THE

EUGENICS REVIEW

PSYCHOLOGY IN THE SERVICE OF EUGENICS.[1]

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We are becoming accustomed to speak of the science of eugenics; yet, from the standpoint of the philosopher who would classify the sciences in a comprehensive and logical scheme, eugenics would hardly be granted a place among the pure sciences. It is, or aspires to be, an art rather than a science. But, like medicine, engineering, and education, it is an art which is concerned with and which must consist in the application of knowledge established by the pure sciences; that is to say, it is what we commonly call an applied science; and it has the same claim to the title of science as these other applied sciences, medicine, engineering and education. Like these, it must be based upon and must apply the knowledge built up, not by any one science, but by a whole group of sciences.

What gives such arts as medicine and engineering the right to be recognised as sciences, is that they are not content simply to take and apply whatever knowledge may be put at their disposal by the pure sciences; but rather they define their own special problems, problems which in many cases the pure sciences would hardly have discovered or attacked; and, adopting and adapting the methods of research worked out by the pure sciences, they apply them to throw light upon their own special problems. In this way each of the great applied sciences calls to its service a body of workers who apply specialised methods of research—and upon whom it relies, more and more as it develops, for the detailed special knowledge that is required for the guidance of its practice.

[1] Read before the Eugenics Education Society, Nov. 6th, 1913.

In these respects the parallel between eugenics and these other applied sciences is exact. But in one important respect the position of eugenics is peculiar. Each of these other applied sciences grew up in the service of an art that had long been practised without any scientific basis. Men bound up their wounds and prescribed herbs, they built bridges and houses, and they trained their children, for thousands of years, before anyone attempted to systematise any body of knowledge for the guidance of such practices. Now, the peculiarity of the position of eugenics is that it cannot originate as these other applied sciences did, namely, in sporadic scattered endeavours to obtain a little light for the guidance of an art already existing and long practised. Eugenics is in the peculiarly difficult position, that it must become an applied science before it can be applied. For the design of improving the human breed is the product of the last step of evolution, it results from the human race attaining to self-consciousness; or, at least, it can only become an effective purpose in proportion as the human race attains to a collective self-consciousness and becomes capable of collective volition. In less technical language, eugenics can only work towards its end by establishing its ideal in the mind of the community as an aim approved and accepted by public opinion. Therefore eugenics has to make secure its scientific foundations before it can begin to make application of them. It behoves us therefore to examine with the greatest care the relations of eugenics to its parent sciences, in order that the scientific basis may be laid as securely and as rapidly as possible.

It is generally recognised that eugenics has to find one of its principal supports in biology; but it is not so generally recognised that it must rely even more directly upon psychology, conceived as the empirical study of the mind. Hitherto eugenists, in so far as they have recognised in any degree this necessity, have done so in a very partial manner only, treating psychology as merely an aspect or minor department of biology. But whatever may be the philosophically correct conception of the relation of psychology to the rest of the biological sciences, the practical and actual relation is one

of relative independence; *i.e.*, psychology is taking shape as an observational and experimental science which pursues its own problems by its own methods. And it is therefore of the first importance that the applied science of eugenics should take pains to establish intimate relations with psychology, and that it should apply its results and adopt and adapt its methods of research for application to its own problems.

For it will, I suppose, be generally agreed that eugenics is even more deeply concerned for the preservation and, if possible, the improvement of mental sanity and vigour and the level of intellectual and moral efficiency in the human stock, than for its bodily perfection. So long as our bodies were healthy and hardy, we could tolerate with equanimity some actual decline of the average standard of stature and bulk and muscular power. And it is especially the mental qualities of the race (mental being taken in the widest sense to include all that we call intellectual, moral, and spiritual qualities) that seem to be threatened by the conditions of high civilisation. It is the paradox and tragedy of high civilisation that, in the present and in all previous ages, its tendency has been to destroy or eliminate just those mental superiorities by which it has been built up and which are essential for its maintenance and further progress.

That eugenics has been a little slow in openly proclaiming psychology as its nearest relative among the sciences was due largely to the fact that psychology is, as compared with most of the other biological sciences, still in a very early stage of its development; and especially this is true of that branch of psychology which can be of most service to eugenics. Throughout the modern period psychology has been studied mainly from the point of view of philosophical and biological speculation, and has been chiefly concerned with the task of discovering the general laws of mind and mental process, just as physical science is concerned to discover the most general laws of matter and of physical processes. And the results achieved by psychology of this kind are not of direct service to eugenics.

But there is another way of approaching the study of the mind which, as we have been recently reminded by Professor Max Dessoir in his "Outlines of the History of Psychology," was actively pursued by the philosophers both of classical antiquity and of the middle ages; namely, the study of the peculiarities of mental endowment of individuals. It is this branch of psychological study (Professor Dessoir proposes to call it *psychognosis*) from which eugenics has most to hope. For the knowledge which is required as the scientific basis of eugenics is, above all, a knowledge of the heredity of mental qualities; and this can only be obtained by the study of the peculiarities of endowment of related individuals.

It is true that something may be done and has been done by statistical methods which rely only upon such knowledge of individuals as may be inferred from their achievements in life, without attempting any psychological analysis of their mental endowment. The great founder of eugenics, Francis Galton, threw open this line of research and did epoch-making work along this line, as we all recognize. And others have followed it up and have obtained interesting results (Schuster, Karl Pearson).

But statistical work of this kind would seem incapable of bringing the exact knowledge of mental heredity required by eugenics, so long as it relies only upon popular psychology, and investigates only such vaguely defined and complex qualities as talent, or genius, or popularity, or good temper, or capacity for success in the various professions. That is to say, students of mental heredity must make use of the principles, the results, and the methods of systematic psychology, must apply them to their own special problems; and more especially they must concern themselves with psychognosis. Now this branch of psychology, after a long period of neglect, is once more being actively pursued. In Germany its principal exponent is Dr. William Stern, who has written a valuable systematic treatise upon it, under the name of "Differential Psychology." But it is also called "Individual Psychology," and that, I think, is the most appropriate English name for this study. Francis Galton himself clearly saw this necessity for

the detailed study of the qualities of individuals; and in those researches, reported in his classical work, "Inquiries into human faculty," in which he applied exact measurement to a number of comparatively simple mental powers, he really initiated the modern revival of *individual psychology,* by introducing the experimental method of observation into this field. At the time when Galton undertook these researches, the experimental methods of psychology were just beginning to attract attention and to be actively developed in Germany, and Galton's work did much to promote their development. Nevertheless, the experimental methods continued to be evolved principally for the sake of and in the service of the general problems of psychology, rather than of *individual psychology.*

Galton's method of *mental tests* fell into some disfavour with the professed psychologists; and some of the leaders of the present day revival of individual psychology show themselves ignorant or forgetful of Galton's pioneer work in this field, work of the very first importance; for it is to the application of the experimental methods in the form of *mental tests* that we must chiefly look for progress of our knowledge of mental heredity. Only such methods can overcome the difficulties that are encountered, when we pursue the statistical study of mental heredity on a basis of popular psychology only. These difficulties must be familiar to all who have discussed the bearing upon eugenics of such work as Galton's study of "Genius." The critic always discounts the value of such evidence by raising the objection that the sons of men of talent or genius start with special outer advantages, so that their success in life is no proof that they have inherited exceptional abilities; or he attributes similarities of the careers of relatives, whether in form of successes or failures, to similarities of social and general environment. And, though we may not feel that such objections are well founded, there seems to be no way of overcoming such difficulties, other than the way of experimental observation or *mental tests.*

Let me pass now to my proper topic, and attempt to show you very briefly some of the ways in which the experimental

method can (we may hope) bring us more exact knowledge of the kind we need as the basis for eugenics.

We may distinguish three principal directions of such experimental work that are supplementary to one another, but which may be and are being pursued more or less independently of one another.

I. The experimental method of mental tests may be applied to the problem of the analysis of the complex mental powers that we make use of in ordinary life into elementary or relatively simple powers. If such relatively elementary powers can be defined and measured they will not improbably be found to be in many cases unit factors in heredity, and themselves inheritable not only as regards presence or absence in the make up of any individual, but also as regards the degree of strength in which they are transmitted from generation to generation. Such an analysis and the determination of the heritability of such unit factors is the ideal to be aimed at; needless to say, we are at present very far from the accomplishment of it. But it is much that we can conceive a method for attacking the problem experimentally.

Let me illustrate by indicating one step that seems already to have been made in this direction. We commonly speak of this man or that as being more or less intelligent; and in so doing we mean to imply that his conduct generally, or in most of the relations of life, bears the marks of what we mean by intelligence; and if we try further to define intelligence it seems to mean a readiness and ease of adaptation of conduct to a variety of circumstances. It is probably this that was aimed at by Professor Karl Pearson in his well-known research in which he classified his subjects as quick, moderately quick, slow, very slow.

Now some psychologists have believed that there is no such entity as general intelligence, or no one inheritable factor which is a main condition of what we call intelligence—reaching this conclusion by deduction from general principles. But since our general principles in this region are still of very questionable validity, this procedure is very unsatisfactory. We ought to have perfectly open minds

towards such a question; and to seek to decide it by carefully gathering the empirical evidence.

This was the line taken by Professor Spearman. He asked himself—Is there any truth in this popular notion of *general intelligence*? and he conceived a method of putting the matter to the test of experiment.

Suppose we apply to a large number of individuals (say 50 or more) several (say six or more) mental tests, each demanding a mental operation of a different kind, though not of a very highly specialised kind; and we express the degrees of proficiency displayed by the individuals in respect of each test by ranging them in their order of merit for each task. Now proficiency in any of these tasks, no doubt, depends in each case upon a number of mental factors; some of which may or may not be identical in some or all of the several tasks. If proficiency in the several tasks does not at all depend upon mental factors common to some or all of the tasks, we shall probably find no appreciable correspondence or similarity of order between any two or more of the lists expressing order of merit of the 50 individuals. But, if proficiency in any two or more of the tasks depends in any large degree upon a common mental factor, *i.e.*, upon some function involved in each of the two or more tasks, then we may expect to find some degree of similarity of order in the corresponding lists of order of merit. And conversely, if we find such correspondence or agreement between two or more lists, *i.e.*, if those names which appear high in the one list are high also in the other list; then we may infer with some degree of probability that this correspondence is due to the operation of some one factor or function in the execution of both tasks. And the closer this correspondence the more confidently may we make this inference, *e.g.*, if the correspondence betwen any two lists were exact, if the order of merit were exactly the same in any two lists, then we could infer with high probability that proficiency in the two tasks depended in a very large, in a predominant, degree upon a factor or factors equally involved in the execution of both of them. This kind of correspondence is called in technical language correlation or positive correlation.

Applying this principle, Dr. Spearman found that the orders of merit achieved by a series of individuals in a number of simple mental tests did show a considerable degree of correspondence or positive correlation.[1] And he found further that these orders showed also significant degrees of positive correlation with the order of merit in respect of "general intelligence" assigned to the same individuals by persons intimately acquainted with all of them. These results seem then to justify the popular conception of "general intelligence" as a factor or psycho-physical function that is common to and plays a considerable part in a number of different complex mental operations. Similar and, in some respects, more convincing results have been obtained by Messrs. Burt and Flügel in a research in which they applied Professor Spearman's method, using a different set of tests, and with certain other modifications of procedure which were thought to be improvements.[2]

These results, then, bear out in some measure the assumption of a great function involved in a wide range of mental operations, which provisionally we may call "*general intelligence.*" And, if further research should confirm this tentative conclusion, we must regard it as one of the greatest importance for eugenics; for we should have discovered a measurable factor which is involved in, and is an important factor or condition of proficiency in, many mental operations; a factor which is possessed in very different degrees by different individuals.

The next step would be to enquire—Is the strength or intensity of this factor, "general intelligence," innately determined?—(and there is every probability that it is)—and further, Is it hereditary, and if so in what degree? And it seems very probable that by the application of similar methods these questions also can be answered.

I have cited these investigations in order to illustrate what I mean by the analysis of the mental powers and the discovery of relatively elementary mental functions. It is probable that, by the extended application of this method, we may discover

[1] "General Intelligence objectively determined and Measured," Amer. Journ. of Psychology, Vol. XV.

[2] "Experimental Tests of General Intelligence," British Journal of Psychology, Vol. III.

and measure other such elementary functions. And the strictly logical order of investigation would be first to exhaust the possibilities of such analysis—to establish and define all the elementary functions that can be thus detected; and afterwards to measure the degree of their heritability, and to measure their strength in individuals and in the social classes.

But the sciences seldom or never follow the strictly logical order in their development; nor is it desirable that investigators should hold themselves bound to attempt to follow that order. And so we find that the other two main lines of psychological experiment in the service of eugenics are already being pursued.

II. One of these, the second of our three lines, is to apply mental tests directly to the task of detecting, and, so far as possible, measuring any differences of mental endowment that may obtain between the various classes and strata of the population; primarily in any one community such as our own nation or one university.

You are aware that there has long been an acute conflict of opinion on the question of differences of innate mental endowment of the social classes. One party dogmatically denies the existence of any such differences. The other party (basing itself on the consideration that the upper strata of society have in the long run been formed and continually regulated by the operation of the *social ladder,* which leads persons and stocks of good abilities upward and those of inferior abilities downward in the social scale) assume, often with a similar confidence and dogmatism, that the upper social strata are in the main natively superior in mental endowment to the lower. Hitherto we have no data for the formation of an opinion other than vague general impression, and the presumption in favour of the second view afforded by the consideration of the *social ladder.*

The citation of instances of sons of labouring men who have risen to positions of honour and wealth cannot decide the question in the negative; nor can the demonstration of the large proportion of distinguished men who come from the relatively small well-to-do classes establish the positive answer. For in these cases we cannot discount the influence of the differing opportunities, and of social environment and education.

The application of mental tests to considerable numbers of individuals drawn from the different social strata seems to offer the only possibility of obtaining a definite answer. Of the importance of this problem I need say nothing. That it is widely recognised is sufficiently shown by the many publications which, in recent years, have drawn attention to the difference of rates of reproduction of the social classes, and in most cases have regarded the facts as of very grave significance. But, as is well known, all these many well-meant warnings make but little impression on the public mind; just because the assumption on which they are founded, namely, that of some positive correlation between social level and superiority of mental endowment, has not been demonstrated, and is repugnant to the feelings of the great majority of the public.

In order to apply mental tests to throw light on this question we must devise a series of tests, proficiency in which shall be as nearly as possible independent of special education; *i.e.*, they must test capacities which are developed by such modes of mental activity as all social classes are equally called upon to exercise and have equal opportunities of exercising; *e.g.*, it is impossible to make use of the results of school and college examinations for this purpose, because these results are so largely determined by educational opportunities of widely different kinds.

Again, the tests selected must be adapted to throw light on as many aspects as possible of our mental endowment; provisionally, while we are still ignorant of the primary or elementary hereditary factors of mind, we must attempt to measure such ill-defined characters, as "general intelligence," "mechanical memory," "logical memory," "power of concentration," "power of sustaining a mental effort," "capacity for distributing the attention," "quickness and accuracy of judgment," "readiness in seizing logical relations." And we must hope to improve our tests and our combination of them for this purpose in the light of the experience we gain in the course of such investigation.

Thirdly, we should apply our tests to young subjects, *i.e.*, to children at the earliest age at which they become trustworthy

subjects for such experiment; because the younger we take our subjects, the more will native endowment predominate over the influence of special training and experience in determining degrees of proficiency. And, fortunately, school children from the age of about 11 or 12 years are in other respects excellent and convenient subjects for such investigation.

I may point to an interesting suggestion of an answer to the question we are considering afforded by the work on school children, done at Oxford by Messrs. Burt and Flügel, to which I have already referred; and I may say that we are following up this clue with good hope of obtaining interesting results. But, of course, such work demands the expenditure of much time and energy by many investigators, before we can hope for convincing demonstration of the truths required as a basis for eugenic precepts.

The third principal line of application of psychological experiment in the service of *eugenics* is the direct attack upon the problem of mental heredity. This is the necessary supplement of the other two lines of work already noticed. It must proceed by applying mental tests to large numbers of near relatives, of the same and of different generations; and so determine how far such relatives show greater similarity of degrees of proficiency in the various tasks than persons not related by blood.

And in choosing our tests with this end in view we must primarily seize upon all peculiarities or qualities in respect of which individuals show wide differences that cannot be attributed to differences of training and environment, putting aside the question of their value.

I may mention that, as is already known to many members of this society, Dr. Schuster has equipped a laboratory on the premises of the society and proposes to direct the work of it more particularly to this problem, to this direct attack upon the problems of mental heredity; and I believe that Professor Brown, at King's College, has put on foot a similar or allied enquiry into mental variability.

We may, I think, anticipate that these three lines of work will now go steadily forward; that they will converge more and

more, that they will mutually aid one another, and that within a few years time they will achieve results which will be generally recognised as having given us that firm foundation of fact which is the urgent need of eugenics at the present time.

The work will require much patience, energy, and ingenuity; but if it offers a fair prospect of attaining the knowledge we need, and which can be obtained in no other way, members of this society will not regard any such expenditure of effort as excessive.

In conclusion, I would say a word or two about a question of even larger scope than national eugenics. Galton, in his later days at least, was inclined to regard eugenics as properly concerned only with the life of the highly civilized nations. But can we as citizens of the British Empire continue to observe this limitation? Is it not obvious that practical statesmanship is already confronted with problems, the decision of which should be largely determined by eugenic considerations and by answers to questions which lie within the province of eugenics, broadly conceived as concerned for the future welfare of the whole human race.

Eventually, eugenics must face this larger problem. And then it will require positive knowledge of the mental endowments of the various subraces of mankind; and especially it will require to know as exactly as possible the mental endowments of the progeny produced by the crossing of these subraces. For already we see widely manifested the tendency for large masses of population to transfer themselves from one country and from one continent to another. Especially in north and south America, and in many of our colonies, do we see the juxtaposition within the same areas and political communities of individuals drawn from many different subraces.

And, wherever such juxtaposition occurs, the crossing of these varieties of the human species will eventually occur on larger or smaller scale. Even so determinedly exclusive a people as the Jews have, as is well known, interchanged much of their blood with other peoples. In fact, we seem to be approaching a period of universal miscegenation. Is this tendency, fraught with immense possibilities for good and evil, to

be allowed to go on in an utterly blind manner? Or is mankind, conscious of itself as a whole, to take intelligent thought for its own future and to attempt to regulate in some manner and degree these processes of racial mixture. It is clear that the civilised governments are already exerting great powers of interference, that their powers of regulation are almost limitless, and that problems of this kind will confront them with increasing urgency. Are, then, their decisions to be made utterly without regard to eugenic considerations? Surely such considerations should have an altogether predominant weight in deciding such questions. For it is, I think, clear that healthy political organisms cannot grow up where the population consists of two or more racial stocks that remain persistently averse to intermarriage, and therefore racially distinct. We see this illustrated sufficiently in the United States of America and in South Africa and elsewhere. And it seems highly probable that some blends of the human subraces are eugenically admirable and others disastrous. In order to illustrate the position by a case in which the question is already acute, I refer to the United States of America. There the old population is chiefly descended from the subraces of North Europe. But during the last decade there has been a tremendous stream of immigration from South and South-East Europe, and already the cry is heard that this stream should be checked, that it threatens the future of the States. In Canada and Australia, too, similar problems already confront practical statesmanship. Are these great areas to be reserved for the European or North European stock? or should yellow and brown and black be freely admitted; eventually to form by blending new subraces?

These are great questions on which, as it seems to me, eugenics must strive to express its opinion and make its point of view felt. But it can only do so on a basis of exact knowledge of mental endowment and mental heredity. And the acquisition of such knowledge is the task of psychology. Much has already been said or written on these questions of racial psychology; but very little is established; and it is difficult to see how progress with them is to be made, if we do not apply

the methods of experimental and relatively exact observation now being worked out by psychology.

I have not attempted to lay before you a statement of results achieved by psychology in the service of eugenics, because hitherto those results are few and slight. I have rather attempted to indicate a program of work that lies before us, and the nature of some of the methods by aid of which we may hope to make progress with it; for it is of the first importance for the progress of that work that the members of this society, which embodies and focuses enlightened opinion on these topics, should take an intelligent interest in this programme and give it their sympathy and support.