records, but where they will be available in the biological interests of the human race, for both advice in marriage selection and for studying the inheritance of traits. Such a bureau actually exists in the Eugenics Record Office. The obvious necessity of depositing the family history in a central bureau, if it is to be available for eugenical purposes offers for many an insuperable obstacle. They may enjoy recording facts concerning themselves and other members of their family but they could not think of letting them out of their possession. I can sympathize with this feeling. One does not publish the details of one's family history, because, as society is at present constituted, certain of these facts might, if known, interfere with one's standing or advancement in one's social world. This is owing to the presence of scandalmongers and others of pathological and antisocial instincts who like to hold it up against one that he has certain limitations. The fact that the records are held as confidential ought really to meet this objection. And we may hope that society is nearly ready to take a saner view about one's personal responsibility for one's traits. I am in no way responsible for my racial traits, whether they are due to innate tendencies in development or to peculiar conditions of development, for over neither of these have I, in last analysis, any control. And what a strange spectacle does mankind exhibit, each hiding from others, as far as he can, his personal and family traits, like a lot of little children around a Christmas tree, each hiding from the others the gifts he has received lest it appear that his are not as good as another's. This attitude might be regarded as merely childish and trivial were it not that one's personal and family traits do not belong to oneself, but, in so far as one has, or hopes to have, children and grandchildren, they belong to society. For each one of us is a mosaic of racial traits that have come from a union of various germplasms in the past and some of which will pass into the germplasms of future generations, and organized society has a right to know the racial qualities of its human breeding stock, for organized society is the only agency to which can be entrusted the guardianship of the quality of the germplasm of the future. The scientific genealogy of the future will afford society that knowledge of the racial qualities of its breeding stock. Thus the value of scientific genealogy to humanity lies above all in this that it will make it possible to utilize a knowledge of the racial characters carried by the individual for the advancement of the race.

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Coldspring Harbor, N. Y.,
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THE EUGENICS MOVEMENT AS A PUBLIC SERVICE

It is coming to be a commonplace statement that we have paid more attention to the production of high-grade breeds of sheep, cattle, swine, and so forth, than we have to that of effective human beings, and this statement gains popular strength as we awaken one by one to the fact that man is, after all, a member of the animal kingdom and subject to its laws. The idea that society should concern itself directly with the improvement of human offspring emanated, as you well know, from Francis Galton, and the movement thus initiated has for some time been known as the eugenics movement. In clearing the ground by way of preparation for actual work, the eugenist has made certain important discoveries. It appears that in many of our civilized populations to-day, the defective classes are increasing more rapidly than any other constituent of the community and that quite aside from the enormous cost that their care entails

upon the public at large, their very growth threatens our civilization with future submergence, if not with annihilation. With this condition confronting us, it behooves us to make every effort to ward off possible calamity, and it has, therefore, become a common duty for us to acquaint ourselves with the nature of the situation, to enquire into such remedies as have been proposed, and to support every measure, both private and public, that gives reasonable promise of staying and correcting an impending evil. In the time allotted to me, it is my intention to bring before you certain aspects of man's nature that seem to me of first importance in establishing a sound basis for passing upon such problems as I have suggested. I shall attempt this from the standpoint of a zoologist, not from that of a eugenist, for the obvious reason that I am not an expert in the field of eugenics. If I fail in this effort you must lay the blame at the door of the retiring vice-president of Section F, who in his kindly way has trapped me in a moment of unwariness for this occasion.

Although we are awakening to the fact that man after all is only one of the millions of animal species on the surface of the globe, we are also well assured that he is a species of very unusual character. The particular traits in which he differs from most other species are to be found in his social habits. As a community builder, a founder of civilizations, he is far in advance of any other animal. One of the results of his social activities in many communities has been the development of institutions for the preservation and care of his less fortunate fellows. Thus asylums, retreats, hospitals, and so forth, have been established by private munificence or public grants. More or less under the protection of these institutions has grown up a body of semidependents and defectives whose increase it is that excites the apprehension of the eugenists. That in the past such individuals have always formed a part of our race can not be doubted, but that they ever showed a tendency to increase comparable with what seems to be occurring at present is highly improbable. The occasion of this increase is not, in my opinion, merely the exigencies of modern civilization; it is at least in part due to the immense spread of humanitarian activities which have characterized the last century of our civilization.

That this increase of an undesirable stock should afford an argument against such humane activities is far from my meaning. To my way of thinking this threatening feature is indicative of a minor defect in the workings of modern humanitarianism, and its correction when discovered and applied will, I believe, put that movement on a stronger footing than ever before.

Biologically considered, the situation is described by a simple formula. Most of us have given up the idea that natural selection is a factor of prime importance in organic evolution. Its operations are not detailed enough to yield with any completeness the finished product as we know it in nature, an organic species. But most of us are also thoroughly convinced that selection is a real factor in the development of animals. Its function seems to be that of the elimination of the obviously unfit. As we look about in nature we meet on every side evidences of the ruthless destruction of the strikingly ill-adapted. Among the savage races, as among the lower animals, the defective individual meets an early end. It is only the humanitarianism of our higher civilization that reaches out and protects in a measure such members of our race. Stated biologically then it may be said that we as social beings have devised means whereby the slight effectiveness of natural

selection as seen among most organisms has been measurably checked for certain groups in the human species. Thus a class of individuals with undesirable traits so far as the community as a whole is concerned are beginning to make an alarming showing.

If the increase of defectives is due in large part to a certain restriction of natural selection, is the solution of this problem the reinstatement of that process by a removal of humane protection whereby the defective members of our communities would suffer an early personal removal? Not at all! In my opinion any step in the direction of a curtailment of social help to the defective individual is a step backward. No community can afford such a move. We are at present well enough equipped in our social provisions to extend to such persons a reasonable measure of protection and training whereby they can arrive at the fullness of their slight powers. And such a treatment of them is in my opinion the only right social course. But if society protects them against the attacks of unkind Nature, it is entirely within the rights of society to see that their numbers shall not increase. Such growth may well be the very undoing of society itself.

The increase of such individuals is an organic rather than a social matter; in some cases the defective is the unquestionable product of a disease-laden environment, but in most instances he is the offspring of a defective stock and his present condition is thus chiefly the result of inheritance. Natural selection would eradicate such a class of defectives by the elimination of the individual before he had reached the reproductive period. But society can accomplish this end in a vastly more humane way. It can surround the deficient individual with a reasonable environment and eliminate only his powers of reproduction. Modern biology and surgery have progressed far enough to make it reasonably certain that sterilization of both males and females may be accomplished with so little initial and subsequent disturbance to the individual, excepting in so far as his reproductive capacity is concerned, that no one can object seriously to this method when legally and humanely employed. Vasectomy in the male and salpingectomy in the female are operations for the removal of the outlet ducts of the reproductive glands and thus by checking the escape of genital products they very usually sterilize effectually the individuals operated upon. They are relatively simple surgical procedures. Since they leave the reproductive glands untouched, they do not involve the important question of internal secretions, and, as might be expected, they have practically no effect on the personality of those subjected to them. They are therefore in every way suited to the purpose at hand. Legislative action looking to their adoption has already been taken in several communities, but it is naturally slow in its accomplishments, for its support requires behind it a certain amount of public opinion that has not yet had time to crystallize. What some of us regard with impatience as over-deliberateness on the part of the public and legislators is undoubtedly due to their ignorance of the seriousness of the actual situation and of the simplicity and effectiveness of the remedies proposed. This part of the eugenics program in no sense contemplates an interference with the liberties of what may be called even a small part of the community. It has only a most limited application. The extent of this application is well expressed by the Whethams in their declaration that "except in the case of the feeble-minded, where state interference is glaringly overdue, probably in the case of hopeless habitual criminals, and possibly in the case of

sufferers from certain types of blindness and deaf-mutism, there is no direction in which, as yet, general interference would be justified." What is sought in this movement is that persons who are such radical defectives through heredity as to be in the nature of public wards should be rendered sterile by as innocuous a means as possible, for, as is well known, such half measures as segregation and the like are too often ineffective. Since society offers a reasonable protection to such individuals, it is, in my opinion, entirely justified in taking this step against those who through irresponsibility would inflict upon it additions to its already too lengthy list of defective members.

But the eugenist is not only concerned with the problem of a humane elimination of the unfit, he is also equally desirous of perpetuating and increasing the most highly gifted in the community. If the best workers and the best thinkers in all lines of modern human endeavor could reproduce their kind in the next generation to the exclusion of the incompetent and the vicious, civilization would make a stride in less than the span of a single lifetime such as it has never done before. The elimination of the strikingly defective members of society, as I have already tried to show, is a reasonable and a humane possibility. Is it also reasonable to expect that the second part of the eugenics program, namely, the reproduction in future of only the best at hand, is likewise biologically possible?

We can approach this question best by asking what constitutes high excellence in any member of the community. Such a member must have the physical qualifications for an ample life during which he must contribute more or less continuously to the welfare of society. He must be physically intact in that he can withstand the wear and tear of daily exertion, and meet successfully the strain of momentary crises; and he must cultivate a range of activities that yields products serviceable and acceptable to his community. Modern society has an ample supply of this type of human being and it remains to ascertain the source of his qualities and capacities and the means by which they are handed on to his offspring. The question resolves itself into one of the nature and amount of human inheritance.

On this point the facts gathered from animal breeding are most illuminating. Without this source of information, it would have been almost impossible to have formed any adequate idea of the nature of human inheritance. We know full well that the animal breeder has steadily improved his various stocks and that these improvements have become permanent heritable properties of the particular strains with which he has dealt. We also know that the work of the trained breeder is not a haphazard enterprise, but a well-directed effort in which the constancy of the product can be counted on with ever-increasing certainty. Once well established, a breed will reproduce itself under almost any circumstances with such completeness and fidelity that we scarcely think of the environment as in any way involved and we ascribe the results without further ado to inheritance. To get a Holstein cow we invariably draw from Holstein stock; we do not seek to create Holstein surroundings; and experience entirely justifies this procedure. To be sure, we recognize important effects from the environment. We all know that underfeeding or overfeeding will have an immediate influence upon growth, but we never turn to factors of this kind to change one stock into another. Holsteins are one breed and Guernseys are another, and their immediate characteristics are matters of inheritance, not of environment.

With this kind of information behind us, and with the growing conviction that man too is an animal, we naturally turn to the problem of populating the world with the feeling that if human reproduction were subject to only a little of the kind of control that the expert breeder exerts over his stock, the advance of the human species in social efficiency might be incalculably great.

But here I must invite your attention again and more closely than before to what constitutes an effective human being. Such a member of society is not only a person physically intact and capable of responding to all the requirements of an enormously complex environment, as the best of our domestic breeds do, but he is one who has gathered to himself an untold wealth of experience far exceeding that of any other animal. Moreover, he has not only within himself this vast store of riches, but he long ago devised an immensely complex system of extraneous records in the form of spoken and written languages by which experience could be preserved, handed on to others, and thus made available in a fashion wholly unique. With language came morals, the arts, science, in short all those features that make up civilization. Thus the older naturalists were justified in a measure in regarding man as a species separate from all the rest of creation, and even we must today admit his very unusual character. When we call to mind this vast array of activities so much more diverse, rich and voluminous than that of any other species, the problem of inheritance in man takes on a very different aspect from that in other organisms.

Although very little is known about the transmission of the enormously complex inheritance of human beings, there are in this process two fairly well established features. First, many qualities, some of which are of a more physical nature like the color of hair or eyes and others of a more functional character like resistance to disease or temperamental conditions, are known to be inherited in man in precisely the same way as the peculiarities of the lower animals are, that is, through the germ. Other possessions, such as language with all its social dependences, are handed on, not through the germ, but by a process of learning, a mode of inheritance which is only most scantily represented among the lower forms. These two types of inheritance, the one characteristic of most organisms, the other more peculiarly human, have gained especial attention in the last few years and have been designated organic and social inheritance, respectively. That they represent distinct and well-defined processes there can be not the least doubt, but what proportion of the total human inheritance is included in each is a matter of much uncertainty.

From the standpoint of genetics these two types of inheritance are of fundamental importance. Organic inheritance is the only kind that can be controlled through the reproductive processes, and its product when normal is the rich natural soil in which civilization flourishes. Social inheritance is the work of the educator, using that term in the broadest sense, and its product when normal is civilization itself. For success it depends first upon a proper organic soil in which to root, and next upon the cultivating influence of a civilized environment. So far as the individual is concerned social inheritance is essentially a process of learning and our whole educational system is devoted to its operations. Since we receive our social inheritance as an acquired character, to use a biological term, and not through the germ, we can be sure that it will never be converted into an organically heritable aggre-

gate. The most we can hope for is that through the operation of organic inheritance, a nervous equipment can be evolved that will enable us to accomplish formal education more effectually and in a briefer time than we do at present, but that the store of facts representing the experience of one individual will ever be transmitted through the germ even in part to another is inconceivable. The future child may receive through the germ increased facility for learning languages, but the words of any particular language can never reach it by this route. They must come to it through the ear or eye, as newly acquired characters, a social inheritance.

With this distinction of organic and social heredity in mind how must we picture the complete process of reproducing effective members of society. Not by purely educative means which often waste themselves on attempts at the improvement of an impossible stock, nor by the exclusive control of reproductive processes which seem to be able at most only to prepare the individual to receive his social heritage, but by a mutual operation of both lines of endeavor. I am aware that there are those who believe that all that society needs for steady improvement is a right alteration in the environment and that reproductive irregularities will then adjust themselves to the improved conditions, and I am also aware that there are others who think that the social control of human reproductive activities will lead most quickly to social efficiency and the environmental changes are without permanent significance. The latter view represents that of the animal breeder pure and simple and would be correct for man were it not that he inherits not only as the lower animals do, organically, but also socially. To distinguish in the daily life of a given individual what is organically inherited from what is social in origin is very difficult. Has the reformed drunkard become a useful member of society because of the advice he took or by reason of a natural power of resistance received through the germ? No one can tell, but many in this class assert that the advice, the social inheritance, saved them, and no ultra-eugenist has been able thus far to prove that such may not have been the case. With examples of this kind before us, it seems almost impossible to determine whether in human progress organic or social inheritance is the determining factor. And perhaps such a question is in reality futile. Both factors are surely at work in the world and in the infinite succession of events that go to mould a human being into an effective social organism, now one, now the other, probably predominates. Though we are not in a position to give the exact weight that should be ascribed to each of these two factors, we can be sure that the placing of all the weight on one to the exclusion of the other is a mistake. Both factors have shared in the production of effective human beings, and so far as we can see both are likely to continue to participate in this operation.

To conclude, eugenics in the service of society is, in my opinion, entirely justified in demanding the sterilization by humane methods of those defectives who are in the nature of public wards, and this practise may be extended as experience dictates. Eugenics in its relation to propagating the best in the community has a fundamental position in that it is concerned through the elimination of the extremely unfit with the delivery of a reasonably sound stock for cultivation, but it is only secondarily connected with the final production of efficient members of society whose real effectiveness is often more a matter of social inheritance than it is of organic inheritance.

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