which we possess data, it is nevertheless evident that its causes are different for different populations. It is therefore difficult to assert whether or not this phenomenon constitutes a natural and organic characteristic of the human species, since one would have to decide first which, out of the several populations, so deeply different in habits, sentiments, and knowledge, possesses what one should call the natural atmosphere of the human species.

Such an altogether theoretical problem can be as well left unsolved, since we are satisfied that there are well defined means for lowering the high mortality during development among civilized societies. Of such means (longer interval between deliveries, natural feeding, earlier marriages, obstacles to the reproduction of the weak and degenerate) the one which seems practicable even from to-day is the lowering

of woman's age at marriage. For it neither goes against selfish sentiments or hygienic necessities, such as those which cause artificial feeding; nor against instincts which are difficult to control, such as those which cause the short intervals between deliveries; nor against economic reasons, as those which in modern society, and especially among the higher classes, cause men to postpone marriage; nor against sentiments of pity, affection among relatives, or instincts of independence, such as those which make it difficult for the present to check the reproduction and maintenance of the unfit. It is also concordant with the girls' desires and the æsthetic sentiments of the men.

It is to be hoped that the knowledge of the improvement in the vitality of the offspring to be derived from the early age of the bride may spread and not remain fruitless, especially among some classes of society. To have shown and proved these advantages, by working on numerous statistical data, represents, according to our point of view, the chief result of this article.

NOTES.

(1)—Number of survivors at 20 years of age on every 10,000 born in these countries :—

Table of survival referring to	Years to which the Table refers	Survivors at age of 20, on every 10,000 born.
India ... Males	1901	4516
„ ... Females	„	4519
Spain ...	1880–84	4960
Ireland ...	1881–90	7767
Denmark ... Males	1895–900	7671
„ ... Females	„	7855
Sweden ...	1891–900	7816
Norway ... Males	1891/92–1900/901	7770
„ ... Females	„	7997
West. Australia Males	1899–902	7727
„ „ Females	„	8075

See *Statistique internationale de la population*, published by *Statistique Générale de la France*. Paris. Imprimerie Nationale, 1907.

(2)—At four years exactly 90,645 horses survive out of every 100,000 born. See Caramanzana, *Ensayo de una "Tabla de Mortalidad" de los équidos domesticos*. Congreso de las ciencias de Valencia. Sección actuarial, published in the Boletin Oficial de Seguros. Ministerio de Fomento, Ano I. Num. 10, 30 Junio, 1910. Madrid, R. Rojas, 1910.

(3)—From the tables of mortality in the above-mentioned *Stat. internat. de la population*, I find the maximum number of survivors after the first year of life=9,054 on every 10,000 born in Ireland (1881-90), and=8,947

on every 10,000 males and 9,132 on every 10,000 females born in Norway (1891-92—1900-01). The minimum survival at one year of age is given by Baden (1881-90) with 7,163, by Saxony (1900) with 7,232, and by India (1901) with 7,146 survivors for the males, and with 7,412 for the females on every 10,000 born. The survival at one year of age amongst the native population of Egypt appears to be even smaller according to the data found in the "*Annuaire Statistique de l'Egypte*," 1911. *Ministère des finances. Direction de la Statistique.* Le Caire, Imprimerie Nationale, 1911. Between 1902 and 1910, deaths under one year of age represented 28·94% of the births.

(4)—These are the co-efficients of mortality between one and 17 years according to the calculations of Caramanzana and the observations of the "Scandinavian Society for the Insurance of Live Stock."

Age in Years.	Death Rate for Horses.	
	Caramanzana	The Scandinavian Society for the Insurance of Live Stock
1	2·10	1·98
2	2·20	1·32
3	2·30	1·34
4	2·40	1·60
5	2·50	1·85
6	2·60	2·01
7	2·70	2·21
8	2·85	2·47
9	3·00	2·54
10	3·15	2·90
11	3·30	2·82
12	3·45	3·28
13	3·60	3·40
14	3·75	3·94
15	4·00	4·03
16	4·50	4·03
17	5·00	4·15

The difference would be somewhat higher if we could take into account the fact that the co-efficients of the Scandinavian Society include disabled horses, and are, therefore, rather higher than they would be were death only taken into account. The number of horses insured was :—

6,000 at end of 1892 ; 39,000 at end of 1895 ; 62,000 at end of 1900 ; 101,000 at end of 1905 ; 105,500 at end of 1910.

For further information see the article *L'assurance du bétail en Suède et les nouvelles tables de mortalité des chevaux* in the *Bulletin du Bureau des institutions économiques et sociales*, Second year, Number 8.

31/8/11. Rome. Imprimerie de la chambre des deputés, 1911.

(5)—See for these data H. Westergaard. *Die Lehre von der Mortalitat und Morbiditat.* Jena, Fischer, 1901. Pages 402-3 and 489.

(6)—We must, of course, consider for the two species classes of age comparable with one another; and we may fairly say that, considering development, five years in man is equivalent to one year in the horse.

In Germany (1900-1907) and in Luxemburg (1901, 1904, and 1907) the register of the number of horses gave a total of 422,724 under one year of age. The total number of births registered during the preceding twelve months was 440,547. The total births in one year were to the number of horses alive under the age of one year as 100 to 96. In Italy the 1901 census gave 4,116,511 persons under five years; while in the five years between 1896 and 1901 there were 5,423,361 births. The total births in five years were, to the number of persons under five years, as 100 to 76.

In Hungary (1895), in Germany (1900 and 1907), and in Luxemburg (1901, 1904, and 1907) there were on the average 407,531 horses under one year, and 398,150 between one and two years of age. Those between one and two years of age were to those under one year of age as 98 to 100. In Italy, in 1901, persons between five and ten years of age (3,564,761) were to persons under five years (4,116,511) as 86·5 to 100.

In Norway (1900 and 1907), Denmark (1893, 1898, and 1903), Belgium (1900-1908), Hungary (1895), Germany (1900, 1904, and 1907), and Luxemburg (1901, 1904, and 1907) there were on the average 492,133 horses under one year, and 912,000 between one and three years. Those between one and three years were to those under one year as 185 to 100. In Italy in 1901 persons between five and 15 years of age (6,953,479) were to those under five years as 169 to 100.

In Germany (1900, 1904, and 1907), Luxemburg (1901, 1904, and 1907), Servia (1890 and 1900), and Bulgaria (1900 and 1905), the returns gave on an average 256,527 horses under one year, and 709,524 between one and four years. The number of these is to the number under one year as 277 to 100. In Italy, in 1901, persons between five and 20 years of age were 9,970,600 approximately; they were to those under five years as 242 to 100.

We must remember that these comparisons are far from being accurate; the influence of migration in man, of imports and exports in horses, and of the variations in the number of births in the two species, will only allow them to bear the character of a rough approximation, the general accuracy of which we cannot determine.

For the data for Italian population see the *Annuario statistico italiano* 1905-907. Fasc. 1. Roma, Bertero, 1907. For the data relating to equine species in different States see the *Statistique des superficies cultivés, de la production végétale et du bétail dans les pays adhérents*, published by the *Istituto Internazionale di Agricoltura.* Roma. Tipografia della Camera dei Deputati, 1910.

(7)—R. J. EWART. *The influence of parental age on offspring. The Eugenics Review.* Vol. III., No. 3, Oct., 1911

(8)—The date for Tables III. and V. referring to Greenland allow us to estimate at their proper value the assertions of F. COOK (*Journal of Gynæcology and Obstetrics.* New York, 1894)—that among the Esquimeaux the sexual passion is arrested during the darkness of winter, so that births only occur nine months after the appearance of the sun; and they show once again how dangerous it is to use personal impressions for judging the behaviour of statistical phenomena. See HAVELOCK ELLIS. *Etudes de psycologie sexuelle.* Vol. III.

(9)—For instance, if statistics tell us that an abortion is expelled in December, and that the period of gestation has been two to three months, it will be uncertain whether the month of conception was October or September. Similarly, if statistics tell us that an abortion is expelled in December, and that the period of gestation has been about two months (that is to say, nearer two months than one or three), conception may have occurred in October, September, or November.

The yearly returns of Vienna are divided into the following classes for the period of gestation in the case of abortions and still-born: less than one month; one to two months; two to three, ... eight to nine, nine to ten months, at the end of gestation. In the classification of abortions and still-born, according to the month of conception, the abortions with a duration of gestation between x and x + 1 months expelled in a month y were attributed half to conceptions y—x and half to conceptions y—x—1. The still-born at the upper limit of the gestation period during month y were all put down to conceptions in the month y—9. For instance, abortions of two to three months of gestation expelled in December were held to have been conceived half in October and half in September, those still-born and completely developed during December were all held to have been conceived in March.

The yearly returns for Budapest are divided into the following classes for periods of gestation of abortions: one month, two months, . . . seven months. In the classification of abortions according to month of conception, the abortions with a period of gestation of x months expelled in month y were put down to conceptions in the month y—x. For instance, the two-month abortions expelled in December were held to have been conceived in October.

The yearly returns for Budapest give the still-born separately, according to month, without distinction of duration of gestation: this was considered to have lasted nine months, which is certainly true for most cases.

(10)—The following (see table at page 163) are the percentages of deaths during the first month of life according to method of feeding in Trieste, Budapest, and Berlin:—

I lack similar data from Saxony, Denmark, and Italy; but we may state with certainty that the artificial feeding of children is a rare practice in Italy.

(11)—The data in Table XVI. refer to children expiring in their first year; the same results could have been obtained for those expiring in their first month. The yearly returns for Berlin show the number of deaths

Percentages of deaths during the first month of life.

Children whose system of feeding is known	Trieste 1910	Budapest 1903-905	Berlin 1904-905
Fed naturally	72·1	63·4	33·0
Fed partly, or entirely, otherwise	27·9	36·6	67·0

through maladies of the digestive organs during their first year, selected according to months of age, and as to whether they died in summer or the other seasons.

For the two years 1904-1905 those expiring in summer represented a percentage among the dead as follows:—

Children Fed	Died during their 1st month	Died during their 1st year
Naturally	33·0	37·2
On animal milk(*)	52·2	64·5
On substitutes (*)...	56·5	67·3

(*) Partly or entirely.

As we see, mortality due to maladies of the digestive organs is highest in summer for children artificially fed, both in their first month and in their first year. It is well known, too, that affections of the digestive organs are one of the worst consequences of artificial feeding.

There is no reason to think, on the other hand, that these data as well as those in Table XVI. should be affected by variations in the use of systems of feeding throughout the seasons.

We can well undertand, however, that the influence of artificial feeding on mortality, according to months, should be stronger in the case of those who died in their first year than in the case of those who died in their first month, owing to the less frequency of artificial feeding in the first month

of life. These are the percentages of deaths in Berlin, 1904 to 1905, in the first month and first year of life according to method of feeding :—

Children Fed	Died in their	
	1st month	1st year
Naturally	21·5	9·4
On animal milk (*)	62·1	70·6
On substitutes (*)	16·4	20·0
Total	100·0	100·0

(*) Partly or entirely.

Similarly, the influence of artificial feeding on the mortality according to months will be in the first days of the first month less than in the following. This explains why the summer maxima in infant mortality in Saxony and Denmark (see Table XV.) are found to be, in the first days of life, not so high and not so protracted (for children artificially fed mortality is highest in July). (See Table XVI.)

12—In a stable population the number of those who live to an age x is equal to the number of those who die at an age greater than x, therefore the expectation of death at an age x_1—x_2, is equal to the proportion of those who die at an age x_1—x_2 (which we shall indicate by Mx_1—x_2) to those who die at an age greater than x_1 (which we shall indicate by Mx_1—w). In the case of Rome the population is certainly not stable, and the numbers Mx_1—x_2, Mx_1—w, distinguished according to seasons of birth show, as has been mentioned, considerable lacunae. But we may admit by way of approximation that such lacunae occur with an equal frequency for those born in different seasons, and that the hypothesis of a stable population has upon the expectation of death an analogous effect for those born in different seasons. If all those of a given age-class are grouped according to their season of birth, and the numerical value of the ratio $\frac{Mx_1-x_2}{Mx_1-w}$ is calculated for each group, the numbers so obtained may be considered approximately proportional to the expectation of death in each group. If the corresponding number is found for the class as a whole, then the number obtained for each particular seasonal group will bear the same relation to it that the expectation of death in that group bears to the expectation of death for the whole class.

(13)—This is how deaths between 0 and one month of age in Rome between 1897 and 1911 are distributed according to season and cause of death :—

Seasons of death	Numbers of those who died through immaturity or through maladies usually connected with immaturity †	Eclampsia	Numbers of those who died from maladies of the respiratory system.	Numbers of those who died from maladies of the digestive system ‡	Numbers of those who died from other causes	Total deaths
Winter	2283	308	224	269	125	3209
Spring	1529	200	61	252	93	2135
Summer... ...	1263	158	24	459	73	1977
Autumn... ...	1368	121	36	264	77	1866
Total	6443	787	345	1244	368	9187

† *i.e.*, Hydrocephalus, cerebral hernia, spina bifida, hare-lip, other monstrosities, syphilis, pemphigus, eczema, sclerosis.

‡ That is, diseases of the mouth and tongue, gastritis, jaundice, enteritis and intestinal catarrh.

These data are also the result of an investigation carried out under the direction of Avv. Mancini by the order of Comm. Pélissier.

(14)—P. Mantegazza. *Igiene dell' amore.* Milano, Brigola, 1879. Pp. 266-267.

(15)—This is one of the evils indirectly caused by artificial feeding. The direct evil caused by it, in increasing infant mortality, is certainly worse. Research on this subject dates back to Villermé, and has been lately made wider and more accurate by Silbergleit, Sterneberg, Methorst, and Huber.

In a work, published in 1905, Silbergleit showed that for Berlin the mortality of children naturally fed during the first year of life was equal to 5·7%, and rose to 23·4% among those fed on cow's milk.

At Nimwegen Sterneberg found a mortality of 5·3% for children naturally fed and 35·5% for the others. At the Hague the mortality for those born in 1908 was 3·44% in the case of children naturally fed for at least eight weeks, and 11·86% for those artificially fed. In France amongst children sent out to be nursed in 1907 the mortality for the first year of life for those naturally fed was 33%, for the others it was 50%; but probably, as Huber says, the difference is really greater than is indicated by these figures, owing to the fact that some of the children considered as naturally fed sometimes have to receive additional nourishment.

It is, however, impossible to decide how far the differences shown are due to differences in feeding or how far they may be due to differences in the actual strength of the children, the care taken of them, and the frequency with which they are sent out to be nursed, and how far to other things.

(*a*) It is often necessary to resort to artificial feeding when the mother is suffering from a contagious illness, or when nursing the child would seriously compromise her health, or when her milk is either small in quantity or poor in quality: all these circumstances are always, or often, to be found in company with a constitutional weakness in the mother which is reflected to some extent in the organisation of the child; therefore, if those children who are now naturally fed, were fed artificially they would show a lower mortality than those who are now fed artificially.

(*b*) When artificial feeding has not been resorted to for these reasons, it has often been adopted either through ignorance, carelessness, or want of affection on the part of the parents; and it is natural that parents either ignorant or careless or wanting in affection for their children should take less care of them, and be less able to keep them from those dangers which, apart from the system of feeding, endanger their fragile lives.

(*c*) Children sent out to be nursed, at least in France, are artificially fed more often than those brought up by their mothers. In 1907 of 90,000 children sent out to be nursed in France, only 25,000 were naturally fed; these furnished 1,850 deaths out of a total number of death of 7,950 in the first year of life; while in Paris, in the five years between 1905 and 1909, out of all the children expiring under one year, 10,780 had been naturally fed and 14,684 fed in other ways. Moreover, children sent out to be nursed are less well looked after and therefore more likely to die, quite apart from the system of feeding, than those brought up at home. For this reason alone we should expect to find mortality higher amongst the artificially fed.

The influence due to these circumstances is to some extent taken into account in the works of Methorst and Huber. (W. METHORST. *Mortalité et morbidité des nourissons à la Haye nés en* 1908, *en rapport avec la manière de les nourrir et les circonstances sociales.* Bull, de l'Institut de Statistique. XIII. Session, 1911, Rapport N. 21; M. HUBER. *Mortalité suivant le mode d'allaitement des enfants placés en nourrice en France.* Ibidem, Rapport, N. 17.) The last-named compared the mortality of those naturally fed with that of those artificially fed in the case of children sent away to be nursed; the former classed the children not only according to method of nourishment but also according to the way they were looked after (well, indifferently, and badly). But no one has yet attempted to take into account, nor is anyone likely to be able to take into account completely, all the perturbing influences.

(16)—Hrdlicka, in his physiological and medical observations among the Indians of South-Western United States and Northern Mexico, amongst

whom natural feeding is carried on as long as possible, usually until a new pregnancy takes place, has established in 21 cases the interval between the delivery and the reappearance of menstrual discharges, and for 18 other cases the interval during which menstruation had not yet reappeared.

Out of these 39 cases, once only menstruation reappeared three months after delivery, and this happened to be an exceptional case, because the child had not been fed by the mother. See Ales Hrdlicka. *Physiological and Medical Observations among the Indians of South-Western United States and Northern Mexico.* Smithsonian Institution. Bureau of American Ethnology. Bulletin 43, Washington Government printing office, 1908. P. 64 and foll.

(17)—Cfr. Mayr. *Statistik und Gesellschaftslehre.* Freiburg i. B. Mohr, 1897. II. Band. Pages 399-400.

(18)—Cfr. *Census of India*, 1901. Vol. 1 A. Part II. Tables by H. H. Risley and E. A. Gait, Calcutta, 1903, and *Die Volkszählung am 1-XII.-1900 im Deutschen Reich.* 1 Theil *Statistik des Deutschen Reichs.* B. 150. Berlin. Puttkammer u. Mühlbrecht, 1903.

(19)—Curr. *The Australian Race.* Vol. I., page 110. Mentioned by W. I. Thomas. *Sesso e Società.* Torino, Bocca. Page 178.

(20)—Hrdlicka. Work mentioned. Page 48.

(21)—H. Vierordt. *Anatomische, physiologische und physikalische Daten und Tabellen.* Jena, Fischer, 1906. Page 493 and following.

(22)—Mayr. Work mentioned. Pages 405-406.

(23)—Hrdlicka. Work mentioned. Page 48.

(24)—Curr. Work mentioned. Page 110. Mentioned by Thomas. Work mentioned. Page 178.

(25)—Curr. Work mentioned. Page 107. Mentioned by Thomas. Work mentioned. Page 187.

(26)—Starcke, in Breslau, found, amongst the gigantic fœtuses, 824 males and 342 females; v. Winckel, in Munich and Dresden, 699 males and 208 females; Jacoby, in Mannheim, 286 males and 126 females; Füth, in Lipsia, 431 males and 390 females; Vaccari, adding his data to those of Alfieri, Buzzoni, Dubois, Moisnard, Reinhardt, gets 457 males and 228 females. See Prinzing, *Handbuch*, etc. Work mentioned. Page 53, and Vaccari. *I feti di notevole sviluppo dal punto di vista ostetrico con speciale riguardo al loro rapporto coll'ampiezza della pelvi materna e con la durata della gestazione.* Voghera. Riva and Zolla, 1906.

(27)—See R. Benini. *Principii di demografia.* Barbera, 1901. Pages 120-122.

(28)—See, on the subject, H. Dubois. *Les gros enfants au point de vue obstetrical.* Thèse de Paris. Paris. Steinheil, 1897; G. Lévy. *Documents pour servir à l'histoire des rapports existant entre le poids du fœtus et celui du placenta.* Paris. Steinheil. 1900; Füth. *Ueber die Dauer der menschlichen Schwangerschaft. Central-blatt für Gynäk.* 1902.

No. 39. Sfameni, Vaccari, and Fourman. Works mentioned. Beside that. see in the *Central-blatt f. Gynäk*, 1903-1911, the analysis of the following works: P. Moisnard. *Schwangerschaft und Geburt bei übermässig grossen Kinder.* Paris, 1903; A. Astengo. *Rapport du poids des enfants à la durée de la grossesse.* Paris, 1905; Blau und Cristofoletti. *Ueber die Dauer der menschlichen Schwangerschaft.* Wien; Jacoby. *Ueber Riesenwuchs der Neugeborenem. Archiv f. Gynäk*, 1904, No. 3; Starcke. *Ueber Geburten bezw. Spätgeburten bei Riesenwuchs der Kinder;* Ibidem; Puech *Ueber kunstliche Einleitung der Geburten bei abnormer Schwangerschaftsdauer.* Montpellier, 1907; H. Fuchs. *Ueber Riesenwuchs bei Neugeborenen und über den "Partus serotinus." Münchener med. Wochenschrift*, 1903, Nos. 33-34; C. Panaietoff. *Contribution à l'étude de la grossesse et de l'accouchement en cas de gros œuf.* Montpellier, 1907.

(29)—The maximum survival at 70 years of age, given by women who marry between 25-29 and men who marry between 30 and 34, could be taken as a proof that these are the ages most favourable to marriage for each sex. The smaller survival, which, compared to these, the younger brides or bridegrooms show, might, however, be also put down to the fact that they constitute, out of the whole average, organisms for which sexual development is precocious, and whose vital cycle is shorter (it has been ascertained that women who are young at their first delivery have had their first menstruation very early, and those who had their first-born late began to menstruate later than the others; and it is also known that, at least between race and race, precocity of menstruation is linked with an early menopause).

The second maximum, which is observed in the older groups, depends instead, with all probability, on the circumstance that anyone who feels ready, at such a late age, to sustain the fatigues of marriage, must be in particularly good physiological condition.

(30)—On the data of this table, we must make the same remarks as for Table XXIV.; the number of children observed at the end of the sixth year is greater than the number of those observed at the end of the first year, and in general the number of children surviving at the end of the first, sixth and fourteenth year is too great for them to have been derived from those children who had been observed at birth. It is therefore necessary to suppose that for the different ages, the observations do not concern the same individuals, and this diminishes the value of the results.

(31)—Marro has also carried out a research on the behaviour at school of children, according to the age of their parents at birth. With the rising of the father's age the percentage of children of good conduct increases, and that of children of bad conduct diminishes; whilst, with the rising of the mother's age, the percentage of children of good conduct diminishes, and the percentage of children of bad conduct increases at first to diminish later.

Behaviour at School of Pupils according to the age of the parents.

According to the age of the father.			According to the age of the mother.		
Age of the father in years.	On 100 children behaved.		Age of the mother in years.	On 100 children behaved.	
	Well.	Badly.		Well.	Badly.
up to 25	44	23	up to 21	53·9	17·7
26 – 40	47	17	22 – 36	48·3	18·4
41 – on	51	16	37 – on	41·3	17·2

It seems to me, however, that the meaning of children's behaviour at school is too uncertain to give much importance to these results: the bad conduct of children may depend, in fact, on different causes; on excessive vitality, nervousness, or little interest in their studies.

(32)—See, for the other factors, our work: *I fattori demografici dell'evoluzione delle nazioni.* Torino, Bocca, 1912.

(33)—Other circumstances which concur in the making of this result are the diversity of composition by age of the population, and the emigration of the strongest and most enterprising individuals, which happens during a certain epoch in the evolution of nations. See *I fattori demografici*, etc. Work mentioned. Pages 34 and 37-38.

(34)—K. Pearson. *The Groundwork of Eugenics. Eugenics Laboratory Lecture Series II.* London, Dulau & Co., 1909. Pages 25-26.

(35)—H. Westergaard. Work mentioned. Pages 525-528.

(36)—A. Ploetz. *Archiv für Rassen u. Gesellschafts-Biologie.* Band VI. Page 33. 1909. Mentioned by K. Pearson, *The Groundwork of Eugenics.* Page 26 and Table III.

(37)—Below 70 years of age, however, the proportion of the actual number of the deceased for royal families to the theoretical number does not increase regularly with the decrease of the duration of life of the mother. See Westergaard. Work mentioned. Page 527.

(38)—It would be necessary especially to know if, for the categories of the tuberculous, degenerates, albinos, criminals, etc., the average number of children or the average number of brothers of the pathological individuals has been determined. The two processes are not equivalent: one should expect the average number of brothers to be always higher than the average number of sons.

If f_i ($i = 1, 2, 3, \ldots . n$) is the number of children of one out of n marriages, the average number of children of a marriage comes out to be $= \frac{\sum_{i=1}^{n} f_i}{n}$ the average number of brothers of the sons of a marriage $= \frac{\sum_{i=1}^{n} f_i^2}{\sum_{i=1}^{n} f_i}$

Now is always $\frac{\sum_{i=1}^{n} f_i^2}{\sum_{i=1}^{n} f_i} > \frac{\sum_{i=1}^{n} f_i}{n}$

See, on this point, C. GINI. *I fattori demografici dell'evoluzione delle nazioni.* Torino, Bocca, 1912. Pages 29-30. Note.

(39)—See C. GINI. *I fattori demografici, etc.* Work mentioned. Pages 14-18.

(40)—Between 1895 and 1899, in New South Wales, there died 6,895 males belonging to the higher classes, leaving 15,356 descendants, and 20,173 males, belonging to the lower classes, leaving 48,335 descendants.

(41)—On the duration of the generation for different social classes, see our work on *L'ammontare e la composizione della ricchezza delle nazioni* (being printed). Pages 69-70 and Appendix IV.

(42)—See C. GINI. *I fattori demografici.* Work mentioned. Pages 19-25.

(43)—See C. GINI. *I fattori demografici.* Work mentioned. Page 42.

(44)—For data on the subject, see PRINZING. *Handbuch der medizinischen Statistik.* Work mentioned. Pages 38-39 and pages 58-59.

(45)—See on the subject *I dilemmi fondamentali circa il metodo dell'evoluzione* of DANIELE ROSA, in *Atti della Società Italiana per il progresso delle Scienze.* V. Riunione. Roma. Ottobre, 1911. Roma. Società italiana per il progresso delle Scienze, 1912.

(46)—On the inheritance of genius, see P. FAHLBECK. *Der Neo-Malthusianismus in seinen Beziehungen zur Rassenbiologie und Rassenhygiene*, in *Archiv für Rassen u. Gesellschafts-Biologie*, 1912. Heft I.

(47)—See HRDLICKA. Work mentioned. Page 165.

(48)—HRDLICKA. From a comparison of the composition by age of the Indian population (232,562 individuals), as enumerated on the 1900 *Census*, with that of the whites born in United States of native parents, concluded that the life cycle is similar amongst the whites and amongst the Red Indians. With regard to details, the Indians show, for the males, a greater percentage below 20 and above 80, and a smaller percentage between 20 and 80, and, for the females, a greater percentage below 15 and above 60, and a lower percentage between 15 and 60; this makes HRDLICKA think that, amongst the Indians, there is a high birth rate, a high mortality during adolescence and maturity, and a greater longevity.

He has not, however. taken into account, in all this, the variation in the number of births which has taken place during this time among the two populations. During this time the number of whites born in United

States of native fathers has certainly increased, and it seems that the number of births from Indian fathers has diminished. This can be concluded from the composition by age itself of the Indian population (Cfr. *Census of United States in the year* 1900, Vol. 2, part 2, Table 17, p. 40) which shows how up to 10 years of age, the number of people found was well nigh the same for each age. One may therefore think that the amount of mortality amongst the Indians is much less favourable than that which the classification by age according to the *Census* made Hrdlicka believe.

EFFECT OF ALCOHOLISM ON THE GERM-PLASM.

The New Alcohol Legislation in Norway.(1)

Dr. Jon Alfred Mjöen.

The experience of daily life tells us that the effect of many substance which are taken into the human system is dependent not only on the quantity taken, but also on other factors, for instance, the quantity and quality of foods and fluids taken with them. Prussic acid is taken without harm in the form of fruits. In a concentrated state it is the quickest acting poison that we know. So also formic acid. The effect of chloroform and ether in anæsthesia is so much dependent on the concentration in which it is administered that no narcosis at all is obtained when the mixture of chloroform vapor with air or oxygen is below a certain percentage. The effect of the same quantity of the narcotic substance varies according to dilution. Concentrated hydrochloric acid in very small quantities destroys life, but in a dilute form it is not only harmless, but still more it is a normal and necessary part of the digestive fluid of the stomach. These examples can easily be multiplied.

We will now try to answer the question: Is alcohol in general an exception to this rule? And especially, has alcohol an effect on the germ-plasm? If so, is this effect independent of the form and the concentration in which it is taken?

The little work that I have been doing to answer this question does not pretend to be any more than an attempt to call public attention to one point which, according to my view, has hitherto been overlooked. But before doing so I will give a brief *résumé* of some of the best known investigations as to whether alcohol in general has a hurtful effect on the offspring.

Arrivé found about twice as many still-births and miscarriages by drunken as by sober parents, and Sullivan came to the conclusion that when the

(1) This is an abbreviated report of the paper read by Dr. Mjöen at the congress. The paper was accompanied by 30 lantern slides, 25 of which are omitted here.

During the demonstration of the lantern slides the reader drew attention to the contradictory results which have appeared in alcohol research works. He mentioned the part that the Norwegian Storting and the Norwegian abstinents had played in carrying through the new legislation. He also acknowledged the works done by Dr. Johan Scharffenberg and Dr. Ragnar Vogt.

ther drank more than twice as many children died before their second ır. Helenius sums up the works of Wartmann, Féré, Kowalewsky, euler, and others, in the thesis that epilepsy is one of the most frequent editary effects of alcoholism. Bunge found among daughters of briates that up to 89·4% lost the lactant ability. Laitinen has by his arches found that, at the end of the eighth month, of the children of iners 27·5% were toothless, of moderate 33·9%, of drinkers 42·3%, and th the average number of teeth at the end of the eighth month were among iners 2·5 pro child, among moderates 2·1, and among drinkers 1·5. results of Demme, Legrain, Wimmer, and others go in the same ection. Laitinen gives the following summary of his work: The use of ohol, on the part of the parents, has a retarding and degenerating influence pon the development of the human offspring. The Galton laboratory as from statistical work come to the conclusion that "the general health of the children of alcoholic parents appears on the whole better than the health of children of sober parents." The Galton laboratory gives for this result the following explanation: "The source of this relation may be sought in two directions; the physically strongest in the community have probably the greatest capacity and taste for alcohol. Further the higher death rate of the children of alcoholic parents leaves the fitter to survive."

Auguste Forel asserts that from a scientific point of view there can be no doubt of alcoholic blastophtoria. Johan Scharffenberg does not believe in the possibility of blastophtoria, and Ragnar Vogt is of the opinion that alcohol may have an influence on the *first* generation.

It is obvious from this short sketch of the work done up to the present that it would be difficult to find any other subject in scientific literature, where opinion stands against opinion, authority against authority as in the question: Does alcohol affect the quality and quantity of the offspring? At least, such contradictions are not easily found where the results are based upon careful and conscientious laboratory work. A staff of the best workers on the Continent tells us that alcohol is the cause. The Galton laboratory answers: "Not causation but association. The child is defective not because the parent is alcoholic, but because it is the product like the parent of a defective germ-plasm."

The confusion seems hopeless.

But could we really expect uniform results where almost every worker has his own terms, a measurement of his own, a way of his own for collecting the material?

For instance, Laitinen gives the following definitions for alcoholism: "By the term 'moderate' I mean a person who takes no more alcohol than corresponds to one glass of beer a day, and by the term 'drinker' a person who takes more than the equivalent a day of one glass of Finnish beer (about 4% alcohol equal to 8cc. absolute alcohol)."

If we accept the definitions of Laitinen every man and woman in the mountains in Norway, where I am born, is a drinker. In summer they use more than two or three litres of sour milk a day which contains more alcohol than the equivalent of one glass of Finnish beer.

The collection of the material and its heterogeneous character when used as a foundation for the study of the influence of parental alcoholism on offspring is the weak point. Who can judge about some hundred or some thousands of men and women in the community where the material has been drawn from so many different sources? Who can judge as to real paternity, contra formal paternity, among habitual drunkards and vagabonds?

It is easy to classify deaf-mutism, blindness, and polydactylism. It is easy to count to six and find out whether an individual has five fingers or six. But who can separate individuals taking less than the equivalent of 8cc. pure ethyl alcohol a day from those who take more? Who can separate "drinker" from "drinks"? Who can separate "has drinking bouts" from "drinker"? Who can separate "Trinker" from "Gewohnheits-trinker," especially when the "Gewohnheitstrinker," is defined by Bertholet as: "haben seit Jahren täglich mehrere Liter Wein, Bier oder Schnaps zu sich genommen"? We can probably separate them by the study of single cases, where the observer is living, so to speak, his daily life together with the family he is studying.

If statistical work is to be of any use to us, we must take the whole community, divide the parents into groups and study them and their offspring for years. But I feel more and more convinced that we can only come to definite conclusions by making a careful study of single cases and through laboratory experiments, for instance, experiments on animals, chemical research, etc.

Some experiments on animals have already been done. I would recall the experiments on dogs done by Hodge. The dogs got 4 ccm. pure ethyl alcohol per kg. animal, that is, as much as they could take without becoming visibly intoxicated. The experiments were made for about two years. One of the alcoholised couples produced 23 whelps, eight of which were deformed and nine still-born. An abstinent couple—control animals—produced 45 whelps, of which none were still-born, four were deformed, and 41 viable.

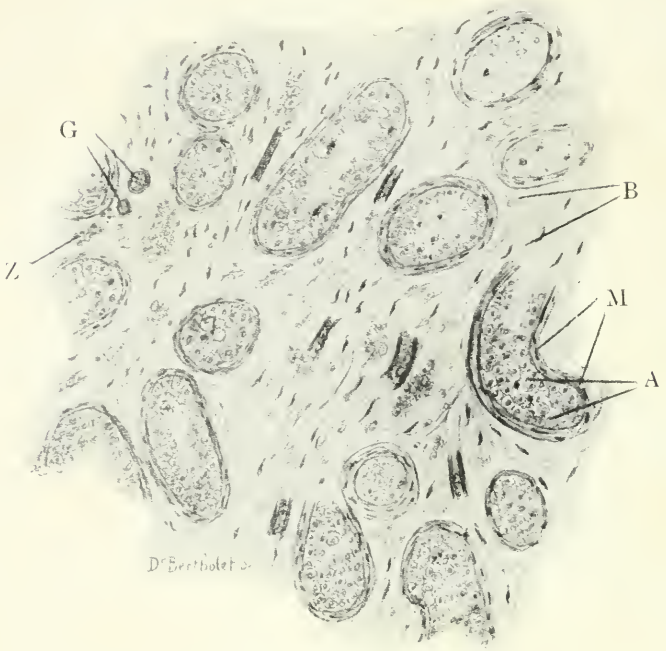
In the experiments of Mairet and Combemale—also on dogs—the mother was abstinent. Of their 12 whelps two were still-born, three died fortuitously, and seven in a couple of months from cramps, catarrh of the guts and tuberculosis.

These experiments and others seem to manifest that the sexual cells are hurt by alcohol and that the offspring of alcoholic parents on the whole are less vigorous than the offspring of the control animals.

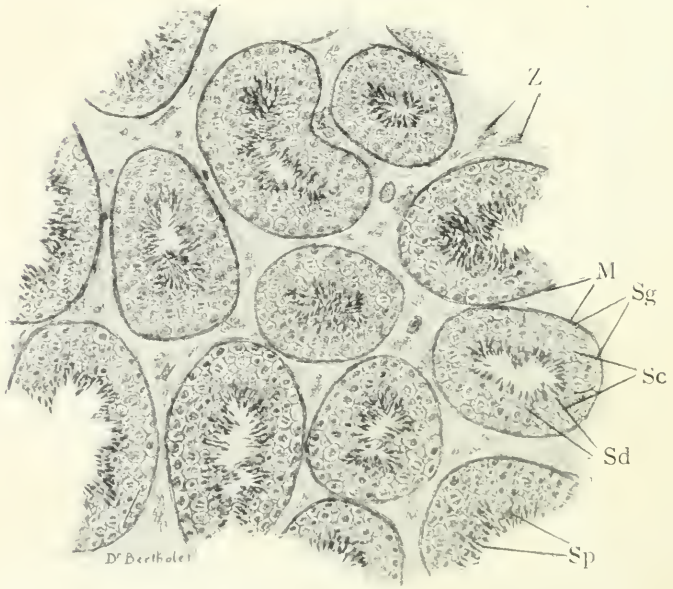
The results of Bertholet and Simmonds evidently affirm that the hurtful

TABLE I. (BERTHOLET).

Influence of Alcohol upon Germ-plasm. Atrophy by Chronic Alcoholism.



Cut through the atrophic testicles of a drunkard, 38 years old, who died from tuberculosis.



Cut through the normal testicles of a young man, 24 years old, who died through an accident.

effect of alcohol on the sexual cells extends also to human beings. Bertholet examined the testicles of 75 persons; 39 of them were habitual drunkards, and in 37 cases he found the testicles of the drunkards more or less atrophied. He sums up: *The hurtful influence of chronic alcoholism upon sexual glands is not to be denied.*

Simmonds found among cases of chronic alcoholism azoospermia in 61%.

From the experiments on animals it seems to have been necessary to use alcohol of very high percentage to obtain hurtful influence on the germ-cells.

TABLE II.

Strength of Alcohol used by experiments on Animals.

Laitinen	Rabbits and Guinea-pigs	Alcohol diluted with water	10%
Kern	Guinea-pigs	Alcohol diluted with water	15 – 25 %
Mairet and Combemale	Dogs	Absinth	58 vol. %
Carlo Ceni	Hens	Ethylalcohol	96%
Hodge	Dogs	Ethylalcohol	96%

Some of the experiments made on animals are very illuminating. Carlo Todde, for instance, found with acute alcoholism that the animals (cocks) perished and no change of the germ-plasm was to be found. With chronic alcoholism young cocks lost their sexual characters (combs, etc.) and ceased crowing. The weight of the testicles was considerably reduced. The spermatic channels were deformed.

Even the experiments on the individual (influence on mental work and senses) show that it is difficult to obtain any effect, if the dilution is carried below 8, 7 or 6%. And it seemed impossible to get measurable effects below 4%. Compare the works of Joss, Kürz, A. Smith, Aschaffenburg, Heck,

Fürer, Frey, Kraepelin, Rüdin, Demme, Davis, Parker, Oseretzkowsky, van Coilli, Bienfait, Bartholow and Austie. An exception to this rule is Riley. Riley used beer and wine of such low strength as 2·3%. But when he used alcohol diluted to such an extent he evidently got no effect at all. And Riley himself uses the expression: "*seems* to have a disturbing influence on digestion." Chittenden's results contradict the results of Riley. Chittenden found that 1-2% alcohol in the digestive fluid has little or no influence on the gastric juice, but if any: an increase of digestive power; 2-5% has a preventive effect, 5-10% has a marked preventive effect, 15-18% may reduce the digestive power still more. In other words the effect of alcohol is so much dependent on the concentration that one strength will have the *contrary* effect of another.

It has been shown by experiments on plants that cells are generally able to prevent hurtful substances from entering into their interior. But their resisting power is not large enough to prevent pure alcohol, ether and chloroform from penetrating. *These* substances go through the cells with great facility (Overton and others). The stronger the alcohol is the larger is its penetrating power.

When alcohol through distillation is separated from the fluid in which it is produced by fermentation it changes its physical, chemical and physiological character. It precipitates albumen which it does not do in the more dilute form. When it reaches a strength of 96% it looses one molecule of water which is chemically bound to the atom complex, and it changes its qualities so much at the same time that it must be classified as a corrosive liquid like the strongest acids. A small amount of this alcohol is able to cause and has caused the instantaneous death of a person taking it. These examples show that alcohol can hardly be considered the same agent and ought not to be handled as the same agent without taking the concentration into consideration.

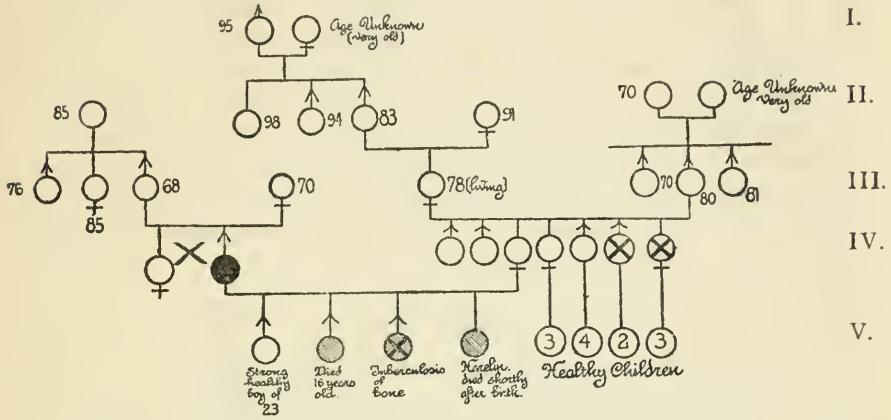
When I commenced to study the effect of alcohol on the offspring I took a few single cases and studied these for years, noting the form of alcohol used, general state at time of conception, maternity. lactation, etc.. and the quality of the offspring. I also took like stocks for comparison. Two such families which I selected had both a slight taint of disposition to tuberculosis, and the amount of alcohol taken was on an average practically the same.

The alcohol used in one case (family Y) was light beer and wine, taken to the extent of three bottles of wine a day on an average before and at the time of marriage, without any effect on the health of the offspring. I have thought it superfluous to demonstrate this or similar cases where the offspring is healthy in spite of their parents having taken great quantities of lighter beer and wine. Each of my readers, especially those from Bavaria, will be able to give such examples from his own environment.

But of the other type, where equivalent quantities of stronger drinks, brandy and whisky have been used I will give an example:—

TABLE III.

Progressive Effect of Alcoholism on Germ-plasm. Family X.



Exceptionally healthy stock (Longevity) on both sides.
Father (X) commenced to drink shortly after marriage.
Increasing use of stronger drinks.
Alcoholism during maternity or lactation excluded.

There is a slight, a very slight taint of disposition to tuberculosis, see IV. generation, where one individual ♂ (practicing physician) got larynx tuberculosis after throat disease, and another individual ♀ got tuberculosis of the bone after a serious accident (knee joint).

First child born *before* the drinking commenced has been and is a strong healthy boy. He is 23 years old. The second, third, and fourth children born several years after the drinking commenced were all "marked" by their birth.

From the two cases mentioned above and from a few other single cases that I have had under observation I draw the conclusion that parental drinking will in one case have no perceptible effect and in another a serious effect on the offspring, dependent on the form and strength in which the alcohol is used; the quantity reduced to pure ethyl alcohol being practically equivalent.

I have also made experiments to find the intoxicating effect that alcohol of different strength has upon *individuals*. The results of these observations were, that below a certain percentage which varies somewhat with the individual there is no intoxicating effect of alcohol whatever. And that stronger drinks, for instance, brandy of 50%, have double, three times or four times the effect of lighter drinks containing the equivalent amount of alcohol.

I feel convinced that my observations allow me to draw the following conclusion :—

The injurious effect of an alcoholic beverage upon individuals or race increases from a certain percentage progressively with the increasing strength of alcohol.

I said before that if statistical work is to be of any use we must put the whole community under observation. Instead of taking the children—epileptic, blind, deaf-mute, and looking up their parents, we must go the other way, take all the parents and look up their children. How this work should be carried on in detail I will consider elsewhere, and in the meantime will mention a case of special interest. We have, by accident, had an opportunity in Norway of seeing how brandy in contrast to other drinks influences the whole community. It was an experiment on a large scale—what I would call a nature experiment, which in all its cruelty has been very instructive to us.

TABLE IV.

Class System for Alcohol with Progressive Taxing.

Every Bottle sold shall have I., II. or III. marked on the Bottle.

Class	Maximum Strength	Taxes	Sale	
I.	$2\frac{1}{4}$ or $2\frac{1}{2}$ % Very light beer or wine. [About twice or three times the strength of sour milk.]	Low tax or No tax (2)	Sold everywhere without licence	Restaurants and hotels carrying only class I. shall be privileged by state and community.
II.	$3\frac{3}{4}$ % (Beer)	Normal tax (8)	Local option	
III.	$5\frac{1}{2}$ % (Beer)	Heavy tax (17)	Local option	Stronger beer than $5\frac{1}{2}$% prohibited
IV.	Stronger drinks : Mixed wines, Aquavite, Punch, Cornbrandy, Absinthe, Whisky, Vodka, etc.	Heaviest tax if not prohibited	(1) Prohibition ; or (2) The seller shall have certain qualities like those selling ether, chloroform, etc. (examen) ; or (3) The buyer shall have certain qualities. The licence to buy refused to drunkards.	

When freedom was given to the distillation of brandy in Norway in the year 1816, the so-called home or house-distillation commenced. In some districts almost every farmer distilled brandy from his own corn and

potatoes. The consumption of brandy replaced the consumption of other drinks in several of our mountain valleys. In these communities the number of feeble-minded increased from 1816 to 35, more than 100%.(1) The country was alarmed, and after an attempt to diminish it by tax on the still, the house-distillation was stopped in 1848. The farmers had for years been brewing beer, most of it holding 3%, 4%, 5%, exceptionally 8% alcohol. Any perceptible difference in the state of health, where more or less of this beer was consumed or where no beer was consumed, could not be detected. The enormous increase of idiots came and went with the brandy.(2)

Being convinced that the eugenic principles which I have tried to sketch before you ought to be followed by practical social work in the form of legislation, I worked out a system which I called the progressive class system for alcohol.

The class system(3) allows a system of taxation which, by a slow process, moves the consumption from the strongest to the lightest drinks. It permits a simple and cheap control, which is not confined to the factory but which follows the article from its origin to its consumption all over the country. When drinks are marked with their class and placed under supervision of State the consumers will themselves easily be able to exercise the control. They will gradually get accustomed to form an opinion on the influence of the various drinks upon the working capacity and health, not only of the individual, but by and by also of the family and the race. The class system will suppress alcoholism by very little interference with individual liberty and will reduce the adulterations of alcoholic beverages, adulterations which are in themselves detrimental to health.

Antiregenerative Effect of Alcohol.

It is beyond the scope or aim of this paper to attempt to throw light on the chemical problem, the problem how the baneful influence of alcohol can be explained But I will take the opportunity to give my opinion on *one* point.

There are many different ways in which we can imagine that alcohol will hurt the germ-plasm.

Alcohol can have an influence on the human system in general, and through a slow process, interaction between soma-cells and germ-cells, the latter can be altered.

(1) Medezinaldirector Dahl: "Geistige Getränke als Krankheits und Todesursache in Norwegen."

(2) According to my view the brandy did not *create* the feeble-minded. The defective germ-plasm was already present. The brandy worked antiregeneratively.

(3) The Progressive class system for beer was favourably received by the Norwegian minister Knudsen and brought before the Storting as a Government measure. It was accepted as a part of the election programme of the Radicals, the Social Democrats, and all total abstinence organisations. And after four years of hard fighting adopted by the Norwegian Parliament, July, 1912.

Alcohol can act through decomposition products of the alcohol itself or the decomposition products which its presence produces.

The alcohol can attack a special organ—*locus minoris resistentiæ*—and the defective organ, for instance, the liver can produce substances which are poisonous to the germ-plasm.

Alcohol might penetrate the membrane and the cells (osmosis) surrounding the egg-cells and the sperms and influence the quality of the germ-plasm directly.

It is the last form of alcoholic influence which is of most interest to eugenists.

The question then arises, does the alcohol create the defective germ-plasm, or can the effect of alcohol be explained in some other way? According to my view we have no proof whatever that alcohol has had an influence on the offspring. *when the parents came from sound and healthy stock.* I have found so many examples of strong and healthy children where father, grandfather, and even great-grandfather have taken a good deal of alcohol, and in fact about the same quantity which in another family has caused deterioration. I am, therefore, not able to accept the theory of blastophtoria in any other sense than *that alcohol prevents the restitution or regeneration* of an already "tainted" germ-plasm. I mean to say that alcohol does not create the defective germ-plasm but maintains it when it already is defective. For instance, in the case mentioned earlier in my paper (Medecinaldirector Dahl's account) I do believe that the defective germ-plasm was already present in the stocks. Without the brandy the stocks would have regenerated to the usual state of health.

We know from experience in the chemical laboratory that alcohol has the character of an indifferent body. Such bodies are very little fit to react on chemical substances in general. But they might be able to promote a chemical reaction which takes place between two or more other bodies (katalysator), and still more so by their presence disturb chemical synthesis between other bodies (antikatalytic effect).

This disturbing or retarding influence on the chemical synthesis is probably also the reason why alcohol acts so differently on the different stages of development of the human being—stages of which we have at least five very marked: adult, child, infant, embryo, conception. The adult cells having reached chemical stability—maturity—balance, are the least injured. In the child we have growing cells which are more injured. In the infant—embryo—conception we find a still greater sensitiveness, a sensitiveness which in all probability is so great that the harm done by alcohol would be fatal to the race in short time if nature had not provided the germ-cells with special protective arrangements.

For social-political work it is of very little consequence whether alcohol really attacks sound stock or only prevents restitution or regeneration, as the last process is one of the greatest factors for the conservation

of the human race. An attempt to disturb this process will in reality be the same as an attempt to disturb the race in general.

In addition to the thesis that I gave before I would therefore like to add one more :—

Where alcohol has a deleterious influence on the human offspring it is due to the retarding or disturbing influence on the regenerative chemical processes of already defective germ-plasm.

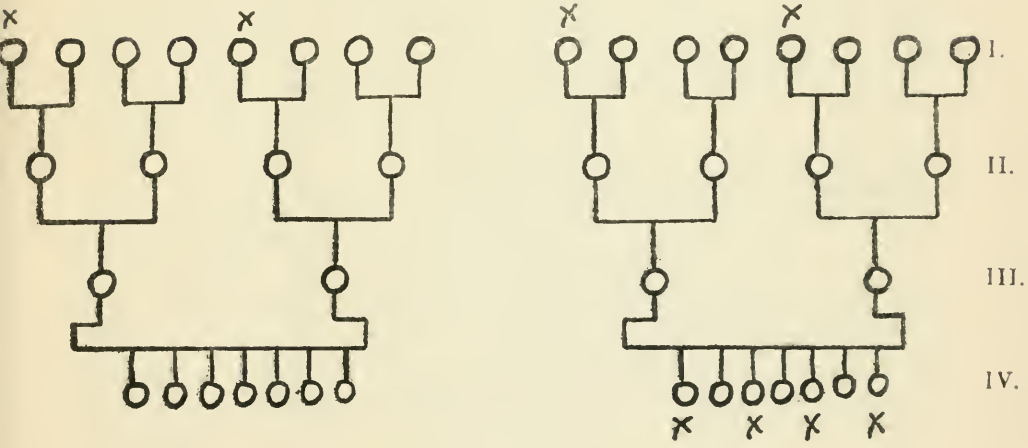
Alcohol does not affect sound stock, except when taken during conception, during maternity, or during lactation.

TABLE V.

Antiregenerative Effect of Alcohol on Offspring.

(Schematic Illustration).

Without Alcohol. With Alcohol.



× = Physical and mental defects.

I will suggest the following working hypothesis for the progressive anti-regenerative effect of alcohol on the germ-plasm.

$$Y = \frac{A + B + C + D}{\propto} \times X^{\underline{n}}$$

where Y = degeneration, X = alcoholism, $\propto$ = regenerative forces, N > 1 quantity and quality (concentration) of alcohol, and where A, B, C, D are the mental and physical defects in the stock.

I recommend this working hypothesis to be tested by my fellow workers and would be glad if someone would apply it to the single cases which he has been studying or is going to study.

I will finish these words with an appeal to all eugenists to join in the fight against alcohol, but on a new basis : *the strongest blow against the*

strongest form. That form which destroys the joy of life, even before that life has commenced.

There has been a tendency in our social history to wait until the harm is done before we take measures. Such philanthropic work may be a sign of great culture and refinement of soul and heart. But to society the act of saving drunkards is nothing more or less than to teach corpses to walk. The question, " will someone take care of little Else? " is answered by the Norwegian author, Alexander Kjelland, in the biting, sarcastic words: " First she must fall."

It is more human to take care of the young girls in time than to save prostitutes. It is cheaper to prevent war than to mend the effect of it. It is better eugenics to take precautions against brandy than to build asylums for inebriates.

NEO-MALTHUSIANISM AND RACE HYGIENE.

Dr. Alfred Ploetz, Munich,

President of the International Society for Race Hygiene.

I shall first define briefly the words of our theme—Race Hygiene and Neo-Malthusianism. Race Hygiene treats of the sum of the most favourable conditions for the preservation and development of our race. The word "Neo-Malthusianism" signifies the tendency to limit the birth-rate below the physiological capacity of the mother.

The question of how far the great decline of our birth-rate is to be ascribed to the spread of Neo-Malthusianism or, on the other hand, to a natural decrease of fertility, is difficult to decide. The great majority of observers would make Neo-Malthusianism responsible.

The consequences of Neo-Malthusianism manifest themselves in two ways. One of these is common to every kind of decreasing of fertility and the other is peculiar to the special voluntary limitation of the family in its influence on selection. We shall see this more clearly when we come to consider the effects of Neo-Malthusianism upon the chief phenomena of race biology.

First, let us deal with the preservation and the increase in the number of individuals of a race. This number results, in the main, from the difference between the number of births and of deaths—the so-called excess of births. Of the two factors, the decrease in the number of births is self-explanatory; it is an essential result of Malthusian practice. The decrease may be so great that not a single child is born. Or this decrease may be so slight that it begins only after a certain number have been born. The most frequent situation lies between these two extremes. But the number of deaths is also diminished by Malthusianism, and increasingly so the fewer the number of children born. Westergaard found that in a large number of births with a greater mortality there still remained more living children than in a lesser number of births with a small mortality, although the net gain in surviving children, if the number of births is increasing, becomes relatively smaller. This holds for the well-to-do as well as for

the rich. Thus if the number of births decreases, even though the number of deaths is also decreasing, the surplus decreases, and so Malthusianism diminishes the general surplus of births over deaths.

How far this decrease may go we see in three populations which practice Malthusianism: the French in Europe, the Yankees, and the Australians of European descent. All three of these are decreasing in number. Among the French the apparent standstill is due to the fact that foreigners, who constitute a considerable group in France, show a good increase. The great importance of these phenomena appears from the fact that France as well as Germany numbered, in 1870, 40 millions population, but France has still only 40 millions and the German Empire has now 65 million inhabitants.

We shall now consider the influence of Malthusianism on single factors of race biology, beginning with the variability in the quality of the offspring within the family. The percentage of first-born, second-born and third-born children is increasing and that of the later-born is decreasing. Some evidence of this may be gathered from the following figures:—

In Berlin, among legitimate children there were

	1st born.	4-6th born.
1880	18% of births	32% of births
1906	33% ,, ,,	20% ,, ,,

Thus the percentage of first-born has nearly doubled in these 26 years.

If it is true that the quality of the children is different according to their order in the birth rank, so that, for example, the three first children are weaker or are stronger than the later-born, Malthusianism would evidently have a direct effect upon the quality of the offspring. Arthur Geissler concluded from a study of about 26,000 births of unselected marriages among miners that the mortality of children was least in the four first-born and then increased to a very high rate. The following are Geissler's figures (the marriages with only one or two children are omitted)—

	Deaths during the first year.
1st born children	23%
2nd born ,, ...	20%
3rd born ,, ...	21%
4th born ,, ...	23%
5th born ,, ...	26%
6th born ,, ...	29%
7th born ,, ...	31%
8th born ,, ...	33%
9th born ,, ...	36%
10th born ,, ...	41%
11th born ,, ...	51%
12th born ,, ...	60%

Ansell concluded from a great mass of material that there was only a slightly increased mortality after the sixth-born. After 45 years there were still alive, out of 1,000 children born—

1st born children	658
2nd born ,, ...	653
3rd born ,, ...	655
4th-5th born ,, ...	654
7th born, etc. ,, ...	635

But the circumstance that Ansell's material consists of well-to-do life-insured, and that he does not take into consideration the duration of the marriages, somewhat diminishes the value of his figures and explains also the comparatively small difference between the several numbers of the birth series.

I have myself investigated this problem in the cases of 3,300 children of completed marriages (to the end of the mother's child-bearing age) in royal families. Here economic difficulties play no part, and I found no higher mortality among the later-born except from the ninth child upwards.

In estimating all these situations two things must be kept in mind. First, that if the economic status of the family is low, every new-coming child makes the prospects worse for those already existing, and further, that the last child has less favourable prospects than the former children because the lower standard of living affects it at a more susceptible age. Second, we ought not to forget, in the consideration of these figures of Ansell and also of my own—which do not show a very great variation—that in well-to-do families the weaker children may be relatively much better cared for than would be possible in miners' families, so that in the former families many weaklings survive, and the survival of such weaklings would not be evident in the mortality figures.

The truth lies, perhaps, between these two extremes, so that it may be that the first four or five children of the average marriage have a lower mortality than the later-born, but the difference is not so great as in the statistics from miners' families nor yet so small as in the classes of the well-to-do and of the higher nobility. The first-born child, however, seems to have a somewhat lesser biological fitness.

Pearson and Heron tried to decide this question by stating the percentage in which the different members in the birth rank become tuberculous, insane or criminal. They found that the first and second-born were more liable in all these respects than the later-born, and the first-born more liable than the second. Thus :—

	Tuberculosis.	
	First two births.	Third and later-born.
Calculated cases ...	132	248
Observed cases ...	191	189
	Excess of 59 actual cases.	59 less than calculated.

	Insanity.	
Calculated cases ...	152	316
Observed cases ..	188	280
	Excess of 36 actual cases.	36 less than calculated.
	Criminals.	
Calculated cases ...	113	270
Observed cases ...	198	185
	Excess of 85 actual cases.	85 less than calculated.

Against this Weinberg has justly argued that among the working classes (and chiefly such are here included) in consequence of the higher mortality of the later-born the first two born survive more frequently to adult age and thus are more exposed to such diseases and conditions which are peculiar to adult age.

A second objection against all the foregoing statistics arises from the influence of natural selection. Among the children of a number of marriages taken at random there are a good many children of parents who died early, consequently there is a higher proportion of children who represent early numbers in the birth rank, and principally first, second and third-born. Because of the death of one or both parents there could be no later-born. First, second and third-born children, therefore, come in a greater percentage from early deceased—that is, on the average, weaker parents than do the later-born, and they will therefore inherit in a higher degree the weaker constitution of their weaker parents. If, in spite of this, the first numbers should show a lower mortality than the later-born, we must conclude that their superiority would be much more evident in the average sound families in which the parents reach a normal age.

From these arguments, therefore, it appears to me that we have not yet sufficient scientific material to attack Malthusianism from the standpoint of the deterioration of offspring in consequence of the increase of the percentage of the first two or three births of the birth series of a family.

Malthusianism further affects the quality of the offspring by increasing the intervals between the single births. In families in which the parents intend to have only a few children, the mother is usually exempt from so frequent child-bearing, and she has ample time for regaining her strength. The greater interval between births has evidently a favourable effect upon the expectation of life of the children that are born. Westergaard has stated that in 21,000 births, if the interval between births is :—

	The percentage of deaths before five years of age is :
less than one year	20%
one to two years	14%
more than two years	12%

That means a difference in the mortality between the first and the last class of 40% in favour of the longer interval. The cause of this difference must

remain undecided. It does indicate, however, a favourable effect of Malthusianism.

As to the deterioration of the offspring of one pair of parents in consequence of Malthusian practices, on the whole, no certain evidence can be brought forward.

We have further to consider the effects of Malthusianism upon selection. The selection postulated by race hygiene should act in such a way that the more fit come more frequently to marriage and parentage and propagate more children than do the unfit. Now how does Malthusianism affect this? If Malthusianism is practiced equally both by the fit and the unfit, then without doubt it does not affect selection. But existing conditions indicate that it is not so equally practiced by different classes. There are enormous differences in the extent to which it is practiced (1) among the families of a people, (2) among the peoples of a race, and (3) among the different races of mankind. It ought therefore to be asked whether these differences are accidental and have nothing to do with the fitness or unfitness of the individuals practicing Malthusianism (and are hence non-selective) or whether the unfit practice it more frequently so that there results a weeding-out of the less fit, or, finally, whether the fit practice it more, so that a contra-selection results.

We shall first consider the role of Malthusianism in different families of about the same social stratum, and for this differentiate three principal strata in the population: (1) the class of the well-to-do, (2) the socially ambitious middle class (Kleinbürger), and (3) the lower class. Within these three strata the causes of Malthusianism are not wholly equal. Among the well-to-do we find the tendency of the parents to live their own lives in ease and pleasure, and added to this a greater care and outlay in the rearing of such children as are born, as well as the endeavour to leave to them as much wealth as possible. In the middle class the tendency to a life of ease and personal enjoyment is not so strong, but the desire for a good education and the later advancement of the children, and coincident with this a very limited income, is an inducement to keep the family small. In the last class personal ease is still less a factor, and where Malthusianism is practiced at all in this class, regard for the welfare of the first-born children seems to be the prevailing motive.

In all three strata an effective Malthusianism demands a certain measure of intelligence and self-control, so that here is a contra-selective element resulting in a lesser propagation of offspring inheriting these qualities. This, however, is perhaps counterbalanced by the fact that the individual of weak impulses succeeds better in that practice, this limiting to a greater degree offspring who would inherit these weak impulses, while a strong temperament breaks more easily through the barriers of precaution, even though the individuals possess intelligence and self-control in other respects,

so that the families of such individuals are less likely to be limited by Malthusianism.

A contra-selective tendency arises also from the possibility that families with very few children are more likely to be able to provide the greater care needed to rear the weaker children, so that weak children are thereby more frequently received into the life-stream of the race than would be the case if the families were larger and unable to provide the means for survival for these weaker members.

In all these strata, the decline of the natural parental instincts will often result in voluntary limitation of the number of children. Those individuals who do not care to have children, who if they see about them vigorous, beautiful children, have no desire for children of their own, the individuals who are self-centred and self-sufficient, who feel no need of anything to foster, to " mother " or " father," the individuals who are not willing to be disturbed by children, who are jealous of any transfer of affection from themselves to any possible children—such individuals will adopt Malthusian practices sooner than will those individuals who have a keen desire to see around them young flourishing life to which they may devote their impulses to care and work for others. Thus Malthusianism has the tendency to weed out characteristics which are less valuable for the race. The desire not to endanger the educational and social advancement of children already growing up by adding to their number, strikes sooner the fitter members, at least so long as that desire does not reach so high a grade, that it becomes a means of weeding out those who shirk the responsibilities of life.

The whole effect of Malthusianism within one social stratum, therefore, is difficult to measure, depending very largely on the extent to which it is practiced. Selective and contra-selective influences are working against each other. If out of all these different forces of Malthusianism which act upon selective conditions within a single social group one ventures at all to draw a resultant, one could perhaps say that Malthusianism favours the selection of individuals of strong sexual and propagative instincts, the sanguine and the weakwilled. It must be admitted that there is almost no statistical basis for our conclusions.

We shall now turn from these obscure relations to the effect of Malthusianism upon selection within the whole population, the different social strata being considered as units. In general, the well-to-do practice Malthusianism more frequently and more intensively than do the middle class, and the latter more than the poorer class. Since, now, the upper classes contain also racially, on the average, the best variations, at least in regard to intellectual traits, Malthusianism shows here the tendency to reduce the average ability in the population.

Just as Malthusianism affects the higher classes more than the lower, from the same causes it is practiced more, on the average, by the more highly cultivated than by the less cultured. The French and Yankees decrease in

number. England, Holland, Scandinavia and Germany—the principal seats of the highly endowed Nordic (Teutonic or Germanic) race—show a decreasing birthrate from year to year. Poles, Hungarians, Russians, on the contrary—the countries with strong Asiatic mixtures—have an extraordinarily high birthrate, so that they are everywhere pressing successfully against the West. The preservation of the Nordic race is thus seriously menaced.

In the struggle of the three great races of mankind Malthusianism is playing a part and it gives no favourable outlook for the white race, in its great combat for lasting supremacy, but a great handicap, especially before the yellow race which in its ancestor worship possesses a strongly effective hindrance to the spread of Malthusianism practices. Here, too, we must note that the decline of the birthrate has no natural end, while the mortality cannot sink below a certain figure. However doubtful, therefore, the harmfulness of Malthusianism may be in its effect on the single families, for the people as a whole and for our race it has without doubt a most harmful tendency, lowering the average fitness and ability, and endangering the future of our race.

If we look on all its effects we must conclude that to-day the spreading, unregulated and misdirected Malthusianism has a harmful effect from the standpoint of race hygiene. We should strive to abolish it, but its abolition would, I believe, be wholly impossible. As soon as Malthusianism has anywhere arisen, it remains in the affected families a standing tradition. Mothers hand it on to their daughters, elder sisters to younger ones, fathers to sons, brothers to brothers. Even the Catholic Church has proven itself powerless against it. There remains nothing but to influence Malthusian practice eugenically in such a way that the race suffers the least possible under it, and, further, to bring about such economic reforms that the parents have an economic interest in the rearing of a certain large number of children. To-day it is necessary, firstly, to combat the propaganda of Neo-Malthusianism. It is making its own progress only too rapidly without assistance.

On the positive side, race hygiene must strive, especially through the work of our artists—our dramatists, novelists, painters—to renew in our young men and women the ambition for the advancement. the perpetuity and the increase of their family. But we must go still further, for the narrow interest of the family is, perhaps, not so much harmed by a mitigated Malthusianism. We must instill in our children greater courage to undertake the responsibilities of life, a higher patriotism, a sense of devotion to our race which must face the great combat of future, so that they gladly prepare for an expenditure of energy beyond their own immediate and personal interest. Only then, in the decision between self-centred individualism and service toward a new generation and new forces for their race. will they decide in favour of life.

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E—*continued.*

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