

partly due to his having no children, and partly to an inborn trait ; for he told me that he believed a man may inherit two unblended temperaments, and that it was so in his case.

“ His knowledge of character, derived from long experience and contact with men in all ranks of society in his professional capacity and otherwise, made his conversation upon politics and social problems most interesting and entertaining, for it revealed a keen insight into human conduct, and the motives activating it.

“ He had a great love of Nature, and up to a few years ago he worked industriously in his garden, but he had no taste for music ; although he possessed the sense of rhythm, that of melody was lacking.

“ Up to the very end he retained all his remarkable mental faculties, and his memory was marvellous ; for he would quote long passages from the great authors and poets, and show that he still kept abreast with the general principles underlying modern biological science.”

Part I.--Original Articles.

The Ætiology of Crime. By CHARLES GORING, M.D. B.Sc., Fellow University College, London.

IN a recent number of the *Journal of Mental Science*, Sir Bryan Donkin contributes some important and interesting “Notes on Mental Defects in Criminals.” This is an important contribution, because, with manifest sincerity, it criticises adversely an important modern idea : the idea that Criminological Science, that all Social Science, must be built upon facts, and facts only. And, apart from their general interest, these notes are particularly interesting to me, because they refer, more than incidentally, to my book *The English Convict*, wherein the validity of arguments and conclusions depends entirely upon the study and logic of facts whose value, for elucidating biological problems, Sir Bryan would appear to discredit. For this reason may I be permitted to say a few words in support of a position which has been formidably assailed ?

As a method of biological research, Sir Bryan holds, or used to hold, strong views on the subject of Biometry, which he would seem to regard, at best as an intellectual fad, at worst as a troublesome expedient for exploiting Biology in the interests of Mathematics. This prejudice, which is not shared with many other informed thinkers, has always been to me an unaccountable mystery, and I never read an article by Sir Bryan without hoping to find therein some explanation which may clear it up. In the present case I was not so disappointed as usual. On p. 31 Sir Bryan states that “the complex environment which moulds

the characters of men cannot be analysed or reasonably dealt with by statistical handling"; because, "if it be true, as Dr. Goring has proved"—through the medium of Biometry—that the facts are as Biometry shows them to be, "it must follow that there would be little, if any, reason for making efforts to reform law-breakers." In other words, since Biometry, by disturbing preconceived notions, may threaten the stability of our institutions, the employment of biometric methods is to be deprecated. But Criminology is not part of a propagandist movement for regulating conduct. It is a Science, critical of the ideas by which conduct is being regulated. And to Science, whose sole object is to derive truth inevitably from fact, any consideration, apart from this single purpose, can have no claim to relevance.

In my Government Report the genesis and growth of the so-called "criminal character" were examined by biometric methods, and the conclusion was drawn that the factors conditioning them were to be found more in the *constitution* of the delinquent than in his *circumstances*. Sir Bryan replies that, if these findings be true, certain consequences follow, and that, anyway, Biometry is not a suitable medium for elucidating the problem in question. But I hope to show that the sinister consequences affecting reform, so much dreaded by Sir Bryan, are really illusory, and also that the systematic analysis of data, by biometric or other statistical methods, is indispensable for judging probabilities, for estimating existing tendencies, for measuring the strength of associations, for obtaining, in short, that clear and well-focussed vision of ætiological processes by which alone a prudent, just, sympathetic, and efficient policy of administration and reform can ever be attainable.

Let me examine in turn the more important arguments put forward by Sir Bryan. The first point is contained in the statement already quoted, which is to the effect that, if the truth of my conclusion be admitted—that "the one vital mental constitutional factor in the ætiology of crime is mental defectiveness"—it follows as a self-evident proposition that law-breakers must continue their misconduct, and that efforts to reform them must be futile! But, surely, it would be as reasonable to affirm that when disease has a constitutional origin it must, on that account, be incurable! The conclusion, in a word, does not follow from the premises. The premise from which we start is the statistical fact that *inferior intelligence is associated with law-breaking*, which, stated inversely, is the same thing as saying that superior intelligence is associated with law-keeping. Consequently, if from the first statement of the fact we permit the conclusion that law-breakers, because of their lower intelligence, must go on breaking the law, we are bound to conclude, from the second statement of the fact, that people of higher intelligence must, by virtue of their quality, go on keeping the law—a

deduction that is patently inadmissible. The argument is also fallacious in another respect: it is an appeal to the emotions, it is an appeal in favour of the notion of an *environmental* origin of crime, and of the theory that efforts at reform based upon this notion can alone be effective. But, surely, if one thing is clear, it is this: that whatever may be postulated about criminal responsibility and reform must apply, with equal truth, whether crime originates from the corrupt or defective nature of the criminal, or whether it be traced to its origin in the malign influence of the position in which he is placed. If, when crime is due to nature, and not at all to circumstances, we are forced to conclude that the criminal acts not wilfully, but under strict necessity imposed by his constitution, we are, by parity of reasoning, also bound to conclude that, when crime is due to circumstances and not at all to nature, he again acts without any choice in the matter, but under strict necessity imposed by the force of circumstances. Accordingly, in neither case can the criminal be held responsible for his actions; in neither case will he be amenable to reform. According to this reasoning, whose prime fallacy is to ignore the existence of the human will, we can brought up against a doctrine of sheer fatalism.

It seems likely that Sir Bryan sees the possibility of this *reductio ad absurdum* of his reckoning; because, before making his pronouncement, he formally disavows the spectre of fatalism, whose liability to haunt the human heart he evidently understands. The formidable logic with which he there lays the ghost is in contrast with the unsound reasoning when he attempts to raise it again in order to influence opinion in favour of an environmental origin of crime. On the one side we are told that deterministic doctrines have foundation neither in personal experience nor in the observation of the conduct of men; and we have the explicit injunction that "the dispute about free-will does not concern the matter in hand," that "the most thoughtful student of crime and criminals need not trouble himself about it." On the other side, and with this argument still drumming in our head, we are led to infer that biometric conclusions based on observation and experience, would, if true, lead direct to a doctrine of fatalism, whose avoidance, by adopting an environmental theory of crime, is the chief thing the thoughtful student need trouble about. These two statements are on the face of them contradictory. They disclose a misconception of the nature of scientific predictions. They exemplify how inexplicably confused the notion of causation has become with the kindred idea of association.

A chief aim of Science is admittedly prediction: the predicting of future events from past experience. At the first blush, it seems plausible to argue that what is predicable must be inevitable; and that what is inevitable must be predestined. But the lurking fallacy is easily

revealed. Scientific prediction is only inevitable *in certain conditions*; and therefore must always deviate, and very often must depart entirely, from predestination which is, *ex hypothesi*, totally unconditioned. Thus even in exact science, prediction, based on knowledge of causation, is a very different thing from predestination, with its signs and portents of inevitable and unavoidable destiny. In the biological sciences, which are, and always must be, far from exact, the two are entirely dissimilar. Here, one event, in a universal sense, rarely determines a second. The search in this field is not for causes, but for tendencies or associations; and prediction, based on a knowledge of tendency, is again vastly different from prediction, based on a knowledge of causes. In the first place, its value lies not in application to individuals, but to individuals *en masse*. In the second place, the process makes no pretence to forecast specifically the occurrence of individual events: fore-knowledge of the definite probability of their occurring is all it pretends to provide. In the third, last, and most important place of all, the accuracy and legitimacy of prediction, based on a knowledge of association, depends entirely on the conditions governing the association remaining constant. Because intelligence and crime are associated in conditions pertaining to-day, we cannot assume that defective intelligence has always been a source of crime; and we cannot predict that it will remain so in changed conditions of the future.

It will be seen, then, that the criminological correlations upon which, in my report, all conclusions were based, make no claim to rival, and could never be twisted to correspond to, the soothsayer's pretensions at revelation; to which would be related the notion of individuals "compelled to continue their misconduct if not permanently coerced by force"; or the doctrine, preached by Lombroso, of a "*criminal né*"—predestined from birth to do evil. Yet it is a profound mistake to suppose that biometric prediction formulæ, because limited in their application, have little value. Legislation, social and economic organisation, the schemes of the actuary, all practical affairs whose aim is to promote, protect, or materially better, not this or that individual, but the people as a whole, may turn, as many of them have already profitably turned, to the prediction potentialities of Biometry. And my criminological coefficients have no less and no more value than any of these. Within the prescribed limitations, predictions based on these will be definite, precise, and serviceable; and a by no means unimportant service is the knowledge they provide, not for paralysing, but for promoting schemes of reform. For the aim of reform is not to eradicate tendency; it is to strengthen the will to overcome tendency. It is not to effect a miraculous change of constitution by equalising circumstances; it is to modify conduct by strengthening the will to act decently even in the face of adverse circumstances. "Man is master

of man's estate." Despite of his circumstances, despite of himself, is the theory on which reform is based. And whatever may be his motives, proclivities, or leanings, however favourable or adverse his circumstances may be, the criminal who gives up doing evil becomes reformed. Certainly the subjects upon whom I made my inquiry were habitual criminals; and were, therefore, at the time of examination, unreformed. But this fact does not prove that reform is futile; nor does it necessarily demonstrate that future efforts at their reform will go on being futile: All it shows is that, despite of education, constitutional tendencies have prevailed; it tells nothing of the majority, whose mean emotions, jealousies, suspicions, greed, intellectual defects, and other constitutional tendencies and deficiencies have been overcome or masked by education. To-day, we are grappling with only the rudiments of the problem, whose nature becomes more clearly revealed as the relationship of habitual criminality with mental enfeeblement is more strictly defined. How full of promise for the future may be efforts in correcting or diverting activities originating from feeble-mindedness, is shown by the effectiveness of regulations laid down for the treatment of mental defectives in prison. No one would suppose that the classing of a prisoner as weak-minded affects any miraculous change in his constitution or character. Yet when so classed, the immediate change in his conduct is indisputably manifest. Within my experience a modern idea of the mental defective criminal as a soulless husk of a man, without will, with capacity only for doing evil, uneducable save for breaking the law, drifting aimlessly along a course of least resistance always towards evil, a Frankenstein monster with every human essential omitted—this imaginative portrait of the criminal mental defective is a conception which, when contrasted with my experience of the actual man, appears entirely detached from reality. In my experience, the habitual criminal, even when classed as mentally defective, and despite his low level of intelligence, is far removed from the pathological imbecile he is often portrayed to represent; he has capacity for useful activity as well as for doing evil; he is amenable to good, as well as to bad, influence; he by no means contradicts the general truth that, to make a law-abiding citizen, two things are needed, capacity and training. The existence of the habitual criminal to-day proves the failure of existing measures to reform all criminals; but it does not prove the futility of reform. What it does point is the urgency of our immediate task: which is to find the appropriate penalties, discipline, scholastic education, or other form of supervision and training best adapted to mask the disabilities, and cherish the potencies within every individual, for keeping their activities within the law, and for playing a useful part in the world. For, when all is said, what are the facts? We know that criminal action is largely due to lack of intelli-

gence. We know that the most unintelligent activities can be diverted into useful channels by discipline and training. We know that the activities of actual mental defectives may be, and in fact every day are being, diverted in prison—surely, to utilise again Sir Bryan's quotation from Dr. Samuel Johnson, "there's an end on't."

The next point in Sir Bryan's criticism is a statement to the effect that it may be laid down in advance, as an *à priori* proposition, and even despite statistical evidence to the contrary, that environmental conditions must of necessity have a determining influence on crime. Before proceeding to deal with this statement, I should like to say one thing. I have never pretended that my systematic study of *some* environmental factors was sufficiently exhaustive to justify a general conclusion that crime is uninfluenced by *any* environmental condition. My own statement was as follows: "between a variety of environmental conditions examined and the committing of crime *we find no evidence* of any significant relationship." This does not claim to be a last word on the matter. It does not claim that because some factors are unrelated to crime therefore any relationship of this kind is, or must be, non-existent. It does not deny that when other conditions come to be examined, clinching evidence of existing relationship may then emerge. All it affirms is that, in my own particular inquiry, no such evidence had been discovered; its only claim is that, until such evidence is forthcoming, judgment must be suspended. If evidence does exist, let it be produced. In the absence of evidence a mere rehearsing of belief is idle. That Sir Bryan will sympathise to some extent with the truth of these principles is revealed by his own statement: "The very posing of this question"—whether the criminal is a product of heredity or environment—"leads to irrelevant and unnecessary disputes in many and varied fields; and it lies at the root of great confusion in much that is written on the causes of criminality." With that statement I heartily agree. And I also concur with the observation that "many grounds of literary dispute would vanish on the attainment of greater precision in the meaning of the terms employed." That is one reason why Biological Science has profited enormously from Biometry, whose characteristic feature is precision of terminology. As biological problems have found expression through the medium of mathematical symbols and formulæ, less and less have they been centres of verbal disputation and literary wrangling, which more and more have been replaced by reasoned criticism, based on definite and stated grounds. It has been said, as a merit of Mathematics, that they provide no scope for diletanti. Mathematics have the additional merit of replacing the frequent vagueness of verbal expression by a symbolism whose meaning is precise, unvarying, and always unambiguous. Moreover, when the conditions of a problem are stated in, and reasoned about through,

the terms of an algebraical formula, everyone knows precisely what is being aimed at, and with what success the target is reached. This may not appear a great gain; yet, within its limitations, it is a distinct advance on verbal disquisition and reasoning, which rarely convey the same shade of meaning, and often transmit totally different notions, to different people. Personally, I never had a clear and well-focussed vision of environment and heredity problems until I viewed them through the medium of correlation and prediction formulæ. And, certainly, it is difficult to believe that the formula employed by me, with the facts and figures and 2-and-2-make-4 reasoning on which they were based—all of which were published in my report—can have so obscured the issue upon which I was engaged, or have left its admitted limitations so vaguely and indefinitely prescribed, as to justify the following criticism: “Even if, for the sake of argument, the validity of methods employed and conclusions arrived at be assumed, it cannot possibly be held that any significant proportion of the innumerable influences that act on all men from infancy to age, for good or for ill, and contribute so largely to the make-up of each of us, have been eliminated by the inquiry we have been considering.”

I must confess I find this outburst of Sir Bryan Donkin astounding! Surely no one could dispute that influences which act for good or ill on *all* men, from youth to age, etc., must act similarly, for good or evil, on all *criminal* men, whatever their age may be, whether they be in prison or out of prison, whether they be reformable or incorrigible. For instance, the existence or non-existence of food to eat, of air to breathe, of a world to live in, of buildings that may burn, of people who may be robbed, of institutions that may be defrauded, are, all of them, influences for good or evil; and they are, all of them, influences on crime and criminals: in the sense that without air to breathe there could be no breathing criminals; without the influence of food no men could live to become criminals; without material potentiality for committing criminal acts, no crime could be committed. But in no rational, or less equivocal sense, could these essential conditions of life itself, in any of its manifold forms, be described as part of the force of circumstances determining the particular form of being known as criminality. Accordingly, we can assume that those circumstances which are *indispensable for any form of human activity* are not the *particular* ones whose influence, Sir Bryan warns us, still survive my investigation. What, then, are the influences to which he does allude? If he has any circumstances in mind, why does he not plainly specify what they are? An unconscious answer to this question may, perhaps, be found in the following statement of Sir Bryan: “The various factors that contribute to the production of a criminal cannot be disentangled from the totality of the complex environment which moulds the characters of men,” and

this environment itself "cannot be analysed or reduced to such items as can be established, or eliminated, or reasonably dealt with by statistical handling." The reason then, for Sir Bryan's reticence in this important matter, is clear. He does not specify the conditions to which he refers because, being unanalysable and irreducible to specific items, they cannot be specified. But, in this case, these conditions, if existent at all, can have little practical significance for the criminologist. Sir Bryan defines criminology as knowledge that "may assist in the formation of *practical* measures for the prevention of crime and the treatment of criminals." What practical measures, we ask, can possibly result from the knowledge that crime depends upon circumstances which, *ex hypothesi*, are unanalysable and cannot even be nominally specified?

I think it is important to assert that the environmental influences studied by scientific investigators, and the influences of environment as envisaged by reformers, humanitarians, and other propagandists, are two separate things which are often quite unrelated to each other. The former are causes or associations, whose effects or strength, being universal in character and variable in degree, can only be estimated by investigation. The latter are *incidents*, whose effects upon individuals, being self-evident, are not matter for scientific inquiry. The humanitarian exclaims: "All individual men are influenced for good or ill by the incidents of their environment." "Quite so!" replies the scientist; "that is an axiom which is presupposed by the investigator, whose object is not to demonstrate a self-evident proposition, needing no demonstration, but to search for a truth which only by investigation can be discovered: *viz.*, the *varying* extent to which, in the long run, men are influenced for good or ill by *varying* the conditions of their environment." Thus every individual child is influenced in some way by education. Yet, from this indisputable fact no one can assert, as an *à priori* proposition and without inquiry, that failure in class or life, or in becoming a law-abiding citizen, must necessarily, in the long run, be due to lack of some particular form or degree of education, under the influence of which success would be equally assured.

It will be seen, then, that in one sense Sir Bryan is right when he says that "the innumerable influences that act on all men for good or for ill cannot be dealt with by statistical handling." They cannot be dealt with by statistical handling because, their effects being self-evident, they are not material for any sort of scientific handling. For Science is not concerned with the cataloguing of series of incidents affecting the careers of individuals. The business of Science is to discover causes; and causation, as investigated in the laboratory, is always the universal relation, which cannot be revealed by representation, however vivid, of particular incidents. That is to say, the

causes there traced are not those affecting any one thing, but things in general ; they are not the innumerable incidents affecting for good or ill individual lives ; they are those general truths which are described within that category of Science technically known as *Ætiology*.

I am, of course, aware that incidents affecting individual persons or things are often described popularly as causes ; and, if it pleases people to regard any incident as a cause, there is no reason why it should not be called by that name : provided one is not misled into attaching scientific value to the term. To describe thus particular events is certainly justifiable ; because any event, however insignificant, is one out of what Huxley described as "the great series of causes and effects which, with unbroken continuity, comprises the sum of existence." And to single out any one event from a series and to attribute causative value to that, may serve many a good or bad purpose. Thus, for the sake of assuming responsibility, a mother might attribute to her own negligence the cause of a child's taking cold ; or, in order to transfer responsibility, she might seek a causal agent in her nurse's carelessness, etc. The reasons for thus attributing a special value to particular events may be excellent. But the causes there specified are unrelated to the general truths of causation : no scientific treatise would refer to a particular mother's negligence, or to her servant's carelessness, when describing the *ætiology* of cold in the head.

Let me illustrate my meaning in some of the foregoing remarks with a case of murder which was committed by an epileptic, who was also a licentious fellow, a heavy drinker, and who suffered from the effects of syphilis. The crime was apparently a motiveless one ; and the plea put forward by the defence was that the prisoner committed the act when in a transient state of epileptic unconsciousness. According to the evidence, this was a just plea ; and consequently, for administration of justice, it was justifiable here to select the factor of epilepsy from the series of causes and effects of which the crime was the culminating episode, and to describe epilepsy as the cause of the crime. This selection was justifiable, because its object was not to advance scientific knowledge, but to show that at the time of the offence the prisoner's will was in abeyance, and his mind free from guilty intent. To Science the selection of epilepsy, as the cause of this particular crime, contributes nothing. That is to say, this representation of a *particular* relationship does not in itself increase our knowledge of the *general* relationship between epilepsy and crime : it is without value for purposes of prediction. For the scientific purpose of predicting crime from a knowledge of epilepsy, the describing of this man's epilepsy as the source of his crime is of no more value than would be the attributing of its cause to his alcoholism, his syphilitic disease, his licentiousness, the fact that he carried a revolver, the fact of

the stupidity of his victim, or an indefinite number of other factors. For it is the sum of all these factors which was the real cause of the crime ; and when prominence is given to any one factor by describing that as a cause, the existence of all the others, as an unvarying background, is, as it were, assumed. The scientific problem of causation is to trace how and to what extent two events, A and B (*e. g.*, epilepsy and crime) are connected in the picture, independently of its ever-varying background ; and this is provided by the conception of association which, in the biological sciences, replaces the physical concept of causation. From data of the several conjunctions, namely, (1) A with B ; (2) A without B ; (3) B without A ; (4) A and B both absent, we measure the extent to which changes in the A event are followed by corresponding changes in the B event. In other words, we find the law that governs the relationship between A and B ; and the correlation formula expressing it is a truly scientific statement, because, when the tests of science are applied to it, it will be found to answer true. It follows that the scientific problem of the influence on crime of the force of circumstances is essentially a problem of correlation, which can only be solved satisfactorily to Science in one way, namely, by measuring the extent to which specifiable and explicitly specified environmental conditions are correlated with crime. My own investigation consisted almost entirely in measuring these correlations for several representative conditions which have been accepted as criminal influences. And because the result was practically zero in almost every case, I formulated my conclusion that no evidence had emerged from the investigation to show that crime, to any appreciable extent, was influenced by the force of circumstances. I then went on to trace and explicitly define, in similar fashion, the influence of heredity on crime : which brings me now to the third point of Sir Bryan's criticism of my work which I want to discuss.

I find Sir Bryan's arguments, which refer to my biometric treatment of the heredity and crime problem, evasive. He employs also, it seems to me, unsubstantiated charges against the Biometric School. I will produce these charges *seriatim* with my reply to each. The first is stated in these words : "The two diverse schools," *i. e.*, the Biometric and Mendelian, "appear to be at one in placing a sharp dividing line between inborn and acquired characters." Now I am not competent to speak with authority on behalf of Mendelian doctrine, but as a biometrician I am in a position to say this : that the Biometric School is not inclined to place sharp dividing lines between categories ; and it certainly would not draw one between such highly imaginative and artificial categories as those described by authors as "inborn" and "acquired." Indeed, the case is just the contrary. For what are the *ifferentia* which, in fact, do separate by a sharp dividing line the

doctrine of Biometricians from that of their more ambitious, but perhaps rather more confused, *confrères*, the Mendelians? It is this: that Biometricians refuse, and always have refused, to recognise any real existence in the unit characters, unit compartments, and sharply partitioned pigeon-holes which are at the basis of Mendelian theory. The characteristic feature of Biometric doctrine is that Nature distributes her attributes in continuous quantitative series. The tall and the short peas of Mendelians are not, according to Biometric teaching, specific entities of one definite degree: there is a wide range of tallness in the one variety, as there is a wide range of shortness in the other. And, very similarly, Biometricians recognise no line of demarcation between Albinos and those who are without the Albinotic character; or between criminals and those who are without criminal tendency: Albinos and criminals merging into their opposites by insensible gradations. To accuse, then, the Biometric School of drawing a hard and fast line between categories is, of course, a mistake.

Equally mistaken is the second charge against the Biometric School of "employing the terms 'inheritance' and 'reproduction' as synonymous." Nowhere in biometric literature, certainly not in my Report, would these words be found used as if they were interchangeable. Sir Bryan says that "the Biometric School has made several elaborate investigations into heredity questions and draws its conclusions from large numbers of observations gathered and statistically studied." This is the fact. But what in each case has been the object of the investigation, and what the nature of the observations? In every case, without any exception, they have been the tracing of ancestral resemblance from data of ancestors and offspring. These investigations were inspired by the genius of Sir Francis Galton, whose ideas of heredity, which have been adopted by those carrying on his work, were defined in his *Law of Ancestral Resemblance*: a title which speaks for itself as to the meaning adopted of heredity. The title, at any rate, disposes of the allegation that Biometricians confuse reproduction with inheritance, which is a law of reproduction; and the nature of the investigations, referred to above, prove conclusively that to Biometricians the law of reproduction called Heredity means one thing, and one thing only—Ancestral Resemblance. I don't maintain that these two notions are never confused; they frequently are. All I assert is that they have not been confused in published works of Biometricians, whose refrain, emphatic and unvarying, reiterates monotonously the fact that inheritance means ancestral resemblance—nothing more and nothing less. Nearly all misconceptions about heredity arise from an inability to hear, or from refusal to listen, to the cardinal fact of this refrain. Grasp this fact, and you will see, for instance, how stupid is the widely spread misconception that inheritance of a character, such as criminal

tendency, must nullify efforts at criminal reform. It is as foolish to say that a criminal is incorrigible because he is like his criminal father, as it would be to deny possibility of his reform because he is like any other criminal who is not his father. For parental resemblance does not imply annihilation of the human will, whose incalculable power of conquest over tendency is at the source of all reform. I repeat: the essential fact to be grasped is that heredity means nothing more and nothing less than ancestral resemblance. Fix that fact well in mind, and you have a key to many difficulties of the heredity question. That is the sum and substance of Biometric teaching; and, in the face of it, to say that Biometricians treat of inheritance and reproduction as if they were synonymous is manifestly inaccurate.

The next charge is more difficult to repudiate because of the ambiguity of some of its terms. Here it is verbatim: "The Biometric School place a sharp dividing line between inborn and acquired characters; it employs the term inheritance and reproduction as synonymous. *Thus*, the characters or qualities this School investigates are found by them to be inherited or inborn; and a reproduced quality means, in fact, for this school a purely inborn and transmitted quality." Why the word "thus," connecting this charge with the two preceding ones? What is the meaning of this thusness which transfers responsibility to the Biometric School for an unthinkable conception of a purely inborn and transmitted quantity? There are, of course, such things as figures of speech; and figurative language is often as useful as, and is sometimes more illuminating than, literal speech. Yet the expressions, "purely inborn character," "transmitted character," which were probably not intended by their real authors to be interpreted literally, are being used here as descriptive terms in a highly technical subject; and figurative expressions, when used technically, can only perpetuate the confusion of thought that may have engendered them; and consequently, they would be studiously avoided by the Biometric School, whose characteristics are clear thinking and precision of language. Biometric descriptions refer invariably to facts of experience; Biometric investigation, as Sir Bryan admits, "draws its conclusions from large numbers of observations" which are the recorded results of experience. Now, observation and experience show us heredity not as a power for transmitting, or withholding transmission, of any definite thing such as a purely inborn quality; they show us heredity as a tendency only: as a tendency to reproduce a more or less approximate likeness of that thing. Accordingly, without calling upon figurative expressions, the Biometrician is able to describe his experience of heredity influence in simple, literal, and plain language, as the observed tendency of every newly created being to develop the likeness of those within, and the relative unlikeness of those without, his own

line of ancestry. Descriptions of characters as "inborn" and "acquired" are not only not employed, but they are studiously avoided, by Biometricians. And in this studied boycott of figurative terms we have the exact opposite of what Sir Bryan states to be the case, namely, that the characters or qualities the Biometric School investigate are found by them to be purely inborn or transmitted qualities.

The fifth charge Sir Bryan brings against the Biometric School is that "as regards heredity it necessitates no further assumption than that sameness of reproduction in the case of a given quality implies sameness of inheritance." In apparent contradiction to previous statements, Sir Bryan admits here that Biometric Science regards heredity as *sameness* of reproduction, which is a different thing to reproduction, and might mean the same thing as ancestral resemblance. The allegation, however, now is that ancestral resemblance is always, without further inquiry, assumed by the Biometric School to be due to one cause, namely, the influence of heredity. The inaccuracy of this statement is shown by the following passage from the Report of my biometric investigation of the problem of heredity in its relation to crime: "We only know that there is such a thing as Heredity by its effect in producing Ancestral Resemblance. The first step, then, when studying the influence of Heredity is to obtain a measure of this resemblance. It must be understood, however, that this estimation of resemblance is only a first stage towards the solution of the heredity problem. Inheritance presupposes resemblance, but *resemblance need not necessarily be due to hereditary influence*. The first step, then, in the study of criminal heredity leads only to the discovery of certain statistical facts of family resemblance. These facts alone do not in themselves provide answers to the wider questions they lead up to; these are, to what extent these facts of family history are due to the inheritance of a constitutional anti-social disposition, or to what extent they depend upon the influence of family contagion."

This concludes the indictment against the Biometric School. The remaining charges are directed against me and my particular biometric work. The first of them is as follows: "Dr. Goring's final conclusions rest upon the conception that qualities or characters are either inherited or acquired—either of a constitutional origin or produced by the force of circumstances, and that it is possible to disentangle the influence of heredity from a complication of environmental influences—which illustrates the unfitness of applying biometrical methods to all branches of biological research." What the statement really illustrates is the futility of criticising the application of a principle until the nature of that principle has been definitely agreed upon and accepted. Were Sir Bryan and I at one concerning the conception involved in heredity problems, we should not possibly be at variance regarding the fitness of

applying biometric methods for the solution of those problems. Now, what precisely Sir Bryan's conception of heredity may be I do not know. He tells us something of what it isn't—for instance, that heredity is not the same as reproduction, but he nowhere states explicitly and unambiguously what he conceives it to be. How widely and fundamentally our respective conceptions must differ is revealed in the passage quoted above. For no one, proceeding from a conception of heredity as an influence tending to produce ancestral resemblance, could profess to form an estimate of the extent of its effectiveness in any particular case without investigating the matter statistically; that is to say, without making a statistical analysis of data recording the degree of resemblance actually observed between ancestors and descendants. These data are as necessary for estimating intensity of ancestral resemblance as were observations on falling bodies essential for measuring the intensity of terrestrial gravitation. And as with the force of heredity, so with the force of circumstance. The forces of heredity and circumstance are both of them conceptions derived from experience of associations, and the only way to measure precisely the strength of associations is by the statistical analysis of data. But Sir Bryan implies that characters can be differentiated as either inborn or acquired without investigation; that, by some mystical process unexplained, character can be shuffled into either one or other of these two compartments at sight. It is clear, then, that when describing characters as influenced by the forces of heredity and of circumstance, I am performing an entirely different operation to that of Sir Bryan when he classifies characters as either inborn or acquired. In other words, the conceptions of heredity and environment on which my conclusions rest must be fundamentally different from the conceptions of environment and heredity in Sir Bryan's mind when he criticises those conclusions. And, in fact, that our respective ideas of heredity and environment do refer to entirely different realities is conclusively proved by a final pronouncement on my work which Sir Bryan makes in reply to his own question, "whether any conclusion of value bearing on the genesis of the criminal is likely to be attained by the statistical methods Dr. Goring has employed?" The answer is that no conclusion of value could be so attained, and a verdict pronounced on the final conclusions I did reach by these methods is that "these conclusions are erroneous." The conclusion that crime is influenced by heredity is erroneous, because "the fact that inborn capacities are necessary for the production of human characters is accepted knowledge; no longer a hypothesis in need of verification." The conclusion that crime is not appreciably influenced by the force of circumstance is erroneous; because a notion that "the human being, criminal or non-criminal, is the creature of his inborn capacities alone has not been proved." Could anything be more final?

Could anything settle more conclusively, once and for all, that biometric research is a futile intellectual vagary? Or else, that Sir Bryan's notion of the problem involved in the ætiology of crime is unsound at the core? And, in pursuance of this latter contingency, I think a glance at the introduction of my book will take us as far as this: That whatever his own notion of the ætiology of crime may be, Sir Bryan has completely failed to acquaint himself with the biometric conception of that problem. For it will be seen immediately, from my description of the criminal diathesis in the introductory chapter referred to, that "the hypothesis no longer in need of verification," which Sir Bryan describes as one final conclusion of my investigation, is, in reality, a postulate or starting point from which that investigation proceeded. And it will also be seen, from the same reference, that what Sir Bryan describes as a second final conclusion of my investigation, namely, that the criminal is a creature of his inborn capacities alone—this unthinkable notion was certainly not a goal which that investigation set out to reach.

Let us try to get down to the fundamentals of a problem that can provoke such complete misunderstanding. The first point, which is abundantly clear, is that the mere existence of life, apart from the form it may take or the characters that may distinguish it, the mere fact of life itself must presuppose two things. First, the influence of reproduction and development determining, through the germ plasm, a continuity of organic growth between the generations. Second, a range of environment within whose influence alone organic growth can take place. These influences upon life are assumed wherever any form of life is manifest. In the absence of either of them, or rather in the absence of reproduction and development, and in the presence of an environment extending beyond prescribed limits, organic growth ceases, and existence comes to an end. It follows, therefore, that questions connected with the formation of human characters, that all questions of ætiology, are in no way concerned with this fixed and invariable influence of both germ and environment, which is obviously indispensable for growth. In discussion of these questions there can be no real difference of opinion on these elementary facts; and any difference there may appear to be is one of expression only. As pointed out by Prof. His "To think organic beings can be built up without any environmental means is a piece of unscientific mysticism." All this, of course, is as simple as it is obvious; but it is a matter whose importance cannot be over-emphasised by statement and restatement of the obvious postulate which I repeat: when investigating ætiology problems, the facts of reproduction and development determining growth within a fixed range of environment, have no relation or reference of any kind whatsoever to our direct and immediate concern which refers to the opposition between germinal and environmenta

influences in determining not growth, but the particular way growth takes place, and the particular kind of characters which are produced as an ultimate result of growth. How is growth modified by varying germinal influences? How are the ultimate effects of growth modified, to what extent can they be stunted, or encouraged, or diverted, by varying the degree or proportions of environmental influences? These are the questions the investigator asks himself; and in seeking answers to them, he naturally turns to the observation of the senses as the only means for formulating a truly scientific reply.

In plants, and amongst lower animals, the possibilities of modifying growth by environmental means are very great. Apart from effects due to selective breeding, pronounced modifications in the growth of fruit and flowers have been, and every day are being, produced under varying conditions of temperature, nutriment, moisture, climate, etc. As the result of treatment, the remarkable variability in the produce of gardeners, working on the same material, is a matter of everyday experience. But as we go up in the animal scale, the possibility of thus modifying growth becomes more constricted; and the extent to which results achieved are due to stock, or environmental selection, becomes increasingly doubtful. Hence the innumerable questions which arise. We know that for human physical development some form of nutriment and exercise are requisite. The question is to what extent, by taking thought—by prescribing this or that *régime* of nutriment and exercise—a cubit can be added to stature, or muscular development can be increased, or obesity reduced? We know that a tendency of human tissue to become diseased would be arrested by eliminating any one of the conditions which are essential to the life of human tissue. The question is to what extent, modifications, within the range of conditions compatible with life, will arrest or encourage the fruition of morbid tendencies: to what extent will over-crowding, insufficiency of diet, defective sanitation, increase tubercular tendency; to what extent will cod-liver oil, tuberculin, or open-air treatment arrest it? We know that the criminal tendency is affected by the “environmental influences which act for good or for ill on all men,”—by all kinds of education or training, for instance. The question is to what extent the *degree* of this character ultimately attained depends on the presence or absence of some *particular* kind of training, or some *particular* form of discipline: whether any one form of education, as, for instance, primary, secondary, or reformatory school training, or the education of the streets, or the educative influence of parental example in a corrupt home, is more productive of, let us say, habitual criminality than is any other specified form of education? These are the burning questions that require answering, and that call for precise answer, in plain language, from the expert sociologist; and from the

nature of the questions it will be realised that no amount of reflecting, of appealing to opinion, of referring to authority, of exercising dialectical ingenuity, can possibly provide the convincing and indisputable answers which are demanded, and which can only be attained in one way: namely, by appealing to, and making the best possible analysis of, experience. For what is the nature of the questions referred to? In every case it will be found that what these questions demand is an exact measure of the relationship between two variables. Consequently, for all practical purposes, problems of ætiology resolve themselves to this: as we modify one variable, what is the observed effect on another variable? In all their mental and physical attributes, and morbid states, and conditions resulting from these, how and to what extent, in all these ultimate results of growth, do human beings change, as we vary the hereditary and environmental influences which govern the growth of human beings? This is the problem of ætiology which, it will be seen, in every case, is essentially a problem of correlation. And how correlation between variables is to be assessed, save through the medium of a correlation calculus, it is not for me, as a biometrician, to say. It is incumbent on those critics who condemn the biometric calculus for solving problems of ætiology to supply that information.

In conclusion, I should like to point out that I do not discover in Sir Bryan's criticism any sense of the fact that the aim of my inquiry was not to support speculation upon what, in ideal conditions, might conceivably be a source of crime, but to discover what actually are its relations in conditions prevailing to-day. Because certain specified, but entirely imaginative, adverse circumstances might admittedly increase the production of habitual criminals, therefore habitual criminality is, in fact, a product of adverse circumstances—this seems to be the burden of a passage, which I cannot refrain from quoting, as an illuminating commentary on Sir Bryan's conception of the ætiology of crime. "I venture to think," writes Sir Bryan, "that most of us, including Dr. Goring, would agree, even in default of a demonstrative experiment, that most children and young persons from whatever stock they might have sprung, could have their normal criminal diathesis so influenced by neglect or positive training as to be actually and easily produced as even habitual criminals of various kinds." Let us admit that habitual criminals might be produced in the conditions Sir Bryan lays down. The admission would not affect the conclusions of my investigation; it would only restate a possibility which, in fact, that investigation did assume: "the possibility that environmental, as well as constitutional, factors play a part in the production of criminality." This possibility is, and always must be, a matter for investigation: never for discussion. Crime might be influenced by many circumstances; just as it might be

uninfluenced by many circumstances. Crime might be influenced if doors were left unlocked, or if streets were no longer policed; it is none the less uninfluenced by the circumstances I examined. Future investigation may reveal many criminal agencies at work which are at present unsuspected. But in the meantime, we need not let ourselves be diverted, by such speculations, from established facts. These facts were summarised in my conclusion which, despite of speculative criticism, still holds. It is that "between a variety of environmental conditions examined, such as illiteracy, parental neglect, lack of employment, the stress of poverty, etc., including the states of a healthy, delicate, or morbid constitution *per se*, and even the situation induced by the approach of death⁽¹⁾—between these conditions and the committing of crime we find no evidence of any significant relationship.

(¹) At all ages of life up to fifty-five the death rates of prisoners are practically identical with the general population rates.

The Relation of Alcohol to Mental States, particularly in regard to the War. By Major Sir ROBERT ARMSTRONG-JONES, M.D., R.A.M.C., Lecturer on Mental Diseases to St. Bartholomew's Hospital.⁽¹⁾

I PROPOSE to deal with this subject in the light of present-day experience and knowledge, reflecting, to begin with, the medical opinion of to-day and afterwards that of the general public, and I propose to divide my theme into two sections: Firstly, the evident meaning attached to my title, *viz.*, the different forms of mental abnormality resulting from excessive drinking in the individual, and secondly, the different mental states exhibited, or the different points of view adopted by the community responsible for the methods of its sale and use, and, as a consequence, for the maintenance of public order. In dealing with the latter section I shall pass in review the different legal measures that have been adopted to control its sale and the various steps that have been taken to safeguard the health of the people in connection with it.

The question of the effects of alcohol upon the human organism is an important medical point, as well as being an interesting, economic, and sociological one; for it has a concern with the vitality and with the output of work of the individual, as also with his relation to the State which protects him and of which he forms a component part. As to the use of alcohol in health all experiments are in accord, and it would be useless to occupy space with a repetition of the results obtained. Broadly stated, they are that alcohol stimulates the heart and circulation; in other words, it increases the force and frequency of the pulse