

CHAPTER IX

EARLY ANTHROPOLOGICAL RESEARCHES

A. THE PASSAGE FROM GEOGRAPHY TO ANTHROPOLOGY AND RACE-IMPROVEMENT

"About the time of the appearance of Darwin's *Origin of Species* I had begun to interest myself in the Human side of Geography, and was in a way prepared to appreciate his view. I am sure I assimilated it with far more readiness than most people, absorbing it almost at once, and my afterthoughts were permanently tinged by it. Some ideas I had about Human Heredity were set fermenting and I wrote *Hereditary Genius*. In working this out I forced myself to become familiar with the higher branches of Statistics, and, conscious of the power they gave in dealing with populations as a whole, I availed myself of them largely."

Manuscript Note of Francis Galton in the handwriting of Mrs Galton found among his papers.

I HAVE indicated in the preceding chapter how Galton's interests were turning from man's environment to man himself—not only to his physical but to his psychical characters. One of the most conspicuously interesting facts in Galton's development is that in 1865 he had reached, we might almost say had planned out, the main conception of his work on Man. It is not possible to say from the dates of issue which of Galton's anthropological papers of this year, namely "The first steps towards the Domestication of Animals"¹ or "Hereditary Talent and Character"², was the earlier, because the date of publication is not necessarily that of writing the paper. Mrs Galton's 'Record,' however, shows that both papers antedate 1865 :

1863. Returned by the Riviera road [from Switzerland] and home in November. Frank appointed Secretary to the British Association. Wrote paper on Domestication. Visited the Norths, etc.

1864. Very cold beginning of year. Went to Leamington at Easter [to visit Galton's mother]... Emma and Milly to us in May. Went abroad in July to Switzerland, Peiden, Grindelwald, St Luc. Returned for British Association at Bath. I at Julian Hill meanwhile [Mrs Galton's mother's house]. Visited Hadzor [home of the Howard Galtons] and Leamington. ...Went to the Norths in December. Frank writing *Hereditary Talent*... Frank busy editing Murray's Handbook. Christmas at home and alone."

The "Domestication" paper is chiefly of value as showing the transition of Galton's thoughts. Examining the accounts travellers give of savage races and his own experiences, Galton propounds the view that wild animals were tamed as pets or even kept for religious purposes³ before they were

¹ *Transactions of the Ethnological Society of London*, Vol. III, pp. 122-38, 1865. I have no record of when it was read.

² *Macmillan's Magazine*, 1st Paper, June 1865, 2nd Paper, August 1865, Vol. XII, pp. 157-66, 318-27.

³ Several of the cases cited by Galton, e.g. that of the kites from Shark's Bay, Australia, and the serpents at Whydah in Africa, suggest that totemism even might be the ultimate source of domestication.

domesticated for food or transport. He cites many—but relatively few out of the statements he had collected—of natives keeping animals as pets and even of native women feeding the young of wild animals from their own breasts, Australian women puppies, presumably young dingoes, New Guinea women young pigs, and Indian women of North America bear cubs. Galton considers that the value of domestication as a source of food was only found out incidentally as a result of taming animals for pets¹.

“Have,” he writes, “extraordinary geniuses arisen who severally taught their contemporaries to tame and domesticate the dog, the ox, the sheep, the hog, the fowl, the llama, the reindeer and the rest? Or again: Is it possible that the ordinary habits of rude races, combined with the qualities of the animals in question, have sufficed to originate every instance of established domestication? The conclusion to which I have arrived is entirely in favour of the last hypothesis.”

Because all savages maintain pet animals, because many tribes have *sacred* ones, and because kings of ancient states had *imported* animals on a vast scale from their barbarian neighbours, Galton holds that every animal of any pretension has been held in captivity over and over again and had numerous chances of becoming domesticated. We have no more domesticated animals than exist, because there are no others suited for domestication. Suitability for domestication depends upon an animal (i) being hardy, (ii) having an inborn liking for man, (iii) being comfort-loving, (iv) being useful to man, (v) breeding freely in captivity, (vi) being gregarious in its nature. These conditions Galton illustrates and states the exceptions. He gives due place to continual selection after domestication.

“To conclude. I see no reason to suppose that the first domestication of any animal, except the elephant, implies a high civilisation among the people who established it. I cannot believe it to have been the result of a preconceived intention, followed by elaborate trials, to administer to the comfort of man. Neither can I think it arose from one successful effort made by an individual, who might therefore justly claim the title of benefactor to his race; but on the contrary, that a vast number of half-unconscious attempts have been made throughout the course of ages, and that ultimately, by slow degrees, after many relapses, and continued selection, our several domestic breeds became firmly established.” (p. 138.)

We know much more of the history of man now than was known in 1863. We realise the long history of man, and how he knew the elephant, the reindeer and the horse as sources of food long before he tamed them. It is, indeed, doubtful whether palaeolithic man ever domesticated any form of animal. His art shows no trace of the pet, and there is only one and that a very doubtful case of a possible bridle—the horse is merely ‘game,’ as the reindeer or earlier the mammoth.

¹ There was probably some correspondence between Galton and Darwin as to savages’ pets. I am unable to date the following letter, but it probably belonged to this period.

DOWN, BROMLEY, KENT, *July 7th.*

MY DEAR GALTON, I return the enclosed signed with great pleasure. Many thanks for information about Dr Barth’s work, which I will read. I continue much interested about all domestic animals of all savage nations, though I shall not take up cattle in detail. If on reading I shall have anything to ask I will accept your kind offer and ask. Anything about savages taking any the least pains in breeding or crossing their domestic animals is of particular interest to me. With kind remembrances to Mrs Galton, Pray believe me, Yours very sincerely, CH. DARWIN.

When we pass from the palaeolithic to the neolithic stage we are not, unfortunately, able to trace the pet developing into the domesticated animal. What does seem to loom through the mist of prehistory is a series of races each with a more or less completed culture breaking up an older culture, a race which has domesticated cattle, a race which has domesticated horses, a race living with dogs or with reindeer; they loom upon us from the unknown, replacing less effective cultures. This does not exclude the domesticated animal arising from the pet, but it does suggest that either environment or religious belief led to pets of a certain type, and that only certain groups had the inspiration to turn their pets to the service of the group. Galton states that when he travelled in Damaraland the chiefs took pleasure in their herds of cattle rather for their stateliness and colour than for their beef—they were as the deer of an English squire.

“An Ox was almost a sacred beast in Damaraland, not to be killed except on momentous occasions, and then as a sort of sacrificial feast, in which all bystanders shared. The payment of two oxen was hush money for the life of a man. I was considerably embarrassed by finding that I had the greatest trouble in buying oxen for my own use, with the ordinary articles of barter. The possessors would hardly part with them for any remuneration; they would never sell their handsomest beasts.” (p. 135.)

The possibility that the pet was a totem, or an animal of religious character, might throw light on the association of special domestic animals with definite races and their cultures.

A paper which may be considered in relation to that on “Domestication” may be fitly referred to here, as it also arose from Galton’s travel-experience. It is entitled: “Gregariousness in Cattle and in Men.” It was published in *Macmillan’s Magazine* for 1872¹. The theme of this article is a remarkable one, namely that our remote ancestors lived in herds or packs and that this gregarious or herd instinct is the source of many of man’s intellectual weaknesses in his advanced civilisation². The same idea of the instinct of the herd in man appears to have occurred to a number of writers recently, but they do not seem to have known or at any rate do not acknowledge Galton’s priority of idea. The most interesting point of the article lies not only in the fact that Galton here assumes that he has in the earlier memoirs, which will shortly be discussed, proved the inheritance of the mental and moral characters in man, but in the fact that he stands definitely on the Darwinian platform and considers what heredity and selection have made of man. He opens his paper with the following description of its aims:

“I propose, in these pages, to discuss a curious and apparently anomalous group of base moral instincts and intellectual deficiencies, to trace their analogies in the world of brutes, and to examine the conditions, through which they have been evolved. I speak of the slavish aptitudes, from which the leaders of men, and the heroes and the prophets, are exempt, but which, are irrepressible elements in the disposition of average men. I refer to the natural tendency of the vast majority of our race to shrink from the responsibility of standing and acting alone, to their exaltation of the *vox populi*, even when they know it to be the utterance of a mob of nobodies, into the *vox Dei*, to their willing servitude to tradition, authority and custom. Also,

¹ Vol. xxiii, pp. 353–7.

² Galton does not say that it may also be the source of some of his higher altruistic sympathies and social habits, but he had recognised this in his paper of 1865.

I refer to the intellectual deficiencies corresponding to these moral flaws, shown by the rareness with which men are endowed with the power of free and original thought, as compared with the abundance of their respective faculties and their aptitude for culture. I shall endeavour to prove that the slavish aptitudes, whose expression in man I have faintly but sufficiently traced, are the direct consequence of his gregarious nature, which, itself, is a result both of his primæval barbarism and of his subsequent forms of civilisation. My argument will be that gregarious animals possess a want of self-reliance in a marked degree, that the conditions of the lives of these animals have made gregarious instincts a necessity to them, and therefore by the law of natural selection, these instincts and their accompanying slavish aptitudes have gradually become evolved. Then I shall argue, that our remote ancestors have lived under parallel circumstances, and that we have inherited the gregarious instincts and slavish aptitudes which were developed under those circumstances, although in our advanced civilisation they are of more harm than good to the race." (p. 353.)

Galton points out how in earlier life he had gained an intimate knowledge of certain types of gregarious animals. First he had found the camel's need for companionship a never exhausted topic of curious admiration in his tedious days of travel across North African deserts (see our Vol. I, pp. 199-205). Secondly and chiefly he had spent more than a year in close association with the semi-wild cattle of Damaraland. He had travelled an entire journey on the back of one of them with others at his side either as wagon or pack cattle for which nearly a hundred were broken in, or wholly unbroken and serving the purpose of an itinerant larder. He had often spent the night in their midst while the cries of prowling carnivora sounded around.

"These opportunities of studying the disposition of such peculiar cattle were not wasted upon me. I had only too much leisure to think about them, and the habits of the animals strongly attracted my curiosity. The better I understood them, the more complex and worthy of study did their minds appear to me." (p. 354.)

Galton then gives us a very striking account of the psychology of the herd.

One of the difficulties in breaking in wild cattle is to obtain 'fore-oxen' for the team; these must be those who are of an exceptional disposition—born pioneers and leaders.

"Men who break in wild cattle for harness watch assiduously for those who show a self-reliant nature, by grazing apart or ahead of the rest, and these they break-in for fore-oxen. The other cattle may be indifferently devoted to ordinary harness purposes, or to slaughter; but the born leaders are far too rare to be used for any less distinguished service than that which they alone are capable of fulfilling." (p. 354.)

Galton considers that the law of "deviation from an average"—about which he had recently been writing (see our Chapter X)—would certainly be applicable to independence of character in cattle. He found every degree of it from the ox that could be ridden even at a trot apart from his fellows down to the ox that exhibits every sign of mental agony when segregated from the herd. The herd, with its mutual defence, its 'fore-oxen' as material for leaders, and its own leader, is the product of a country infested by large carnivora. A crouching lion fears oxen who turn boldly upon him, and does so with reason. The 'fore-oxen,' who are self-reliant, tend to be destroyed.

"Natural selection tends to give but one leader to a herd....Looking at the matter in a broad way we may justly assert that wild beasts trim and prune every herd into compactness,

and tend to reduce it into a closely united body with a single well-protected leader. The development of independence of character in cattle is thus suppressed far below its healthy natural standard by the influence of wild beasts, as is shown by the greater display of self-reliance among cattle whose ancestry for some generations have not been exposed to such danger." (p. 357.)

It would be impossible in a résumé like this to cite all Galton's acute observations on the cattle herds of Damaraland, but the paper is well worth reading even to-day. He then proceeds to apply its lesson with certain modifications to savage man, but he insists

"on a close resemblance in the particular circumstance that most savages are so unamiable and morose as to have hardly any object in associating together besides that of mutual support."

As in the case of cattle herds there is a definite size in a given environment which is best suited to the human herd. A very large tribe is deficient in centralisation or is straitened for food and falls to pieces; a small tribe is sure to be overrun, slaughtered or driven into slavery. The law of natural selection "must discourage every race of barbarians which supplies self-reliant individuals in such large numbers as to cause their tribe to lose its blind desire of aggregation. It must equally discourage a breed that is incompetent to supply such men, in a sufficiently abundant ratio to the rest of the population, to ensure the existence of tribes of not too large a size." (p. 357.)

Galton now proceeds to his 'moral': All through primaeval times, the steady influence of social condition summed up in the clan, the tribe, the petty kingdom tended to exterminate a superfluity of self-reliant men.

"I hold that the blind instincts evolved under those long-continued conditions have been deeply ingrained into our breed, and that they are a bar to our enjoying the freedom which the forms of modern civilisation could otherwise give us. A really intelligent nation might be held together by far stronger forces than are derived from the purely gregarious instincts. It would not be a mob of slaves, clinging together, incapable of self-government, and begging to be led; but it would consist of vigorous, self-reliant men, knit to one another by innumerable attractions, into a strong, tense and elastic organisation. Our present natural dispositions make it simply impossible for us to attain this ideal standard, and therefore the slavishness of the mass of men, in morals and intellect, must be an admitted fact in all schemes of regenerative policy. The hereditary taint due to the primaeval barbarism of our race, and maintained by later influences, will have to be bred out of it before our descendants can rise to the position of free members of a free and intelligent society; and I may add, that the most likely nest, at the present time, for self-reliant natures, is to be found in the States founded and maintained by emigrants." (p. 357.)

Wonderful, is it not, how Darwinism had already gripped Galton? How he thought in terms of heredity and natural selection and was ready to apply them to the past history of man in order to explain its present and suggest its future! The notion that it is necessary for human progress to breed out the men of slavish morals and intelligence—the essential foundation of eugenics—is already a truth to him.

Democracy—moral and intellectual progress—is impossible while man is burdened with the heritage of his past history. It has bound mankind to a few great leaders; it has produced a mass of servile intelligences; and only man's insight—man breeding man as his domesticated animal—can free mankind. This was Galton's view. Possibly the historian of man in the dim future may grasp that man in the age of nations was as much a product

of natural selection as man in the age of tribes ; and that a nation was not stable when it produced too many self-reliant 'fore-oxen,' or, worse still, when each ruminant and stolid ox no longer considered the common determination of the herd as binding on his conscience. He might even cite as illustration the Ireland of the twentieth century !

The world has seen numerous travellers, many men of mechanical genius, and not a few students of nature who grasped the evolution of human societies. But Galton the Cambridge mathematician, Galton the ox-rider, Galton of the wave-machine, and Galton the eugenist, seem at first sight so widely incongruous, and yet rightly estimated are necessary features of that all-round individuality—observant, constructive, calculating, and enthusiastic—of Galton the anthropologist, using that term in its widest sense, who by originality of method, wide experience of men and ripe judgment of affairs influenced the development of many younger men in the last quarter of the nineteenth century.

The paper just discussed was taken somewhat out of its proper order because it springs so directly from Galton's travel-experience, and because it indicates so clearly the growing tendencies of Galton's mind. But the reader must remember that Galton did not suddenly rush to the conviction, that from this time onward dominated his view of life, namely that the psychical characters in man, and also in the lower animals, are hereditary. He had been working on this subject for at least six or seven years. The best evidence of this is the paper written in 1864 on "Hereditary Talent and Character" (see our p. 70). It is singular how this foundation stone of Galton's anthropological work—the equal inheritance of the psychical and physical characters—has been disregarded even by some of his professed followers. As for the psychologists by calling they at first left this fundamental problem to others, and later, instead of observing and experimenting themselves, wasted energy in futile criticisms. Few men are willing to admit that their folly on the one hand is inbred, or that their talent which has led to success is not a product of their own free industry. Even men of quite reasonable intelligence daily confuse the possession of knowledge with mental endowment, and, as a result of their confusion, assert that psychical characters are chiefly the result of training. Another very common argument is of the following kind: A dictionary of biography is appealed to and it is found that far more distinguished men are sons of mediocre parents than of distinguished parents. It is then asserted that talent cannot be inherited. The fallacy is fairly flagrant, if examined, but is sufficiently plausible to be often repeated. Let us suppose that one parent in a thousand is distinguished, and, the rate of reproduction being the same, one offspring in ten to distinguished parents is distinguished, but only one offspring to the hundred in the case of non-distinguished parents. Then in a community of 10 distinguished and 10,000 non-distinguished parents we shall have one distinguished individual born of distinguished parents and 100 distinguished individuals born of mediocrity.

The fallacy consists in emphasising the 100 against the unit, and overlooking the fact that the distinguished parent produces distinction at ten

times the rate of the mediocre parent. Galton is very careful in this paper to compare rates and not totals, and he realises that if we could increase the fertility of the able and check that of mediocrity, we should effectually alter the intellectual standard of our race. It is difficult for the mind with even a small modicum of statistical intelligence to appreciate how Galton's thesis could possibly be upset by showing that a larger *total* of talented men were born from mediocre than from able parents; that is only to proclaim the enormous prevalence of mediocrity!

"The power of man over animal life, in producing whatever varieties of form he pleases, is enormously great. It would seem as though the physical structure of future generations was almost as plastic as clay, under the control of the breeder's will. It is my desire to show, more pointedly than—so far as I am aware—has been attempted before, that mental qualities are equally under control.

A remarkable mis-apprehension appears to be current as to the fact of the transmission of talent by inheritance. It is commonly asserted that the children of eminent men are stupid; that, where great power of intellect seems to have been inherited, it has descended through the mother's side; and that one son commonly runs away with the talent of a whole family. My own inquiries have led me to diametrically opposite conclusions. I find that talent is transmitted by inheritance in a very remarkable degree; that the mother has by no means the monopoly of its transmission; and that whole families of persons of talent are more common than those in which one member only is possessed of it. I justify my conclusions by the statistics I now proceed to adduce, which I believe are amply sufficient to command conviction. They are only a part of much material I have collected, for a future volume on this subject¹; all of which points in the same direction." (p. 157.)

Galton writing in 1864 points out that while we are perfectly certain of the inheritance of qualities in the brute world and breeders have learnt many empirical rules by experience, we have not advanced even to this limited extent in the case of man. It appears to have been nobody's business to study heredity in man, and the facts that only two generations are likely to be born in the lifetime of any observer, and that each individual rarely marries more than once, render the study harder in man than in the animals. Still nobody has doubted that the *physical* characters of man are equally transmissible with those of brutes. Galton then notes that as far as he is aware no one has bred animals for intelligence, but only for qualities which are useful to man. He suggests that instead of breeding dogs for special aptitudes and points we should try breeding them for intelligence:

"It would be a most interesting occupation for a country philosopher to pick up the cleverest dogs he could hear of, and mate them together, generation after generation—breeding purely for intellectual power, and disregarding shape, size and every other quality." (p. 158.)

The reader would have to remember that the wise dog would not always be most sympathetic to man; he might be a dexterous thief, a sad hypocrite or show marked contempt for humanity. As no one has bred for intelligence in animals, so no one has considered the possibility of breeding for intelligence in man. Galton's aim is to show that it is feasible because talent and character are inherited. His method is precisely that of his first great book *Hereditary Genius* (1869), only therein it is more fully developed. He estimates that of the men who receive a fair education about 1 in 3000 reach

distinction; it would not have affected the validity of his argument had he taken 1 in 1000. He then takes from biographical dictionaries and other sources the number of distinguished men who have had distinguished fathers, sons or other relatives, and shows that they have far more distinguished sons than could possibly be anticipated in a like number of the general population. For example, taking 391 painters from Bryan's Dictionary there are 33 cases of sons who have renown as artists. Now supposing each painter had on an average 3 sons, we have 33 distinguished in a group of 1173, or about 1 in 36. Galton's statistics show something of this order—when allowance is made for size of family—for the frequency of distinction of all kinds in the sons of a population of fathers of distinction. But in the general population of the educated¹ distinction is only of the order 1 in 3000—or 1 in 1000 if the reader prefer. This rough method—ample enough for its purpose—was Galton's first application of statistics to the problem of heredity. It is the way he convinced himself that the mental characters in man were transmissible. But Galton was not content with merely reaching a truth. His next step was to consider what its relation to race betterment might be, and then—in 1864—we suddenly find the whole doctrine of eugenics as the salvation of mankind developed half-a-century too early!

“As we cannot doubt that the transmission of talent is as much through the side of the mother as through that of the father, how vastly would the offspring be improved, supposing distinguished women to be commonly married to distinguished men, generation after generation, their qualities being in harmony and not in contrast, according to rules, of which we are now ignorant, but which a study of the subject would be sure to evolve!” (p. 163.)

Galton next meets the “great and common mistake” of supposing that high intellectual powers are generally associated with puny frames and small physical strength. He says that men of remarkable eminence are almost always men of vast powers of work. He notes how even sedentary workers astonish their friends when on vacation rambles, and how frequently men of literary and scientific distinction have been the strongest and most daring of alpine climbers.

“Most notabilities have been great eaters and excellent digesters, on literally the same principle that the furnace that can raise more steam than is usual for one of its size must burn more freely and well than is common. Most great men are vigorous animals, with exuberant powers and an extreme devotion to a cause. There is no reason to suppose that in breeding for the highest order of intelligence, we should produce a sterile or a feeble race.” (p. 164.)

Galton condemns the civilisation of the Middle Ages that enrolled so many youths of genius in the ranks of a celibate clergy; and he condemns the costly tone of society to-day which also forces genius to be celibate during the best period of manhood. He finds that very great men are not averse to the other sex, for many have been noted for their illicit intercourses, and in this respect he especially blames great lawyers. But science does not escape his censure; he takes the commoners who have been Presidents of the British Association as a fair list of leaders in science of the present day,

¹ Galton limits his field because of the handicap on the uneducated, however talented they may be.

and finds that only one-third of them have been married and had children. After drawing attention to the ages which thought it quite natural that the strongest lance should win the fairest lady in the tournament, Galton concludes the first part of his lecture half humorously, half earnestly as follows:

“Let us, then, give reins to our fancy and imagine a Utopia—or a Laputa if you will—in which a system of competitive examination for girls, as well as for youths, had been so developed as to embrace every important quality of mind and body, and where a considerable sum was yearly allotted to the endowment of such marriages as promised to yield children who would grow into eminent servants of the State. We may picture to ourselves an annual ceremony in that Utopia or Laputa, in which the Senior Trustee of the Endowment Fund would address ten deeply-blushing young men, all twenty-five years old, in the following terms: ‘Gentlemen, I have to announce the results of a public examination, conducted on established principles; which show that you occupy the foremost places in your year, in respect to those qualities of talent, character, and bodily vigour, which are proved, on the whole, to do most honour and best service to our race. An examination has also been conducted on established principles among all the young ladies of this country who are now of the age of twenty-one, and I need hardly remind you, that this examination takes note of grace, beauty, health, good temper, accomplished housewifery and disengaged affections, in addition to noble qualities of heart and brain. By a careful investigation of the marks you have severally obtained, and a comparison of them, always on established principles, with those obtained by the most distinguished among the young ladies, we have been able to select ten of their names with special reference to your individual qualities. It appears that marriages between you and these ten ladies, according to the list I hold in my hand, would offer the probability of unusual happiness to yourselves, and what is of paramount interest to the State, would probably result in an extraordinarily talented issue. Under these circumstances if any or all of these marriages should be agreed upon the Sovereign herself will give away the brides, at a high and solemn festival six months hence in Westminster Abbey. We on our part are prepared, in each case, to assign 5,000*l.* as a wedding present, and to defray the cost of maintaining and educating your children, out of the ample funds entrusted to our disposal by the State.’

If a twentieth part of the cost and pains were spent in measures for the improvement of the human race that are spent in the improvement of the breed of horses and cattle, what a galaxy of genius might we not create! We might introduce prophets and high priests of civilisation into the world, as surely as we can propagate idiots by mating *crétins*. Men and women of the present day are, to those we might hope to bring into existence, what the pariah dogs of the streets of an Eastern town are to our own highly-bred varieties.

The feeble nations of the world are necessarily giving way before the nobler varieties of mankind; and even the best of these, so far as we know them, seem unequal to their work. The average culture of mankind is become so much higher than it was, and the branches of knowledge and history so various and extended, that few are capable even of comprehending the exigencies of our modern civilisation; much less of fulfilling them. We are living in a sort of intellectual anarchy, for the want of master-minds. The general intellectual capacity of our leaders requires to be raised, and also to be differentiated. We want abler commanders, statesmen, thinkers, inventors, and artists. The natural qualifications of our race are no greater than they used to be in semi-barbarous times, though the conditions amid which we are born are vastly more complex than of old. The foremost minds of the present day seem to stagger and halt under an intellectual load too heavy for their powers.” (pp. 165–6.)

Here was Galton fifty years ago calling out for the ‘superman,’ much as the younger men of to-day are doing. But he differed from them in that he saw a reasoned way of producing the superman, while they do not seem to get further than devoutly hoping that either by a lucky ‘sport’ or an adequate exercise of will power he will one day appear!

One point—possibly the tragedy of his own life—Galton overlooked: you may be a man of wide intelligence, of a gifted stock with fertile parents,

you may marry a woman of gifted stock and fertile parents also, and yet have no need to ask the 'Senior Trustee of the Endowment Fund' to maintain and educate children, if they are denied you. There are not only the physical and mental, but the physiological harmonies to be considered and of these the 'Senior Trustee' does not give us a hint. In later years Galton modified his views; he would, I think, have been content to grade physically and mentally mankind, and have urged that marriage within your own grade was a religious duty for those of high grade or caste.

In the second part of his paper Galton adds a number of interesting considerations and meets probable criticisms. Thus he starts with the statement that out of a hundred sons of men highly distinguished in the open professions eight are found to have rivalled their fathers in eminence¹. But Galton considers that the mother has in most of these cases been selected 'at hazard.' He points out that, where even *both* parents are of eminence, it would be absurd to expect their children to be on the average equal to them in natural endowment, because beyond the parents they would necessarily have much 'mongrel' ancestry.

"No one, I think," he writes, "can doubt, from the facts and analogies I have brought forward, that if talented men were mated with talented women of the same mental and physical characters as themselves, generation after generation, we might produce a highly-bred human race, with no more tendency to revert to meaner ancestral types than is shown by our long-established breeds of race-horses and fox-hounds." (p. 319.)

In this passage we see Galton feeling towards the effect of (what I later termed) 'assortative mating,' and pointing to the 'mongrelism' of previous ancestry as the true source of his own 'law of regression.'

Galton next indicates that while marriage within the like intellectual grade would tend to differentiate society into two grades or castes objection may be raised that it would not tend to elevate society as a whole². He suggests that (what I have later termed) 'reproductive selection' would or should be called into play. In the first place natural selection, he considers, would powerfully assist in the substitution of the higher caste *A* for the lower caste *B* by pressing heavily on the minority of weakly and incapable men. He did not at that time seem to have recognised that, while in the 'sixties the fertilities of the two castes were—what they no longer are—very nearly equal, the whole course of modern social evolution has been to suspend the action of natural selection. Galton did see, however, that a differential fertility has to be brought about, and he suggested that if intermarriage between *A* and *B* be looked upon with strong disapproval, so the early marriage of *A* and the discouragement or postponement of that of *B* would be "agencies amply sufficient to eliminate *B* in a few generations."

¹ I am not clear that Galton here accurately expresses the result deducible from his figures. I cannot find that he has allowed for size of adult family—at most say an average of $2\frac{1}{2}$ sons. If so, then we ought to say out of the 100 sons of distinguished men a little over three on the average would be distinguished, which statement would still be ample to prove Galton's point.

² It would tend to produce more and stronger leaders for the nation which adopted it, which after all may be more important than elevating society as a whole, especially if we lay stress on Galton's herd analogies.

I venture to think that Galton hardly gave due weight to such a primary human instinct as that of mating, if he really thought that the matings of *B* could be effectively discouraged or retarded by any existing agencies short of another primal force—such as natural selection—of equal intensity. The possibility of separating marriage from birth, better realised to-day than in the 'sixties, is of course a factor of great importance, but the general influence of birth-control so far has been little short of disastrous from the eugenic standpoint; it has tended to decrease the fertility of the intelligent relatively to that of the unintelligent caste in the community. That a wider knowledge of birth-control will produce the desired 'reproductive selection,' as some eugenists apparently hold, is to assume that Caste *B* is intelligent and social enough to adopt control, and Caste *A* is altruistic enough to discard it, even at the cost of that social eminence which is the natural reward of its superior intelligence. Galton held that the improvement of the breed of mankind presents no insuperable difficulty.

"If everybody were to agree on the improvement of the race of man being a matter of the very utmost importance, and if the theory of hereditary transmission of qualities in men was as thoroughly understood as it is in the case of our domestic animals, I see no absurdity in supposing that, in some way or other, the improvement would be carried into effect." (p. 320.)

May we not answer to that proposition: Undoubtedly true, but how bring every one, nay even a majority of Caste *B*, to agree? To think it possible is to assume they belong to Caste *A*! Galton himself when he returned to Eugenics forty years later seems more fully to have recognised these difficulties, to have appreciated that, important as the problem is, its solution will be long and difficult. That we must be content to create a 'religious' feeling on the subject, to endeavour legislatively to strengthen the economic position of Caste *A* so that it may multiply, and legislatively to restrict the propagation of the worst members of Caste *B*, its minority, the mentally defective, the deaf and dumb, the blind and the deformed, when, as is mostly the case, these characters are of the hereditary type. Not one all-embracing remedy—certainly not birth-control—is the solution of the eugenic problem, but a steady examination of all social schemes, philanthropic and legislative, from the eugenic standpoint, and the bringing of an enlightened public opinion to bear upon them, so that the main idea of Galton, a differential fertility in favour of Caste *A*, is little by little brought into existence¹.

Galton in the paper under discussion emphasises the fact that he is not dealing solely with ability; he is thinking of all "mental aptitudes" as well as of "general intellectual power." He cites even mental and physical pathological states as certainly hereditary; cravings for drink, gambling, strong sexual passion, proclivities to fraud, pauperism or crimes of violence, longevity and premature death go by descent; many forms of insanity, gout, tendency to tuberculosis, heart disease, diseases of brain, liver and kidneys, of ear and of eye, etc. In fact Galton outlines the vast field of hereditary

¹ I have here (as Galton does) only spoken of two divisions, Castes *A* and *B*, to show his argument. Actually society is made of an infinity of grades for any character, and this Galton fully recognised.

research, which science is only slowly, if surely, investigating forty years later.

To illustrate what he means by "mental aptitudes" Galton refers to those of the American Indian and of the Negro; both have been reared under the most different environments from the North to the South of the world, and again under the most diverse social and political institutions, yet in all their essential mental characteristics they remain Red Man and Negro. Nature, as Galton later expressed it, is ever dominant over nurture. The Red Man has everywhere great patience, great reticence, great dignity, yet he has the minimum of affectionate and social qualities compatible with the continuance of his race.

"The Negro has strong impulsive passions, and neither patience, reticence nor dignity. He is warmhearted, loving towards his master's children and idolised by the children in return. He is eminently gregarious, for he is always jabbering, quarrelling, tom-tom-ing and dancing. He is remarkably domestic, and is endowed with such constitutional vigour, and is so prolific that his race is irrepressible." (p. 321.)

The characterisation Galton gives of Red Man and Negro—briefly resumed above—has been equalled, if scarcely bettered, by other anthropologists, but it remained for him to draw the essential conclusions that if the Negro is more unlike the Red Man in his mind than in his body, and this holds for all the environments in which you find them, then a race is a race because mental and moral characteristics are hereditary, and heredity will maintain these features dominating the slight, we might almost say superficial, effects of the most varied environment.

"Our bodies, minds and capabilities of development have been derived from them [our forefathers]. Everything we possess at our birth is a heritage from our ancestors." (p. 321.)

Galton next turns to the question whether habits acquired by the parents can be inherited by their offspring, and discusses it at length.

"I cannot ascertain that the son of an old soldier learns his drill more quickly than the son of an artizan. I am assured that the sons of fishermen, whose ancestors have pursued the same calling time out of mind, are just as sea-sick as the sons of landmen when they first go to sea."

Galton rejects the inheritance of acquired characters whether mental or physical. Then, in vague language, he propounds a doctrine probably for the first time in the history of science, which amounts to the theory of the continuity of the germ plasm. He boldly asserts that there is nothing in the embryo of an individual that was not in the embryos of its parents; that all the parental life from embryo to adult age, and from that to senility, has contributed nothing to the offspring embryo.

"We shall therefore take an approximately correct view of the origin of our life, if we consider our own embryos to have sprung immediately from those embryos whence our parents were developed, and these from the embryos of their parents, and so on for ever. We should in this way look on the nature of mankind, and perhaps on that of the whole animated creation, as one continuous system, ever pushing out new branches in all directions, that variously interlace, and that bud into separate lives at every point of interlacement."

"This simile does not at all express the popular notion of life. Most persons seem to have a vague idea that a new element, specially fashioned in heaven and not transmitted by simple descent, is introduced into the body of every newly-born infant. Such a notion is unfitted to

stand upon any scientific basis with which we are acquainted. It is impossible it should be true unless there exists some property or quality in man that is not transmissible by descent. But the terms *talent* and *character* are exhaustive; they include the whole of man's spiritual nature so far as we are able to understand it. No other class of qualities is known to exist, that we might suppose to have been interpolated from on high. Moreover the idea is improbable from *à priori* considerations, because there is no other instance in which creative power operates under our own observation at the present day, except it may be in the freedom in action of our own wills. Wherever else we turn our eyes, we see nothing but law and order, and effect following cause." (pp. 322-3.)

The reader will now grasp how necessary it is to appreciate that the inheritance of mental and moral characters in man was the fundamental concept in Galton's life and work. It led him to all his later quantitative investigations on heredity; it led him to his conception of the 'stirp,' or as it was later termed the principle of the continuity of the germ plasm, but it led him also to his rejection of the doctrine of an implanted 'soul'—"*talent* and *character* are exhaustive; they include the whole of man's spiritual nature so far as we are able to understand it." Galton's free thought was the product of his views on heredity, and Darwin's *Origin of Species* had led Galton directly to the study of heredity in man. This is very obvious in the present paper. He admits variation between the embryos due to the same parents, although we know not the how of that variation. He applies selection directly to man. It is Nature's

"fiat that the natural tendencies of animals should never disaccord long and widely with the conditions under which they are placed. Every animal before it is of an age to bear offspring has to undergo frequent stern examination before the board of Nature, under the law of natural selection; where to be 'plucked' is not necessarily disgrace, but is certainly death." (p. 323.)

Then Galton proceeds to question whether the moral character is not also selected in words which Huxley would have done well to ponder on before he gave many years later his much misguided—for so I must venture to characterise it—Romanes Lecture.

"In strength, agility, and other physical qualities, Darwin's law of natural selection acts with unimpassioned merciless severity, the weakly die in the battle for life; the stronger and more capable individuals are alone permitted to survive, and to bequeath their constitutional vigour to future generations. Is there any corresponding rule in respect to moral character? I believe there is, and I have already hinted at it when speaking of the American Indians. I am prepared to maintain that its action, by insuring a certain fundamental unity in the quality of the affections, enables men and the higher order of animals to sympathise in some degree with each other, and also that this law forms the broad basis of our religious sentiments¹." (p. 323.)

Galton then goes on to point out that animal life in all but the lowest classes depends on at least one and more commonly on all of the following types of affection: sexual, parental, filial and social.

"The absence of any one would be a serious hindrance if not a bar to the continuance of any race. Those who possess all of them, in the strongest measure, would, speaking generally, have an advantage in the struggle for existence. Without sexual affection, there would be no marriages, and no children; without parental affection, the children would be abandoned; without filial affection, they would stray and perish; and without social, each individual would be

¹ I think Galton is here applying the word 'religious' in its correct philological sense to the sentiments which unite society or bind men together; the theistic sentiment (p. 324) is hardly known to savages; religion in the earliest development is a social or tribal bond.

single-handed against rivals who were capable of banding themselves into tribes. Affection for others as well as for self, is therefore a necessary part of animal character. Disinterestedness is as essential to a brute's well-being as selfishness. No animal lives for itself alone, but also, at least occasionally, for its parent, its mate, its offspring and its fellow. Companionship is frequently more grateful to an animal than abundant food.....But disinterested feelings are more necessary to man than to any other animal, because of the long period of his dependent childhood, and also because of his great social needs, due to his physical helplessness. Darwin's law of natural selection would therefore be expected to develop these sentiments among men, even among the lowest barbarians, to a greater degree than among animals. I believe that our religious sentiments spring primarily from these four sources." (pp. 323-4.)

"In the same way as I showed in my previous paper that by selecting men and women for rare and similar talent, and mating them together, generation after generation, an extraordinarily gifted race might be developed; so a yet more rigid selection, having regard to their moral nature, would, I believe, result in a no less marked improvement of their natural disposition¹." (p. 325.)

In short Galton puts forth as his faith, that morality and the religious sentiments so far from being inexplicable on the basis of natural selection, as Huxley thought them, are its direct products. He thought that until a society has developed under natural selection a morality, religious sentiments and an instinct of continuous steady labour it would never be stable, and these thoughts suggested his later researches into social stability². Indeed power of continuous steady work, prolonged or late development and tameness³ of disposition are the three features which differentiate for Galton civilised man from the savage. He goes on to consider some of the effects of civilisation in diminishing the rigour of natural selection. It preserves weakly lives that would perish in barbarous lands. Above all he emphasises the ill-effects of inherited wealth.

"The sickly children of a wealthy family have a better chance of living and rearing offspring than the stalwart children of a poor one.' 'Poverty is more adverse to early marriages than is natural bad temper or inferiority of intellect.' 'Scrofula and madness are naturalised among us by wealth; short-sightedness is becoming so.' 'There seems no limit to the morbid tendencies of body or mind that might accumulate in a land where primogeniture was general, and where riches were more esteemed than personal qualities.'"

Such are a few of Galton's aphorisms. He again and again points out how little value there is in a 'noble' descent, for generally the 'nobility' of a family is represented by a few slender rills amid a superfluity of non-noble sources. Nor is there, he holds, any limit

"to the intellectual and moral grandeur of nature that might be introduced into aristocratic families, if their representatives, who have such rare privilege in winning wives that please them best, should invariably, generation after generation, marry with a view of transmitting these noble qualities to their descendants." (p. 326.)

¹ Galton cites as an illustration of the alteration of natural disposition the evolution of the North American people, the selection of the emigrants from the most restless, combative and rebellious classes of Europe. "If we estimate the moral character of Americans from their present social state we shall find it to be just what we might expect from such a parentage!" I do not cite Galton's estimate because I think it truer when he wrote than to-day, partly owing to the change in the nature of emigrants, and partly owing to the same sort of natural selection within that nation itself.

² His schedule on this subject will be referred to in a later chapter.

³ By 'tameness of disposition' Galton denotes the opposite to wild and irregular disposition, the untameable restlessness which is innate in the savage and to some extent in the gypsy.

And then follows Galton's first enunciation of the Law of Ancestral Heredity. He writes:

"The share a man retains in the constitution of his remote descendants is inconceivably small. The father transmits, on an average, one-half of his nature, the grandfather one-fourth, the great-grandfather one-eighth; the share decreasing step by step in a geometrical ratio, with great rapidity." (p. 326.)

Galton is clearly on the right track, but the numbers he gives would only be correct if he used parental generation, grandparental generation, great-grandparental generation, instead of father, grandfather, great-grandfather. He has overlooked the mother, and overlooked the multiplicity of the ancestral individuals. The numbers as he gives them in a later publication are one-fourth for the parent, one-sixteenth for the grandparent and one-sixty-fourth for the great-grandparent, etc. Galton's view was that this rule held for either blended or alternative inheritance¹. Thus in 1865 Galton had already in mind this law of ancestral heredity, although by an obvious oversight he gave the wrong proportions. It has been suggested by certain over-confident geneticists that Mendelism has for ever done away with Galton's Law. I doubt the validity of this conclusion, as I doubt whether hybridisation will explain variation, or mutation account for the origin of species. The subject is, however, too controversial and technical to be discussed here, although it must be referred to as long as the tendency is to belittle Galton's contributions to heredity².

Galton draws from his law the conclusion that there is nothing much to be proud of in descent in a single line from a Norman baron for it would contribute on the average only $(\frac{1}{4})^{26}$, if 26 generations intervened, to the individual's natural aptitudes,

"an amount ludicrously disproportioned to the value popularly ascribed to ancient descent. As a stroke of policy, I question if the head of a great family, or a prince, would not give more strength to his position, by marrying a wife who would bear him talented sons, than one who would merely bring him the support of high family connections." (p. 327.)

¹ See his *Natural Inheritance* (pp. 138 and 151) where he applies it both to stature and to eye colour; in the one case to deduce the average stature of the offspring, and in the other case to deduce the distribution of eye colour in the offspring.

² If Galton in 1865 had applied his law to the following scheme of the crossing of two pure races (DD) and (RR) to produce the hybrid (DR)—to use Mendelian notation—let us see what it would have given him for the offspring of (DR) mated with (DR). The two parents are (DR) and (DR), the four grandparents are (DD), (RR), (DD), (RR), the eight great-grandparents are four (DD) and four (RR) and so on. Hence according to Galton's Law applied to alternative inheritance, the constitution of the offspring would be for a family of $4f$

$$\begin{aligned} 4f\left\{\frac{1}{4}(DR) + \frac{1}{4}(DR) + \frac{1}{16}[2(DD) + 2(RR)] + \frac{1}{64}[4(DD) + 4(RR)] + \frac{1}{256}[8(DD) + 8(RR)] + \dots\right\} \\ = f\left\{2(DR) + \left(\frac{1}{2} + \frac{1}{4} + \frac{1}{8} + \dots\right)[(DD) + (RR)]\right\} \\ = f\{(DD) + 2(DR) + (RR)\}. \end{aligned}$$

Or, this simple application of his law would have led Galton to the fundamental equation of Mendelian hybridisation. On the other hand had Galton applied it to (DD) mated with (DR)—or to a pure race mated with a hybrid—he would have obtained different results according to the origin of the hybrid, i.e. whether it was an immediate result of crossing pure races or the product of two hybrids, or the product of hybrid and pure race, i.e. whether it was not or was an 'extracted' hybrid. And who shall say that he would not have been right? My own experience certainly leads me to doubt whether all hybrids, 'extracted' or not, are of equal germinal valency.

Galton was an ardent democrat, if such means to refuse birth any privilege if birth be not accompanied by mental superiority; he was a thorough-going aristocrat, if such be involved in a denial of the equality of all men; he would have graded mankind by their natural aptitudes, and have done his best to check the reproduction of the lower grades. The last paragraphs of the paper deal in a very novel manner with the theological problem of the sense of original sin. We have already noted that Galton held that conscience and with it the religious sentiments were developed in man by natural selection, they were the highest form of the herd instinct, and the tribe in which they were developed had greater social stability than any group that did not possess them. But man was barbarous but yesterday, and many of his native qualities are not yet moulded into harmony with his recent advance. Even our Anglo-Saxon civilisation is but skin deep, and the majority of English were the merest boors at a much later date than the Norman conquest. We are still barbarians in a large part of our nature; our no very distant ancestry grubbed with their hands for food, and dug out pitfalls for their game, and holes for their hut-poles and palisades with their fingers as tools. We see it all in the pleasure which the most delicately reared children take in dabbling and digging in the dirt, an inheritance from barbarian forefathers, akin to that of the pet dog who runs away from its mistress to sniff at any roadside refuse in the instinct to find the lost pack. The whole moral nature of man is tainted with 'sin,' which prevents him following his conscience, his social sense. From the Darwinian view the development of our religious sentiment has advanced—at any rate in certain members of the community—more rapidly than the elimination of the savage instincts of past stages of culture. The more recent the barbarism the more conscious the race is of the inadequacy of its nature to its moral needs.

"The conscience of a negro is aghast at his own wild, impulsive nature, and is easily stirred by a preacher, but it is scarcely possible to ruffle the self-complacency of a steady-going Chinaman." (p. 327.)

The revivalist meets with the greater success, the more degraded and less cultured is the population he works on.

"The sense of original sin would show according to my theory, not that man was fallen from a high estate, but that he was rapidly rising from a low one. It would therefore confirm the conclusion that has been arrived at by every independent line of ethnological research—that our forefathers were utter savages from the beginning, and that after myriad years of barbarism, our race has but very recently grown to be civilised and religious." (p. 327.)

Thus on the basis of Darwin's law of natural selection, and on the theory that natural aptitudes are not at the same time harmoniously developed, or eradicated, Galton accounts for the conflict in human nature summed up in the doctrine of 'original sin.' It will not be cleared away by any atonement, but solely by breeding out the uneradicated and hereditary savagery of human nature still dominating civilised man. What an illustration of his views Galton might have drawn from the events of the decade which followed his death!

I have given what the reader may consider undue space to this one magazine article, until he comes to see its relation to Galton's later views. It is really an epitome of the great bulk of Galton's work for the rest of his life; in fact all his labours on heredity, anthropometry, psychology and statistical method seem to take their roots in the ideas of this paper. It might almost have been written as a résumé of his labours after they were completed, rather than as a prologue to the yet to be accomplished. It is not only that Galton here gives us clearly his religious creed—religion has ceased for him to have a supernatural and taken on a purely anthropological value—but he formulates the work he intends to do, and actually did do in the remaining forty-five years of his life. Few realise that Galton was already in 1864 a thorough-going eugenicist, that here in the prime of his life—in his 42nd year—he stood free of all the old beliefs which he implicitly accepted ten years earlier¹. He acknowledges that his freedom was due to Darwin. But he does not hint that he had stepped out beyond Darwin. For Darwin wrote:

“You ask whether I shall discuss ‘man.’ I think I shall avoid the subject, as so surrounded with prejudices, though I fully admit it is the highest and most interesting problem for the naturalist².”

and Galton said:

“I shall treat of man and see what the theory of heredity of variations and the principle of natural selection mean when applied to man.”

So he came to sketch out his future work and whither he thought it would lead him in the course of years. Reading this article we see that his researches in heredity, in anthropometry, in psychometry and statistics were not independent studies, they were all auxiliary to his main object—the improvement in the race of man. Those who, ignoring what Galton and others have done, would cast doubt on the inheritance of the mental and moral characters, at once withdraw the foundation stone of Galton's life-work. That principle was essential to his views on the past evolution of man, was the mainstay of his religious belief, and the rock on which he built his scheme for man's future progress. For him the chief difference between barbarous and civilised man lay not in their physical qualities but in their mental or moral aptitudes, and all recent progress has been made by the action of natural selection on these hereditary characteristics.

It was by furthering this work of selection, by, in a broad sense, the further domestication of man, that Galton hoped to produce supermen. And, however desirable later writers, ignoring Galton, have proclaimed this end to be, they have provided no rational and scientific means, such as he did, of attaining it. Natural, albeit idle curiosity would like to know how Galton's orthodox friends and clerical relations met this bolt from the blue. The only letter, however, that has reached me from 1865 is one of May 31st

¹ See my account of his *Art of Travel*, p. 4.

² *Letter of Darwin to Wallace*, 1857. Between 1857 and 1871 Darwin's views of these prejudices changed. I venture to think Galton's voice crying in the wilderness had aided in the preparation of public opinion.

from Frank Buckland, to whom, I think, Galton must have sent an advanced copy of his paper, for Buckland says that he cannot thank Galton sufficiently for the copy of *Macmillan's Magazine*.

"Your theory is most excellent, and I shall endeavour to collect facts for you with a view to its elucidation."

And some facts Buckland does give, especially with regard to his experience of soldiers, but they are scarcely scientific observations. One point may be noted, because it carries us back into the age in which Galton was working.

"I have heard," Buckland writes, "that when a fine-looking Englishman travels in the Southern States the slave-owners offer him the best-looking girls, as a cross between a tall strong Englishman and a fine made Black girl produces a good useful slave worth money."

The son of the Dean makes no comment, however, on the originality and heterodoxy of Galton's standpoint; it is probable that he had not yet seen the second half of the paper¹. While Galton always dated his letters fully, Darwin rarely, if ever, did; and it has taken a good deal of consideration and labour to place these letters in approximate order. I cannot, however, find out that Galton sent a copy of this paper to Darwin, although he sent most of his publications. It would, indeed, be of interest to have seen Darwin's comments upon it, if he made any. What Galton himself wrote in 1908 is indeed the best general comment:

"I published my views as long ago as 1865, in two articles written in *Macmillan's Magazine* while preparing materials for my book, *Hereditary Genius*. But I did not then realise, as now, the powerful influence of Small Causes upon statistical results. I was too much disposed to think of marriage under some regulation, and not enough of the effects of self-interest and of social and religious sentiment. Popular feeling was not then ripe to accept even the elementary truths of hereditary talent and character, upon which the possibility of Race Improvement depends. Still less was it prepared to consider dispassionately any proposals for practical action. So I laid the subject wholly to one side for many years. Now I see my way better, and an appreciative audience is at last to be had, though it be small²."

Galton laid it aside as propaganda, but as I have said it is the key to nearly the whole of his work for twenty years.

B. HEREDITARY GENIUS, 1869 (SECOND EDN. 1892)

We now turn to the first step Galton took in the scientific demonstration of his creed—the study of the heredity of the mental and moral characters as a basis for Race Improvement. It was the first of four fundamental treatises in whole or great part devoted to the inheritance of the mental aptitudes in man. The other three are: *English Men of Science, their Nature and Nurture*, 1874; *Human Faculty*, 1883 and *Natural Inheritance*, 1889, and round these four greater works a whole swarm of memoirs and minor researches group themselves like flotillas of destroyers about a battle-fleet. A bio-

¹ Of some interest for the history of journalism is Buckland's statement that "in order to give the public numerous facts connected with Natural History I propose to start a new paper of my own to be called *The Land and the Water*."

² *Memories*, p. 310.

grapher indeed needs courage, when he starts upon the task of conveying to his readers even a moiety of the original ideas—both as to methods and conclusions—offered by this mass of material. It would need undoubtedly a robust conscience to realise that not for many years, possibly never again, will one individual read through practically the whole of Galton's published and unpublished writings, and then be confident that no idea of ripe suggestiveness, which might have developed in the minds of others into a noble scientific or social growth, has escaped his record! And yet the biography of a man of such a productive mentality and of such a lengthy activity as Galton should not only describe the many-sidedness of its subject, but enable readers of many tastes to find out what is of special interest to them in his writings. Galton's biographer has to provide an index to a veritable encyclopaedia, as well as trace the evolution of an original mind. The general scheme of *Hereditary Genius* was outlined in the first part of "Hereditary Talent and Character," but Galton's more complete demonstration of the heredity of mental aptitudes took five further years of work¹.

Galton's book is written with more gravity and less suggestiveness than his preliminary magazine article, and this is fitting.

"I propose to show in this book that a man's natural abilities are derived by inheritance, under exactly the same limitations as are the form and physical features of the whole organic world. Consequently, as it is easy, notwithstanding these limitations, to obtain by careful selection a permanent breed of dogs or horses gifted with peculiar powers of running, or of doing anything else, so it would be quite practicable to produce a highly-gifted race of men by judicious marriages during several consecutive generations. I shall show that social agencies of an ordinary character, whose influences are little suspected, are at this moment working towards the degradation of human nature, and that others are working towards its improvement. I conclude that each generation has enormous power over the natural gifts of those that follow, and maintain that it is a duty that we owe to humanity to investigate the range of that power, and to exercise it in a way that, without being unwise towards ourselves, shall be most advantageous to future inhabitants of the earth." (p. 1.)

In his preface Galton tells us that he was drawn to the subject of hereditary genius in the course of a purely ethnological inquiry into the mental peculiarities of different races.

As the quotation at the head of this chapter indicates, Galton had been led from Geography to Man, but when he came to examine the peculiar characteristics of human races, he found their psychological characteristics as marked and as permanent as their physical characteristics. Such a result

¹ In *L. G.'s Record* these years are represented by continual poor health in both Husband and Wife. They are also years of long continental travels and many home visits. We read under 1869 for example: "My health very troublesome till June and a great hindrance to my doing much. Frank in good health and able to dine out again. Went to Bertie Terrace [Francis Galton's mother's] at Easter and was not the better for it. Emma ['Sister Emma'] came to us in March and June. Lucy Wheler [Mrs Studdy] in May. Started in July for the Tyrol and Bavaria, Venice and home by the Sprügen, returned Oct. 4. Met the R. Gurneys and Mrs Bather at Basle. Went to Julian Hill [Mrs Galton's mother's] and Bertie Terrace before settling down. Dear Mr North died October 26 at Hastings. Frank's book 'Hereditary Genius' published in November, but not well received, but liked by Darwin and men of note. He began his experiments in Transfusion and became a member of the Zoological and Royal Institution. I attended Tyndall's Lectures after Easter. Spent Christmas at home and alone."



Mrs Francis Galton, from a portrait in the Galton Laboratory.

could only be reached by admitting the heredity of mental and moral aptitudes. Such was the evolution of Galton's theory and when he began to apply it to his own contemporaries at school, at college and in after-life he realised the truth that ability goes by descent.

"The theory of hereditary genius, though usually scouted, has been advocated by a few writers in past as in modern times. But I may claim to be the first to treat the subject in a statistical manner, to arrive at numerical results, and to introduce the 'law of deviation from an average' into discussions on heredity." (p. vi.)

We have here Galton's first direct appeal to statistical method and the text itself shows that Downes' translation of the *Letters on Probabilities* by Quetelet (London, 1849) was Galton's first introduction to the Laplace-Gaussian or normal curve of deviations, which was later to play such a large part in Galton's anthropometric work.

Galton's general plan is first to justify, in the case of men of great ability, the measurement of their ability by their reputation. Men *reputed* as endowed by nature with extraordinary genius are taken in the default of better evidence to be of surpassing ability, and the correlation is probably so high that little error in the highest grades of intellect will be introduced by this identification. Probably the identification is somewhat looser in Galton's second and third grades though the correlation must be something considerable here. Galton runs through various methods of appreciating 'eminence,' and comes to the conclusion that they indicate very approximately the same result:

"When I speak of an eminent man I mean one who has achieved a position that is attained by only 250 persons in each million of men, or by one person in each 4000....The mass of those with whom I deal are far more rigidly selected—many are as one in a million, and not a few as one of many millions. I use the term 'illustrious' when speaking of these. They are men whom the whole intelligent part of the nation mourns when they die; who have, or deserve to have, a public funeral; and who rank in future ages as historical characters." (p. 11.)

It was at this time that Galton, I think, first realised the great principle that while between men of moderate ability there is scarcely any difference, between 'illustrious' and even 'eminent' men there are extraordinary differences. Galton (p. 19) illustrates this on the marks of the men in two years of the Mathematical Tripos at Cambridge, the total marks being 17,000.

| Number of Marks | Under 500 | 500—1000 | 1000—1500 | 1500—2000 | 2000—2500 | 2500—3000 | 3000—3500 | 3500—4000 | 4000—4500 | 4500—5000 | 5000—5500 | 5500—6000 | 6000—6500 | 6500—7000 | 7000—7500 | 7500—8000 | Total |
|----------------------|-----------|----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-------|
| Number of Candidates | 24 | 74 | 38 | 21 | 11 | 8 | 11 | 5 | 2 | 1 | 3 | 1 | 0 | 0 | 0 | 1 | 200 |

Here the difference between the first and second man is upwards of 2000 marks, but 157 of the mediocre men fall within the same range of 2000 marks. This difference between the extreme men, whether on the able

or the stupid side, had great interest for Galton and he recurred to the problem many years afterwards, as I shall indicate later in this work.

Having reached series like this Galton considered how he should represent them theoretically, and he came to the conclusion that the proper method would be to use the normal curve, or curve of errors of the astronomers. This had already been used by Quetelet for *physical* measurements and he cites as illustrations the distributions of measurements of 5738 Scottish soldiers for chest size and of 100,000 French soldiers for stature. These results from Quetelet are from our present standpoint not very convincing; but supposing they do show that physical measurements may be approximately described in this manner, it does not follow that psychical measurements will also follow this distribution. The only real evidence Galton gives (p. 33) on this point is to show the marks obtained by 72 Civil Service Candidates in fact and in theory. Tested by modern methods the theory fits the facts to the extent that if the theory were true one sample in six would give results more divergent from the theory than the observed facts are. It cannot therefore be said that Galton demonstrates that intellectual ability is distributed according to the normal law of deviations. We are not even certain of that to-day. But demonstration was not really needful for Galton's purpose; he could legitimately classify human intelligence by applying a 'normal scale' to it, and he would still have his eight classes *A, B, ... F, G* and *X* above and *a, b, ... f, g* and *x* below the average, but he could not claim that these grades were separated by equal "amounts of intelligence," although more recent experience—i.e. with quantitative mental-tests—suggests that it is approximately correct.

Galton's classes: *F*, 1 in 4300, *G*, 1 in 79,000 and *X*, 1 in 1,000,000, correspond roughly to his three highest grades of intelligence. Galton then gives the following more popular description of his classification:

"It will be seen that more than half of each million is contained in the two mediocre classes *a* and *A*; the four mediocre classes *a, b, A, B* more than four-fifths and the six mediocre classes more than nineteen-twentieths of the entire population. Thus the rarity of commanding ability, and the vast abundance of mediocrity is no accident, but follows of necessity, from the very nature of these things.

The meaning of the word 'mediocrity' admits of no doubt. It defines the standard of intellectual power found in most provincial gatherings, because the attractions of a more stirring life in the metropolis and elsewhere are apt to draw away the abler classes of men, and the silly and the imbecile do not take a part in the gatherings. Hence, the residuum that forms the bulk of the general society of small provincial places, is commonly very pure in its mediocrity. The class *C* possesses abilities a trifle higher than those commonly possessed by the foreman of an ordinary jury. *D* includes the mass of men who obtain the ordinary prizes of life. *E* is the stage higher. Then we reach *F* the lowest of those yet superior classes of intellect, with which this volume is chiefly concerned.

On descending the scale, we find by the time we have reached *f*, that we are already among the idiots and imbeciles. We have seen...that there are 400 idiots and imbeciles, to every million of persons living in this country; but that 30 per cent. of their number appear to be light cases, to whom the name of idiot is inappropriate. There will remain 280 true idiots and imbeciles to every million of our population. This ratio coincides very closely with the requirements of class *f*.....

Hence we arrive at the undeniable, but unexpected conclusion, that eminently gifted men are raised as much above mediocrity as idiots are depressed below it; a fact that is calculated

to considerably enlarge our ideas of the enormous differences of intellectual gifts between man and man." (pp. 35-6).

The "undeniable conclusion" is really based on assuming the normal distribution of intelligence. In the light of more recent investigations we may say that such a distribution is at any rate a rough approximation to the state of affairs, and Galton's conclusion within broad limits is correct. This and, in a more proven, if experimental way, the evidence from Tripos marks convinced Galton that men, like races of men, are not of equal natural ability.

"I have no patience with the hypothesis occasionally expressed, and often implied, especially in tales written to teach children to be good, that babies are born pretty much alike, and that the sole agencies in creating differences between boy and boy, and man and man, are steady application and moral effort. It is in the most unqualified manner that I object to pretensions of natural equality. The experiences of the nursery, the school, the university, and of professional careers, are a chain of proofs to the contrary. I acknowledge freely the great power of education and social influences in developing the active powers of the mind, just as I acknowledge the effect of use in developing the muscles of a blacksmith's arm, and no further. Let the blacksmith labour as he will, he will find there are certain feats beyond his power that are well within the strength of a man of herculean make, even although the latter may have led a sedentary life¹." (p. 14.)

In his chapter on "The Comparison of the Two Classifications," in which Galton treats of how far a man's success and reputation is a measure of his natural power of intellect, he explains the method of his selection; he did not regard high social or official position—but "reputation in the opinion of contemporaries, revised by posterity."

"I speak of the reputation of a leader of opinion, of an originator, of a man to whom the world deliberately acknowledges itself largely indebted." (p. 37.)

Galton analyses the qualities, which lead a man to eminence, into capacity, zeal and adequate power of doing a great deal of very laborious work. He holds that men who achieve eminence and those who are naturally capable are to a large extent identical. By genius Galton understands the

"nature, which, when left to itself, will, urged by an inherent stimulus, climb that path that leads to eminence, and has strength to reach the summit—one which, if hindered or thwarted, will fret and strive until the hindrance is overcome, and it is again free to follow its labour-loving instinct. It is almost a contradiction in terms, to doubt that such men will generally become eminent" (p. 38)

and there are few men who reach eminence who do not possess this combination of powers. A boy who is carefully educated learns little useful information at school, he is taught the art of learning; the man who overcomes hindrances learns the same art in adversity. If the hindrances due

¹ Galton illustrates this by a case in which trained Highlanders challenged all England to compete with them in their games of strength. They were beaten in the foot-race by a youth, a pure Cockney, and clerk to a London banker. Perhaps I may be permitted to cite another illustration, from an occurrence at 'varsity sports over 40 years ago. The high jump had been won by a highly trained athlete, and the rod had been replaced at the last half inch he had failed to surmount; a non-combatant, a somewhat sedentary mathematician in every day costume, stepped from among the spectators, leapt the rod to the astonishment of the onlookers, and disappeared again into the crowd.

to humble rank were so severe as they are sometimes described, then all those who surmount them would be prodigies of genius; on the contrary we find many who have risen from the ranks have no claim to 'eminence.' Hindrances of rank only repress mediocre men, and perhaps some men of pretty fair powers—men of classes below *D*. Many of *D* and a great many of *E* ability rise from the ranks, and Galton holds the very large majority of the intelligences above *E*¹.

"If a man is gifted with vast intellectual ability, eagerness to work, and power of working, I cannot comprehend how such a man should be repressed. The world is always tormented with difficulties waiting to be solved—struggling with ideas and feelings to which it can give no adequate expression. If, then, there exists a man capable of solving those difficulties, or of giving voice to those pent up feelings, he is sure to be welcomed with universal acclamation." (p. 39.)

Galton undoubtedly did not believe in any large frequency of "mute inglorious Miltons"²: he felt convinced

"that no man can achieve a very high reputation without being gifted with very high abilities; and I trust I have shown reason to believe, that few who possess these very high abilities can fail in achieving eminence." (p. 49.)

Having made these postulates Galton then proceeds to discuss his material. His method is precisely that of the paper on "Hereditary Talent and Character"; that is to say he makes no attempt to measure in any way the intensity of heredity. He takes the high grades of ability and measures the frequency of their appearance; he then measures the frequency of the appearance in the limited population of kinsmen of the eminent in some special degree, and finding this much greater than in the general population he argues that it can only be because the special talent runs in families. The whole argument is drawn on statistical lines, but, perhaps, it is not more convincing than the pedigrees themselves of illustrious men, many of which Galton gives in part, and which might easily be amplified and brought up to date.

One of the difficulties of Galton's task is the discovery or appreciation of the number of relatives in each grade of important individuals, and his values, or rather appreciations, are open at times to question. Thus he credits the judges on an average with only one son each, say with a family of two, i.e. one son and one daughter. But he makes the judge to have on an average $1\frac{1}{2}$ brothers and $2\frac{1}{2}$ sisters, or to spring from a family of five. In both cases

¹ Galton cites America as a country of more widely spread culture and education than Great Britain, where the hindrances to rising from the ranks are smaller, and yet their men eminent in science and literature are fewer than ours. Hence he argues that if our hindrances were lessened we should not become materially richer in highly eminent men. The footnote which follows seems to justify this opinion stated in 1869.

² A great educationalist recently put to the writer this question: We have had millions of children in London alone through our primary schools, we select the best annually and send them to the secondary schools and the best of these again go to the universities, why have we not yet found a single Darwin, Newton or Milton? The failure is, I think, explicable by the fact that a selection of Galton's *F*, *G* and *X* stocks had been going on for centuries before the County Councils took the net in hand to fish, possibly a trifle crudely, in nearly exhausted waters.

the son or brother is supposed to reach an age of 50 before he can be tested for eminence. Now it is rather difficult to accept the statement that the average offspring of a judge is two and of his father five¹; notwithstanding the discredit Galton casts elsewhere on the moral conduct of lawyers². I believe that owing to the difficulty of getting accurate information, although Galton did not go beyond the ordinary sources—for example to herald's visitations, etc.—it would have been best to take average values from pedigrees of the period. For example Galton gives 36 % of eminent sons to the judges on the basis of one son apiece, but 14·4 % on the basis of 2·5 sons would have been equally effective for his purpose, which was to show that a judge being one barrister in a hundred, or, since as he remarks barristers are highly selected, one man possibly in 4000, the chances are enormously against judges having 14·4 % of legally eminent sons on the assumption of a pure chance occurrence.

Galton's chapter on the judges—his most complete and detailed section—is a very fine piece of work, and might be used as the starting-point for still more complete pedigree work on the heredity of legal ability³.

The next chapter deals with 'Statesmen,' and Galton admits the difficulty of steering between first the acceptance of mere official position or notoriety as equivalent to a more discriminative reputation, and secondly a selection with an unconscious bias towards facts favourable to inheritance. Thus he writes:

"It would not be a judicious plan to take for our select list the names of privy counsellors, or even of Cabinet ministers; for though some of them are illustriously gifted, and many are eminently so, yet others belong to a decidedly lower natural grade. For instance, it seemed in late years to have become a mere incident to the position of a great territorial duke to have a seat in the Cabinet as a minister of the Crown. No doubt some few of the dukes are highly gifted, but it may be affirmed, with equal assurance, that the abilities of the large majority are very far indeed from justifying such an appointment." (p. 104.)

Galton is indeed a democrat in his views on the nobility:

"A man who has no able ancestor nearer in blood to him than a great-grandparent, is unappreciably better off in the chance of being himself gifted with ability, than if he had been taken out of the general mass of men. An old peerage is a valueless title to natural gifts, except so far as it may have been furbished up by a succession of wise intermarriages. When, however, as is often the case, the direct line has become extinct and the title has passed to a distant relative, who had not been reared in the family traditions, the sentiment that is attached to its possession is utterly unreasonable. I cannot think of any claim to respect, put forward in modern days, that is so entirely an imposture, as that made by a peer on the ground of descent, who has neither been nobly educated, nor has any eminent kinsman, within three degrees." (p. 87.)

What would Galton have said had he written fifty years later when peerages appear to be given away, not for noble education, eminent kinsmen, or distinguished public service, but apparently on the ground of men being

¹ Of course the judge may have no offspring and his father must have had *one* at least.

² "Hereditary Talent and Character" (p. 164). "Great lawyers are especially to be blamed in this [illicit intercourse followed by a corresponding amount of illegitimate issue], even more than poets, artists or great commanders."

³ There is a considerable correspondence with E. B. Denison in the *Galtoniana* letters for 1869 about the ability and fertility of judges and peers.

successful tradesmen! And yet Galton is above all an aristocrat. When we read his 'Judges' and his 'Statesmen' we see him almost swept off his feet when he discovers for the first time from his own reading the characteristic ability of the Montagus and Norths, or of the Temples and Wyndhams. There was almost a simplicity about his adoration of ability and he positively gloated over it, if it took an unusual and individual turn. Many very able men scarcely appreciate high ability in others, because, as in the matter of wealth, a man is apt to judge relatively to his own holding. Not so Galton; had he used himself as a standard measure, I fear his modesty would have led him to revise more than one of his estimates.

"A collection of living magnates in various branches of intellectual achievement is always a feast to my eyes; being as they generally are such massive, vigorous, capable-looking animals¹". (p. 332.)

Galton had an immense veneration for genius as he defines it; not only like Carlyle would he have made his heroes rulers of the mediocre, but unlike Carlyle he would have had his heroes steadily and surely replace the latter. That men of genius are unhealthy puny beings—all brain and no muscle—weaksighted, and generally of poor constitutions, Galton will not accept for a moment.

"I think most of my readers would be surprised at the statures and physical frames of the heroes of history, who fill my pages, if they could be assembled together in a hall. I would undertake to pick out of any group of them, even out of that of the Divines, an 'eleven' who should compete in any physical feats whatever, against similar selections from groups of twice or thrice their numbers, taken at haphazard from equally well-fed classes." (p. 331.)

Perhaps Galton laid too great stress on the high wranglers and classics of his own day who had been 'varsity blues'; or again on the big-headed men on the front benches at the Royal Society meetings in the early 'seventies².

One characteristic, but an all-important one, Galton admits both his 'Judges' and 'Statesmen' did not possess; the power of being prolific. It will be obvious that if men of ability are unprolific, as they are often supposed to be, then the families of great men will be apt to die out, and Galton's project for creating a race of 'supermen' must be defeated. This point—whether or no a breed of men gifted above the average could maintain itself during an indefinite number of generations—is so important that Galton devotes a special chapter to the subject. Turning to the 'Judges' he first cites Lord Campbell's statement that when he first became acquainted with the English Bar, one-half of the Judges had married their mistresses,

¹ "One comfort is that Great Men taken up in any way are profitable company. We cannot look, however imperfectly, upon a Great Man, without gaining something by him. He is the living light-fountain, which it is good and pleasant to be near." *Lectures on Heroes*, p. 2.

² He was very unhappy about the low correlations I found between intelligence and size of head, and would cite against me those 'front benches'; it was one of the few instances I noticed when impressions seemed to have more weight with him than measurements. It is possible, however, that between his day and mine science changed its recruiting fields, and 'eminence' became less common.

“the understanding being that when a barrister was elevated to the Bench, he should marry his mistress, or put her away.” Galton describes this statement as ‘extraordinary,’ but no effort of memory is needed to recall at least one illustration of it in the case of those as old as the present biographer. The advanced period of their lives, if Lord Campbell’s statement be correct, at which they would marry, might account for a reduced number of children, but even under this disadvantage Galton asserts that the Judges were by no means an unfertile race (p. 131). Still it may be that their families die out. He finds that out of 31 judges who became peers before the close of George IV’s reign, 12 are no longer represented in the peerage. Galton then inquired into the particulars of the marriages of these law-lords, their children and grandchildren.

“I found a very simple, adequate, and novel explanation, of the common extinction of peerages, stare me in the face. It appeared, in the first instance, that a considerable portion of the new peers and of their sons had married heiresses....But my statistical lists showed, with unmistakable emphasis, that these marriages are peculiarly unprolific. We might, indeed, have expected that an heiress, who is the sole issue of a marriage, would not be so fertile as a woman who has many brothers and sisters. Comparative infertility must be hereditary in the same way as other physical attributes, and I am assured it is so in the case of domestic animals. Consequently the issue of a peer’s marriage with an heiress frequently fails, and his title is brought to an end.” (p. 132.)

This generalisation of Galton’s, most brilliant in its suggestiveness, he extends to the ‘Statesmen’ and to a considerable portion of the peerage. Everywhere with the same result, that in a large proportion of the cases in which peerages become extinct there have been marriages with heiresses. Is Galton’s conclusion, however, that heiresses come of sterile families the correct explanation? I venture to think it is not. In the first place there is in man some, but no very important, correlation between fertility in mother and daughter, and this result has been confirmed for mice and horses. The inheritance of grades of fertility seems hardly adequate to account for such rapid extinction as Galton records. I think explanation may be found in two other directions. The son of a peer starting with an assured position spends a life of ease and pleasure, which is often synonymous with a life which ruins health and squanders wealth. The fortune of the family has then to be retrieved, and the solution is marriage with an heiress. And here the words of Dr Erasmus Darwin are appropriate and he also was a keen observer:

“As many families become gradually extinct by hereditary diseases, as by scrofula, consumption, epilepsy, mania, it is often hazardous to marry an heiress, as she is frequently the last of a diseased family¹”.

The fertility of a libertine and a woman of decadent stock is likely to be much below the normal both in quantity and survival value. Only a very detailed investigation of a long series of cases would allow us to determine whether Erasmus Darwin or his grandson has taken the more correct view;

¹ *Temple of Nature* (Additional notes), p. 45, 1803, cited by Galton on the interleaf of his copy of *Hereditary Genius*, 1869.

and the investigation would be well worth making. Galton himself realised that there might be other points than the sterility of heiresses:

“The reason I have gone so far is simply to show that, although many men of eminent ability (I do not speak of illustrious or prodigious genius) have not left descendants behind them, it is by no means always because they are sterile, but because they are apt to marry sterile women, in order to support the peerages with which their merits have been rewarded. I look upon the peerage as a disastrous institution, owing to its destructive effects on our valuable races. The most highly gifted men are ennobled; their elder sons are tempted to marry heiresses, and their younger sons not to marry at all, for these have not enough fortune to support both a family and an aristocratical position. So the side-shoots of the genealogical tree are hacked off, and the leading shoot is blighted, and the breed is lost for ever. It is with much satisfaction that I have traced and, I hope finally disposed of, an important cause why families are apt to become extinct in proportion to their dignity—chiefly so, on account of my desire to show that able races are not necessarily sterile, and secondarily because it may put an end to the wild and ludicrous hypotheses that are frequently started to account for their destruction.” (pp. 139–40.)

The following chapters on ‘Commanders,’ ‘Literary Men,’ ‘Men of Science,’ ‘Poets,’ ‘Painters,’ ‘Musicians’ and ‘Divines’ and ‘Senior Classics’ we must pass over more briefly; they follow the same general lines as those on ‘Judges’ and ‘Statesmen,’ and the same general criticisms apply. Perhaps the most important of these is that, up to and including ‘Men of Science,’ Galton still appears to consider that 100 eminent men have only 100 sons who reach adult life. If the wickedness of Judges and the heiress-hunting of Statesmen could justify such a fertility, it certainly does not seem reasonable in the case of other classes; although as I have pointed out it does not really affect Galton’s main argument, it still seems to render the column *C* of his Tables unsatisfactory.

In the case of ‘Commanders’ Galton points out the early age at which they generally achieved greatness. He also points out that they have not a long life, and that as their relative chance of being shot varies as the square root of the product of their height and weight, the man who lives to be a great commander will probably be small.

“Had Nelson been a large man, instead of a mere feather-weight, the probability is that he would not have survived so long.” (p. 145.)

Galton does not draw the obvious moral that it is good policy not to face your foe, but to approach him edgewise!

“The enemy’s bullets are least dangerous to the smallest men, and therefore small men are more likely to achieve fame as commanders than their equally gifted contemporaries whose physical frames are larger.” (p. 146.)

Under ‘Men of Science,’ a subject which Galton was to take up again later, there are many topics of interest raised. Galton notes that in the case of science the mother appears to play a greater part than the father. There is a long passage here—one of the finest Galton ever wrote—and one, notwithstanding its length, I feel bound to cite. It runs:

“It therefore appears to be very important to success in science that a man should have an able mother. I believe the reason to be, that a child so circumstanced has the good fortune to be delivered from the ordinary narrowing, partisan influences of home education. Our race is essentially slavish; it is the nature of all of us to believe blindly in what we love, rather

than in that which we think most wise. We are inclined to look upon an honest, unshrinking pursuit of truth as something irreverent. We are indignant when others pry into our idols, and criticise them with impunity, just as a savage flies to arms when a missionary picks his fetish to pieces. Women are far more strongly influenced by these feelings than men; they are blinder partisans and more servile followers of custom. Happy are they whose mothers did not intensify their naturally slavish dispositions in childhood, by the frequent use of phrases such as, "Do not ask questions about this or that, for it is wrong to doubt"; but who showed them, by practice and teaching, that inquiry may be absolutely free without being irreverent, that reverence for truth is the parent of free inquiry, and that indifference or insincerity in the search after truth is one of the most degrading of sins. It is clear that a child brought up under the influences I have described is far more likely to succeed as a scientific man than one who was reared under the curb of dogmatic authority. Of two men of equal abilities, the one who has a truth-loving mother would be the more likely to follow the career of science; while the other, if bred up under extremely narrowing circumstances, would become as the gifted children in China, nothing better than a student and professor of some dead literature.

It is, I believe, owing to the favourable conditions of their early training that an unusually large proportion of the sons of the most gifted men of science become distinguished in the same career. They have been nurtured in an atmosphere of free inquiry, and observing as they grow older that myriads of problems lie on every side of them, simply waiting for some moderately capable person to take the trouble of engaging in their solution, they throw themselves with ardour into a field of labour so peculiarly tempting. It is and has been, in truth, strangely neglected. There are hundreds of students of books for one student of nature; hundreds of commentators for one original inquirer. The field of real science is in sore want of labourers. The mass of mankind plods on, with eyes fixed on the footsteps of the generations that went before, too indifferent or too fearful to raise their glances to judge for themselves whether the path on which they are travelling is the best, or to learn the conditions by which they are surrounded and affected." (pp. 196-7.)

Such was Galton's view of the relation of the higher freethought to science, and those who know his writings closely and knew the man himself will recognise how much of his own course in life these sentences depict; he threw himself with ardour into almost every field of inquiry, absolutely free of customary opinion, regardless, perhaps occasionally too regardless, of the footsteps of the generations that went before; he was essentially a student of phenomena and not of books.

In mathematicians among the men of science he seems somewhat disappointed, for

"when we consider how many among them have been possessed of enormous natural gifts it might have been expected that the lists of their eminent kinsmen would have been richer than they are." (p. 198.)

Galton realised fully the Bernoullis and the Gregorys, but wrote too early to have realised the Darwins, who combine mathematics and natural science. For his criticism is that while he knows senior wranglers related to other mathematicians, he does not think they have enough kinsmen eminent in *other* ways.

"I account for the rarity of such relationship in the following manner. A man given to abstract ideas is not likely to succeed in the world, unless he is particularly eminent in his peculiar line of intellectual effort. If the more moderately gifted relative of a great mathematician can discover laws, well and good; but if he spends his days in puzzling over problems too insignificant to be of practical or theoretical import, or else too hard for him to solve, or if he simply reads what other people have written, he makes no way at all, and leaves no name behind him. There are fewer of the numerous intermediate stages between eminence and

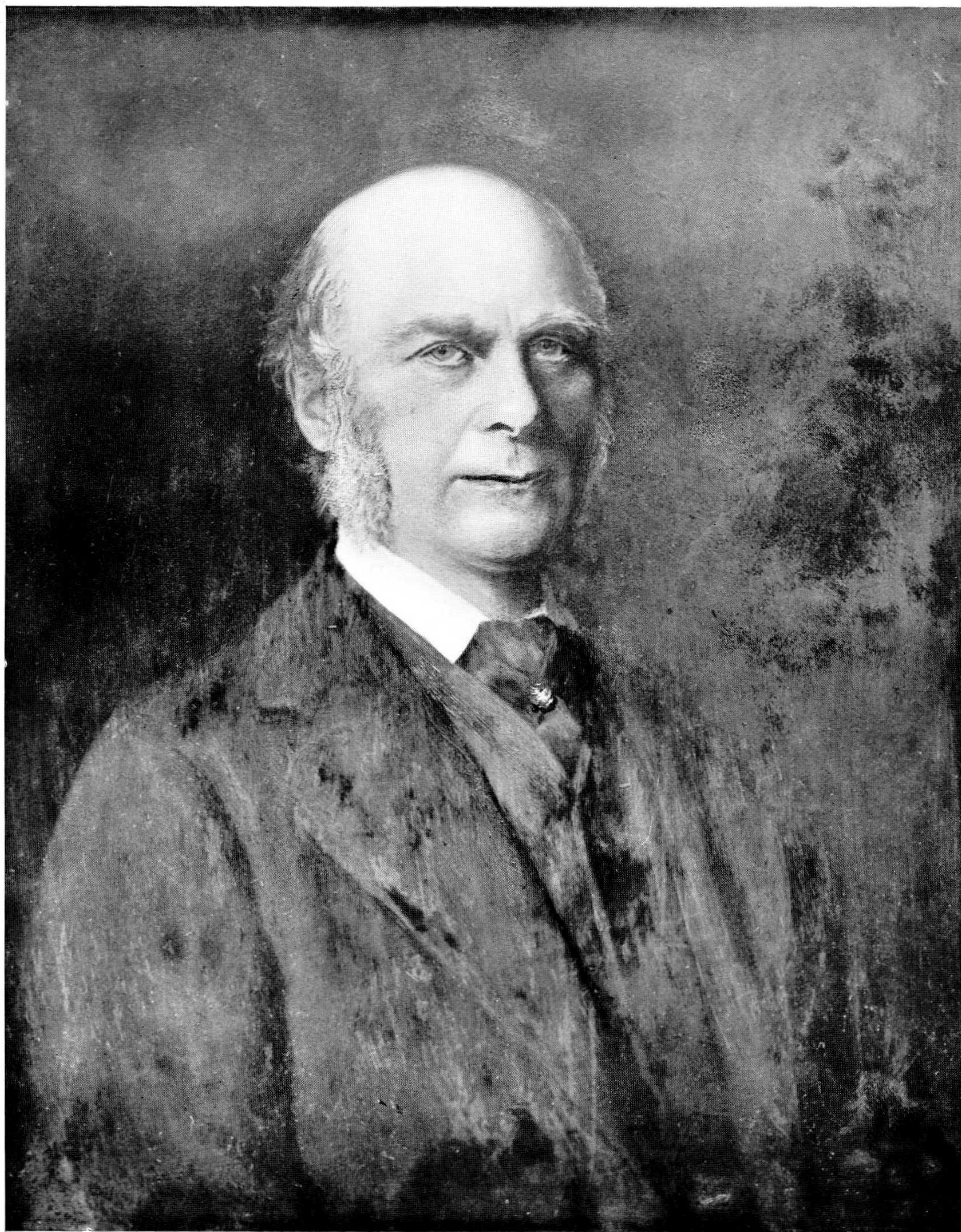
mediocrity adapted for the occupation of men, who are devoted to pure abstractions, than for those whose interest is of a social kind." (p. 198.)

I think there is also another point which applies to all men of science but particularly to the mathematician. Two factors or qualities are needful for a great man of science, namely accurate power of analysis, and an intense power of imagination which equals, if it does not transcend, that of poet or painter. Imagination and analytical power do not seem correlated characters; they may be most fortunately combined in some individual but separated in his kinsmen. There are many mathematicians who are brilliant algebraists, but lack the imagination which finds problems worth solving and suggests the solution to be attempted analytically. That is why so many mathematicians are dull socially, they are inclined to spend their leisure playing chess or solving mathematical puzzles propounded by their fellows in educational journals—a pursuit akin to solving conundrums.

The really eminent man of science does, however, possess imagination; in fact, it is probably the most marked characteristic of all forms of genius, and with it comes the width that counteracts the dangers of specialisation. Galton saw this as fully as Huxley, and would smile in his quiet way when a committee of mediocrities turned down the proposal of a man of great imagination on the ground that it was not 'practical politics.'

"People lay," he writes, "too much stress on apparent specialities, thinking overrashly that, because a man is devoted to some particular pursuit, he could not possibly have succeeded in anything else. They might just as well say that, because a youth had fallen desperately in love with a brunette, he could not possibly have fallen in love with a blonde. He may or may not have more natural liking for the former type of beauty than the latter, but it is as probable as not that the affair was mainly or wholly due to a general amorousness of disposition. It is just the same with special pursuits. A gifted man is often capricious or fickle before he selects his occupation, but when it has been chosen he devotes himself to it with a truly passionate ardour. After a man of genius has selected his hobby, and so adapted himself to it as to seem unfitted for any other occupation in life, and to be possessed of but one special aptitude, I often notice with admiration how well he bears himself when circumstances suddenly thrust him into a strange position. He will display an insight into new conditions, and a power of dealing with them, with which even his most intimate friends were unprepared to accredit him. Many a presumptuous fool has mistaken indifference and neglect for incapacity; and in trying to throw a man of genius on ground where he was unprepared for attack, has himself received a most severe and unexpected fall. I am sure that no one who has had the privilege of mixing in the society of the abler men of any great capital, or who is acquainted with the biographies of the heroes of history, can doubt the existence of grand human animals, of natures pre-eminently noble, of individuals born to be kings of men. I have been conscious of no slight misgiving that I was committing a kind of sacrilege whenever, in the preparation of the materials of this book, I had occasion to take the measurement of modern intellects vastly superior to my own, or to criticise the genius of the most magnificent historical specimens of our race. It was a process that constantly recalled to me a once familiar sentiment in bygone days of African travel, when I used to take altitudes of the huge cliffs that domineered above me as I travelled along their bases, or to map the mountainous landmarks of unvisited tribes, that loomed in faint grandeur beyond my actual horizon." (pp. 24-5.)

As I have tried to impress on the reader, if Galton was a freethinker, he still worshipped as one of simpler faith at his own peculiar shrine—a shrine dedicated to the genius of his race. Those, who have not recognised that the inheritance of mental ability is the essential doctrine of Galton's faith—the



Francis Galton, aged 60.
From the painting made in 1882 by Professor Graef, now in the possession of Mr Cameron Galton.
It was during the painting of this picture that Galton counted the strokes of the artist's brush.

keystone of the arch by aid of which mankind shall pass to a higher future—those, I say, have never properly understood his message to his generation; it is hard to believe that they have read, even superficially, his writings.

With 'Poets,' 'Musicians' and 'Painters' Galton is more brief than he has been in the case of men of action and of reason.

"The Poets and Artists generally are men of high aspirations, but, for all that, they are a sensuous, erotic race exceedingly irregular in their way of life. Even the stern and virtue-preaching Dante is spoken of by Boccaccio in most severe terms¹. Their talents are usually displayed early in youth, when they are first shaken by the tempestuous passion of love." (p. 225.)

Almost all the able kindred of poets are in the first degree.

"Poets are not the founders of families. The reason is, I think, simple and it applies to artists generally. To be a great artist requires a rare and so to speak unnatural correlation of qualities. A poet, besides his genius, must have the severity, and steadfast earnestness of those whose dispositions afford few temptations to pleasure, and he must, at the same time, have the utmost delight in the exercise of his senses and affections. This is a rare character, only to be formed by some happy accident, and is therefore unstable in inheritance. Usually people who have strong sensuous tastes go utterly astray and fail in life, and this tendency is clearly shown by numerous instances mentioned in the following appendix, who have inherited the dangerous part of a poet's character and not his other qualities that redeem and control it." (p. 227.)

Dante having been put aside, and recent revelations having rather discredited Wordsworth, must we look on Goethe alone as the one poet who with steadfast earnestness took the utmost delight in the exercise of his senses? Or, shall we pin our faith solely to Milton, with perhaps Samuel Rogers lurking in the background? Galton was writing in his 47th year, and as we all know 20 and 60 are the dangerous ages for men. Would he have written forty years later with less condemnation, with a greater sense of the impenetrable mist which screens from our gaze the links between creative genius and sex? One of the most brilliant women of our day once said to the present writer: "I am most creative, when my senses dominate me most." The wise man strives to hold the bridle firmly, but in his old age will echo Galton's Boccaccio-like cry: "But who am I to pass judgment?"²

Galton could sit to an artist and count the number of his brush- or mallet-strokes³, while to another the fascination is to watch the features of the man oscillating between gratification and despair as he strives to impart his ideal version of a crude reality to a refractory medium. I do not think Galton had a very clear appreciation of the artistic nature—I do not say of art.

But if he had less feeling for men of poetry than for men of science, he had almost no sympathy at all for 'Divines.' This is not to say that his accounts in the "Appendix to Divines" (pp. 283-98) are not fair, I believe they are, and, I think, he even exaggerates the importance of some of his selected men of piety. In order to be impartial he selects the 196 names

¹ "Amid so much virtue, amid so much knowledge as have been above shown existing in this wondrous poet, lustfulness found most ample place, and not only in his youthful, but in his mature years; which vice, although it is natural, and common and almost of necessity, of a truth cannot be rightly excused, much less commended. But who among mortals shall be the just judge to condemn him? Not I." Thus Boccaccio, and these the words Galton had in mind.

² Letter of February 6, 1907.

³ See *Nature*, June 29, 1905.

contained in Middleton's *Biographia Evangelica*, 1786, and confines his attention to these. In this way he excludes in the first place practically all the founders of great religious movements. In the next place he excludes all Roman Catholic divines, and this on the ground of their celibacy; but still we might question whether research into their ancestry and collaterals would not have been of great interest, even if no descendants are available. But again, before the Reformation and for two centuries after, to a lesser extent however, churchmen of genius reached eminence largely because they were politicians, or the more illustrious because they were statesmen. On the other hand some information would surely be available as to the stirps of St Augustine, St Thomas Aquinas, St Francis, Meister Eckhardt, Johannes Tauler, George Fox, Swedenborg, John Wesley and many others who have left their impress on religious thought, and are excluded from the selection of Middleton. If I may say so, that selection seems to me to contain names of persons who in their day may have been eminent for piety, but did not possess intellectual ability amounting to genius. Yet Galton himself says that after reading Middleton's work he gained a much greater respect for the body of Divines than he had before:

"One is so frequently scandalised by the pettiness, acrimony and fanaticism shown in theological disputes, that an inclination to these failings may reasonably be suspected in men of large religious profession. But I can assure my readers, that Middleton's biographies appear, to the best of my judgment, to refer, in by the far greater part, to exceedingly noble characters. There are certainly a few personages of very doubtful reputation, especially in the earlier part of the work, which covers the turbid period of the Reformation.....Nevertheless, I am sure that Middleton's collection, on the whole, is eminently fair and trustworthy." (p. 259.)

Now you may think a bishop an excellent fellow and find a boon companion in a dean; but even friend 'Punch' will smile at the gravity of the one, and venture to laugh out-loud at the seriousness with which the other takes himself. To make merry over the Divines is not to mock the Divinity—but I fear many of Galton's readers thought so in 1869, and his book for this and other reasons was by some strongly condemned. Yet, perhaps, Galton's chapter on the 'Divines' with all the irony and genial ridicule which make it such good reading is perhaps the subtlest in its analysis.

"I am now about to push my statistical survey into regions where precise inquiries seldom penetrate, and are not very generally welcomed. There is commonly so much vagueness of expression on the part of religious writers that I am unable to determine what they really mean when they speak of topics that directly bear on my present inquiry. I cannot guess how far their expressions are intended to be understood metaphorically, or in some other way to be clothed with a different meaning to what is imposed by the grammatical rules and plain meaning of language. The expressions to which I refer are those which assert the fertility of marriages and the establishment of families to be largely dependent on godliness. I may even take a much wider range and include those other expressions which assert that material well-being generally is influenced by the same cause.....What I undertake is simply to investigate whether or no the assertions they contain, according to their *primâ facie* interpretation, are or are not in accordance with statistical deductions¹. If an exceptional providence protects the families of godly men, it is a fact that we must take into account. Natural gifts would then have to be conceived as due, in a high and probably measurable degree to ancestral piety, and in a much

¹ We trace here the germ of Galton's later work on "The Efficacy of Prayer."

lower degree than I might otherwise have been inclined to suppose to ancestral natural peculiarities. All of us are familiar with another and an exactly opposite opinion. It is popularly said that the children of religious parents frequently turn out badly, and numerous instances are quoted to support this assertion. If a wider induction and a careful analysis should prove the correctness of this view, it might appear to strongly oppose the theory of heredity.

On both these accounts, it is absolutely necessary, to the just treatment of my subject, to inquire into the history of religious people, and learn the extent of their hereditary peculiarities, and whether or no their lives are attended by exceptionally good fortune." (pp. 257-8.)

Galton then starts on his analysis and finds that :

"As a general rule, the men in Middleton's collection had considerable intellectual capacity and natural eagerness for study, both of which qualities were commonly manifest in boyhood. Most of them wrote voluminously, and were continually engaged in preachings and religious services. They had evidently a strong need of utterance. They were generally, but by no means universally, of religious parentage.....There is no case in which either or both parents are distinctly described as having been sinful, though there are two cases of meanness and one of over-spending.....The Divines, as a whole, have had hardly any appreciable influence in founding the governing families of England, or in producing our judges, statesmen, commanders, men of literature and science, poets or artists. The Divines are but moderately prolific." (pp. 260-2.)

Those who marry often marry several times; thus out of Galton's 100, three married four times, two three times, and twelve had two wives apiece. Galton accounts for the early deaths of the wives of Divines by the hypothesis that their constitutions were on the whole weak. They were usually women of great piety, and

"there is a frequent correlation between an unusually devout disposition and a weak constitution." (p. 264.)

Galton finds the median age at death of Divines to be 62 to 63, which is rather *less* than that of eminent men dealt with in other parts of his volume.

"As regards health, the constitutions of most of the divines were remarkably bad." (p. 265.)

Studying young scholars or students he finds that they either die young, or strengthening as they grow retain their scholarly tastes and indulge them with sustained energy, or lastly live on in a sickly way. The Divines are largely recruited from the last class.

"There is an air of invalidism about most religious biographies.....It is curious how large a part of religious biographies is commonly given up to the occurrences of the sick room¹..... I can add other reasons to corroborate my very strong impression that the Divines are, on the whole, an ailing body of men." (pp. 265-74.)

Those who were of vigorous constitution had too frequently been wild in their youth. Galton generally concludes that a pious disposition is decidedly hereditary, but there are also frequent cases of the sons of pious parents turning out badly.

¹ Thus Rivet's biography is cited. He died after twelve days' suffering of strangulation of the intestines, the remedies attempted, each successive pang and each corresponding religious ejaculation is recorded; the history of his bowel attack being protracted through forty-five pages or as much space as is allotted to the entire biographies of four average divines. Where the piety of the divine is not witnessed by his martyrdom by men, it must be illustrated by his martyrdom by disease.

"I therefore see no reason to believe that the Divines are an exceptionally favoured race in any respect; but rather, that they are less fortunate than other men." (p. 274.)

Galton's statistical table indicates that the influence of the female line has an unusually large effect in qualifying a man for eminence in the religious world.

"The only other group in which the influence of the female line is even comparable in its magnitude is that of scientific men; and I believe the reasons laid down when speaking of them will apply, *mutatis mutandis*, to the Divines. It requires unusual qualifications and some of them of a feminine cast, to become a leading theologian. A man must not only have appropriate abilities, and zeal, and power of work, but the postulates of the creed that he professes must be so firmly ingrained into his mind, as to be the equivalents of axioms. The diversities of creeds held by earnest, good and conscientious men, show to a candid looker-on, that there can be no certainty as to any point on which many of such men think differently¹. But a divine must not accept this view; he must be convinced of the absolute security of the groundwork of his peculiar faith,—a blind conviction which can best be obtained through maternal teachings in the years of childhood." (p. 276.)

The chapter concludes with a discussion which, whether it be correct or incorrect, is certainly subtle, of the relative views of the pious man and the sceptic. The contented sceptic having no faith in an external power tends to have confidence in himself and is therefore more stable.

"The sceptic, equally with the religious man, would feel disgust and shame at his miserable weakness in having done yesterday, in the heat of some impulse, things which to-day, in his calm moments, he disapproves. He is sensible that if another person had done the same thing, he would have shunned him; so he similarly shuns the contemplation of his own self. He feels he has done that which makes him unworthy of the society of pure-minded men; that he is a disguised pariah, who would deserve to be driven out with indignation, if his recent acts and real character were suddenly disclosed. The Christian feels all this and something more. He feels he has committed his faults in the full sight of a pure God; that he acts ungratefully and cruelly to a Being full of love and compassion, who died for sins like those he has just committed. These considerations add great poignancy to the sense of sin.....

The result of all these considerations is to show that the chief peculiarity in the moral nature of the pious man is its conscious instability. He is liable to extremes—now swinging forward into regions of enthusiasm, adoration and self-sacrifice; now backwards into those of sensuality and selfishness. Very devout people are apt to call themselves the most miserable of sinners, and I think they must be taken to a considerable extent at their word. It would appear that their disposition is to sin more frequently and to repent more fervently than those whose constitutions are stoical, and therefore of a more symmetrical and orderly character. The *amplitude* of the moral oscillations of religious men is greater than that of others whose *average* moral position is the same." (pp. 280-2.)

On this hypothesis Galton explains the apparent anomaly why children of extremely pious parents occasionally turn out very badly.

¹ The agnostic standpoint has rarely been better put; yet while Spencer, Huxley and Clifford have been acknowledged as protagonists in the mid-Victorian contest of science and theology, Galton's attitude, in many respects more logical, and which caused much opprobrium at the time, has been largely forgotten or overlooked. And yet Galton's view of religion in 1869 was that of the Galton of 1894 and of 1907. He thought that a religion required no ultra-rational sanctions for conduct, and that a passionate aspiration to improve the heritable powers of man would suffice as the basis of a national religion, when the old religious notions and social practices had avowedly failed. See "The Part of Religion in Human Evolution," *National Review*, 1894, pp. 755 *et seq.*

42 Rutland Gate London
 Oct 22/85 SW

My dear Frank

I cannot express how deeply I have been interested by your Father's autobiography. It is so genuine simple & forcible a self-analysis. As regards the religious part I really see not the slightest reason for mooting as to its reception by the outside public. Of course it is one blow the more to self-sufficient dogmatism, in showing that a foremost man does not accept it, but so many

Letter of Francis Galton to Charles Darwin's son Francis, indicating the religious views of both Galton and Darwin.

Blows of the sort have been
given to it that this can hardly
be taken as a serious ^{new} assault.

Still, I quite see the difficulty
about the Westminster Abbey
but question, that it would not
be ~~in good taste~~ ^{in good taste} to ask for it just
about the time that so firm a
disavowal of ~~planning~~ ^{planning} was being
~~prepared for~~ ^{prepared for}
publication.

I have kept the papers these
three or four days, to read them
out in the evening to my wife
to read them. She is as interested
as I am. Very truly
Francis Galton

Had you happened to see
Herbert Spencer's (and published)
book on Ecclesiastical
Institutions !!!

If there ^{still} exists a service of
bell, book & candle, I can
fancy all the Bishops in
prostration performing it over
the book & burning it and
the author ^{together} amidst ~~so~~ hordes
of anathemas

"The parents are naturally gifted with high moral characters combined with instability of disposition, but these peculiarities are in no way correlated. It must, therefore, often happen that the child will inherit the one and not the other. If his heritage consist of the moral gifts without the great instability, he will not feel the need of extreme piety; if he inherits great instability without morality, he will be very likely to disgrace his name." (p. 282.)

As I have said it is a very subtle hypothesis and to be convinced of its adequacy one would need to examine the facts of the instability with statistical categories. Galton had read more than 200 lives of Divines, which is immensely more than his biographer can lay claim to, and Galton had a very shrewd appreciation of character. Still he has not graded his Divines by instability of disposition and compared his graduation with that of other groups in the community, and until that is done his suggestion must remain hypothetical.

But there is a far more valuable idea at the root of the matter than its application to Divines, and that is where the subtlety arises. We are accustomed to speak of the quality or faculty of an individual for a given characteristic and measure it quantitatively if we can on a single occasion, or by a given test. We speak of a man's intellectual power and consider it as exhibited in his actions. But in all his actions he does not necessarily exhibit the same degree of wisdom; his intelligence fluctuates about a mean, and if we examine a man's life as a whole, it is this mean intelligence that we roughly appreciate. The same applies to all psychical characters, and indeed to many physical. Now Galton asserts that two individuals who have the same mean character will or may have widely different fluctuations from the mean. I think no man who has to deal with students or measure them anthropometrically would dispute this view. Personal equations fluctuate round an average and the intensity of the fluctuation or the stability of judgment varies from individual to individual. So far so good, but now comes Galton's subtle suggestion. It is that the magnitude of a character and its stability are independent units and may be inherited independently. As far as I am aware no attempt has been made to correlate the magnitude and the stability of any characters, psychical or physical, still less to test their independence in heredity. It should not be a hard piece of investigation and might lead to very valuable results, especially in economic breeding. It is peculiar to Galton's suggestions that they lead one so far afield. One passes almost unconsciously from the moral character of Divines to problems of root-growing and cattle-breeding¹!

Of the chapter on 'Senior Classics' there is little to be said; it marks the grip of our *Alma Mater*, no less powerful on Galton, than on less considerable sons. The final chapters on 'Oarsmen' and 'Wrestlers' show that Galton gave rather a wide meaning to the term 'genius.' The material is interesting for two reasons. The inquiry for it brought Galton, the descendant of Quakers, into touch with that fine old Friend, Dr Robert Spence Watson,

¹ The seed from two turnip plants gives daughter-plants, say, of the same *average* weight, but in one case the fluctuations from the mean are large and in the other small. The stable crop would probably be more valuable. Is this stability an independent unit?

and I know from the personal accounts of both, how these two men, in many respects of kindred mind, appreciated each other. And secondly, because Galton endeavoured to destroy dogmas about muscle, so similar to those held by many about brain.

“No one doubts that muscle is hereditary in horses and dogs, but humankind are so blind to facts and so governed by preconceptions, that I have heard it frequently asserted that muscle is not hereditary in men. Oarsmen and wrestlers have maintained that their heroes spring up capriciously, so I have thought it advisable to make inquiries into the matter. The results I have obtained will beat down another place of refuge for those who insist that each man is an independent creation, and not a mere function, physically, morally and intellectually, of ancestral qualities, and external influences.” (p. 305.)

We must now turn to Galton's final summarising chapters. I must confess frankly that while I consider that Galton has demonstrated the hereditary character of ability as judged by eminence, I find it very hard to fit in his statistical results with our present knowledge of the inheritance of ability.

One thing of course follows certainly and conclusively from the data, namely the farther removed, either directly or collaterally, a kinsman is from his eminent relative the smaller is his chance of being eminent. A son has the best chance of all and then comes the brother, and the probability tails away as we come to more distant relatives. This is reasonable because the ability has been usually diluted by what Galton would term ‘mongrel’ marriages, i.e. marriages with the intellectually mediocre. But there are two great difficulties in my mind about the analysis. The first is that of his grade of ability. On pp. 33–34, he defines his conception of eminence to be 250 men per million or one man in 4000. He also assumes a normal distribution for intelligence. Now, I think, that the student of *Hereditary Genius*, who considers the men, whether Judges, or Statesmen, or Men of Science, and still more the Divines, in Galton's lists, will hardly credit them with this degree of rarity. I confess that limiting the selection to the class of men educated professionally or by class tradition to aim at distinctions of this kind, I felt in my recent re-perusal that 1 in 500 was an adequate measure of the eminence, and before I came to the end of the book, I doubted whether it was more than 1 in 100. That is to say that while some of Galton's lists indicated men with a grade of 1 in 10,000 or even more, there was a very considerable tail, some of whom had not a greater ability than you would find in one in a hundred or even fewer.

I now started to test this on Galton's hypothesis that the distribution of capacity is normal, and on the result of much recent work that in a stable population the son will on the average inherit half his father's deviation from mediocrity¹, the mothers *not being selected*. In this manner I was able to form the following tables which indicate in a population of a million the probable number of eminent sons of eminent fathers for each standard of eminence.

¹ In technical language, if the standard deviations of the population in the two generations are equal, the coefficient of correlation will be 0.5.

But Galton found 48 sons per 100 fathers! Now I have already referred (p. 96) to my doubts as to Galton's estimate of the number of relatives to be attributed in each grade to an eminent man. He was perhaps biased by the wickedness of Judges and the misogyny of Statesmen! Anyhow I feel certain that the columns *C* of his tables and consequently the columns *D* are incorrect¹. Had he attributed 200 or 250 sons to 100 eminent fathers or families, say, of 4 to 5, he would have found 19 to 24 eminent sons to 100 eminent fathers—still far too many—but approaching nearer our 13 with a

| | Eminence 1 in 1000 Father | | | Eminence 1 in 500 Father | | | Eminence 1 in 100 Father | | |
|---|------------------------------|---------|-----------|-----------------------------|---------|-----------|-----------------------------|---------|-----------|
| | Non- eminent | Eminent | Totals | Non- eminent | Eminent | Totals | Non- eminent | Eminent | Totals |
| Son { | Non-eminent | 946 | 999,000 | 1,861 | 139 | 2,000 | 8,702 | 1,298 | 10,000 |
| | Eminent | 998,054 | 1,000 | 996,139 | 2,000 | 1,000,000 | 981,298 | 10,000 | 990,000 |
| Totals ... | 999,000 | 1,000 | 1,000,000 | 998,000 | 2,000 | 1,000,000 | 990,000 | 10,000 | 1,000,000 |
| No. of eminent sons per 100 emi- nent fathers | 5.5 | | | 7 | | | 13 ² | | |

much lower degree, however, of eminence. An explanation of the remaining discrepancy may, however, be found in the hint³ thrown out by Galton in this chapter, that "a large number of eminent men marry eminent women⁴." He had already emphasised this point of view when discussing Men of Science and Divines. But such a mating of 'like with like' raises the correlation between offspring and parents slightly under 50 %⁵. Forming a table under these conditions we find for 1 in 100 degree of eminence:

¹ *Loc. cit.* p. 317 for general table, and compare tables at end of each section.

² This is much of the order one finds for number of insane sons of insane fathers.

³ *Loc. cit.* p. 325.

⁴ "The large number of eminent descendants from illustrious men must not be looked upon as expressing the results of their marriage with mediocre women, for the average ability of the wives of such men is above mediocrity. This is my strong conviction, after reading very many biographies, although it clashes with a commonly expressed opinion that clever men marry silly women. It is not easy to prove my point without a considerable mass of quotations to show the estimation in which the wives of a large body of illustrious men were held by their intimate friends, but the following two arguments are not without weight. First, the lady whom a man marries is very commonly one whom he has often met in the society of his own friends, and therefore not likely to be a silly woman. She is also usually related to some of them, and therefore has a probability of being hereditarily gifted." (p. 324.)

⁵ The multiple correlation coefficient between parentage and offspring is now .7071.

Parentage

| | | | | Non-eminent | Eminent | Totals |
|---|---|-----------------|-----|-------------|---------|-----------|
| Son | { | Non-eminent ... | ... | 982,675 | 7,325 | 990,000 |
| | | Eminent ... | ... | 7,325 | 2,675 | 10,000 |
| Totals | | | | 990,000 | 10,000 | 1,000,000 |
| No. of eminent sons per 100 eminent parentages | | | | } 27 | | |

This result is well within Galton's limits if we suppose the number of sons born to an eminent father to average 1.8. With more sons, we could afford to give somewhat less credit to the mothers or increase the standard of eminence in the fathers, or take partly both these steps. I believe that the points just referred to: (1) under-estimate of the number of sons of men of eminence; (2) over-estimate of the rarity of the ability of many men, which flowed from Galton's intense admiration for all forms of intellectual power and all grades of originality; and (3) due appreciation of the extent to which assortative mating, or marriage within the caste, already exists among men of ability, suffice to bring the statistical results of Galton's book into line with more recent work. Let it be remembered that what Galton's researches really show is not that talent is under-inherited, but, if his treatment were correct, that it is *markedly over-inherited* as compared with other characters we know of. Genius must in that case be a sport and inherited in a peculiar and intense fashion. Galton felt considerable doubts as to his data of the number of relatives of a man (pp. 318-19), and many years later the Biometric Laboratory provided him with more ample material. He recognised (3), but at that time was not able adequately to measure its effect. While as to (2) I know from personal experience that he was apt to exaggerate the intellectual ability of men, who by a certain brilliancy of expression and adequate self-assertion, obtained temporary notoriety¹.

Galton's next chapter on "The Comparative Worth of Different Races" is, at the same time, more sketchy and more suggestive than the last. He compares the intellectual ability of various races; he places a difference of three grades between Anglo-Saxon and Negro, one being due to relative demerits of native education and two to natural ability. He puts the Australian native one grade below the African negro, and North of England and Lowland Scottish a fraction of a grade above the ordinary English.

¹ I do not mean that Galton could not discriminate a charlatan, but where there was *some* originality, he was apt to exaggerate it into *all* originality; it seemed a natural consequence of his own modesty, of his geniality and above all of the weight he laid on *any* originality.

“The peasant women of Northumberland work all day in the fields and are not broken down by the work; on the contrary, they take a pride in their effective labour as girls, and when married, they attend well to the comfort of their homes. It is perfectly distressing to me to witness the draggled, drudged, mean look of the mass of individuals, especially of the women, that one meets in the streets of London, and other purely English towns. The conditions of their life seem too hard for their constitutions, and to be crushing them into degeneracy.” (p. 340.)

Galton then turns to Greece, and having equated Plato and Bacon, by what must largely be the impressionism of individual personal judgment, concludes that the Athenian race from 530 B.C. to 430 B.C. was very nearly two grades above our own,

“that is, about as much as our race is above that of the African negro. This estimate, which may seem prodigious to some, is confirmed by the quick intelligence and high culture of the Athenian commonalty, before whom literary works were recited, and works of art exhibited, of a far more severe character than could possibly be appreciated by the average of our race, the calibre of whose intellect is easily gauged by a glance at the contents of a railway bookstall.” (p. 342.)

I do not think Galton's comparison is justified, for he leaves out in the one case the labouring and artizan population of 400,000 slaves, and includes such a population in the other when reckoning his percentages of extreme ability. Again he writes :

“We have no men to put by the side of Socrates and Phidias, because the millions of all Europe, breeding as they have done for the subsequent 2000 years, have never produced their equals.” (p. 342.)

Without belittling Phidias we may reasonably question whether his genius was really greater than that of the designer of any one of the great medieval Gothic cathedrals. Who can determine whether Raphael or Phidias was the greater artist? As for Socrates we see him through the mists; we do not know the man himself, but still only perceive him amid the glamour of his contemporaries and the veneration of renaissance humanists¹. If we judge him by the Socrates of the Platonic dialogues, his subtlety is not always deep and his wisdom does not invariably appear very fundamental to the modern cultured mind. If we require a fair test of relative fineness of intellect, in two ages, surely we may ask this: Would the ablest minds of Age *A* have grasped the subtlest thought of Age *B*, and would the genius of *B* have failed to appreciate the intellectual product of *A*'s most eminent minds? Judged by this test, I think both Kant and Einstein could fully grasp and duly appreciate what the Platonic Socrates had to say, but I gravely doubt whether the ideas of both Kant and Einstein would not have transcended Socrates' mental capacity, even as the modern geometrician himself fully understands Euclid, but Euclid would have failed to understand him. And this is not a matter of the accumulated *knowledge* of the intervening centuries, it is a result of the ablest intellects being more subtle, more capable of forming generalised conceptions than the most capable of ancient Greeks.

Again, it is true that 9% of the Athenian population² did enjoy the

¹ ‘Sancte Socrates, ora pro nobis.’

² Rather 2 to 3%, if we take no account of the women and children, who did not of course witness the plays.

tragedies of Aeschylus, Sophocles and Euripides; but it is certain that those tragedies appealed to the primal passions of mankind, stronger and less bridled the closer civilised man is to the primitive savage; and it is not certain that nine-tenths of that audience did not prefer the buffoonery scenes from "The Birds," just as the 5% more highly educated class of to-day professes interest in problem plays but attends the 'revues.'

Galton uses the Greeks as an illustration of a race two to three 'grades' higher in intelligence than our own, and hence as an argument that what man has been man can be. Its failure was due, he holds, to lax morality. But surely that want of moral stability indicated an inferiority in certain aspects of the psychical side, a lack which permitted the shadow of the doctrines of Paul to dim the brilliance of Greek culture. Galton traces with emphasis how the more intellectual rather than the physically stronger nations have dominated the world, the survival of the fitter meaning rather the mentally than the physically fitter. In this evolution of fairly consistent trend, the collapse of the Attic race appears as a most disturbing factor. Galton distinctly felt this, but I believe he took too much on faith. Our confidence in the superiority of the Greek intellect has been too largely based on the judgment of men, the classical scholars, who have devoted a disproportionately large period of their lives to the study of a single, if undoubtedly important, phase of human culture. You cannot judge the relative value of a human culture—especially if you approach it from a literary side only—unless you have a fairly comprehensive knowledge of the achievements of other cultures, and it is needful to study them not from one but from many sides. Our judgment of Greek culture has, I venture to think, not been made with a due appreciation of other cultures even up to our own; it has not been in the highest sense an anthropological judgment—we have taken at second-hand the opinion of men whose lives have been devoted to the study of an isolated, if brilliant incident in the hundreds of thousands of years of human evolution, and we have accepted their justifiable enthusiasm, as if it must be the whole truth as seen from a more distant but wider point of view.

It is a strange illustration of human love of dogmas that Galton's appraisal of the Greek intellect has, perhaps, been the most frequently remembered and cited passage of a book remarkable for its novel and reasoned opinions. Of course its citation is generally associated with the suggestion that the history of man is not one of advancing mental development; whereas Galton used it to point out that races could by judicious organisation raise their intellectual grade.

"And we too, the foremost labourers in creating this civilisation, are beginning to show ourselves incapable of keeping pace with our own work. The needs of centralisation, communication, and culture, call for more brains and mental stamina than the average of our race possess. We are in crying want of a greater fund of ability in all stations of life; for neither the classes of statesmen, philosophers, artizans, nor labourers are up to the modern complexity of their several professions. An extended civilisation like ours comprises more interests than the ordinary statesmen or philosophers of our present race are capable of dealing with, and it exacts more intelligent work than our ordinary artizans and labourers are capable of performing. Our race is overweighted, and appears likely to be drudged into degeneracy by demands that exceed

its powers. If its average ability were raised a grade or two, our new classes *F* and *G* would conduct the complex affairs of the state at home and abroad as easily as our present *F* and *G*, when in the position of country squires, are able to manage the affairs of their establishments and tenantry. All other classes of the community would be similarly promoted to the level of the work required by the nineteenth century, if the average standard of the race were raised." (p. 345.)

The Greek statesman or commander had to deal with hundreds or thousands of men, where ours have to deal with millions in a society where the relations are of immensely increased complexity; that must be borne in mind when we compare the intellectual ability of the two cultures. Foch could have done the work of Themistocles, but the latter would have broken down under the complexity of the work of a modern commander. He would, as Galton does, have certainly called for a superman. One wonders if the ancestry of Mr Bernard Shaw's 'superman' cannot be traced to Galton; for Mr Shaw took him from Nietzsche, and the latter knew of Galton's work¹.

Galton's penultimate chapter "Influences that affect the Natural Ability of Nations" contains results almost commonplaces now, but in 1869 they were original suggestions of the highest value, because he was practically the first to apply the Darwinian doctrines to man and his communities. He notes how careless Nature is of the lives of individuals, she is equally careless of the lives of eminent families, they arise, flourish and decay; and the same may be said of races and of nations, they have arisen in the past, reached grandeur and then perished, often leaving but the slenderest shreds of their culture to be preserved among the mental traditions of humanity as a whole. Nay it is possible that such may be the story of our earth itself relative to other possible scenes of existence in the cosmos around us.

"We are exceedingly ignorant of the reasons why we exist, confident only that individual life is a portion of some vaster system that struggles arduously onwards towards ends that are dimly seen or wholly unknown to us, by means of the various affinities—the sentiments, the tastes, the appetites—of innumerable personalities who ceaselessly succeed one another on the stage of existence." (p. 351.)

But such an outlook produced by the growing physical and historical knowledge of man, while it depressed many of lesser mental calibre, who found themselves torn from their old supernatural moorings and carried helplessly along on the overwhelming tide of new thought, such an outlook only led Galton to proclaim that Man—if at last he would stand on his own feet, and discard his ages-old crutches—could to a large extent make his own future. Confidence in himself, and in his own knowledge—faith in his own intellectual leaders and not in any supernatural kindliness of cosmic purpose—were for Galton the thorny but certain path towards man's salvation.

"Our world appears hitherto to have developed itself, mainly under the influence of un-reasoning affinities; but of late, man slowly growing to be intelligent, humane, and capable, has appeared on the scene of life and profoundly modified its conditions. He has already

¹ Frau Förster Nietzsche in *The Lonely Nietzsche* gives (p. 191) a letter of Dr Panneth (15/12/1883) and the latter reports a talk with Nietzsche at Nice, when "the conversation turned on Galton," but there are unfortunately no particulars.

become able to look after his own interests in an incomparably more far-sighted manner, than in the old prehistoric days of barbarism and flint knives; he is already able to act on the experiences of the past, to combine closely with distant allies, and to prepare for future wants, known only through the intelligence, long before their pressure has become felt. He has introduced a vast deal of civilisation and hygiene which influence, in an immense degree, his own well-being and that of his children; it remains for him to bring other policies into action that shall tell on the natural gifts of his race." (p. 352.)

"How consonant it is to all analogy and experience to expect that the control of the nature of future generations should be as much within the power of the living, as the health and well-being of the individual is in the power of the guardians of his youth." (p. 351.)

Galton puts on one side such social arrangements as existed in Sparta "as alien and repulsive to modern feelings"¹ and confines his discussion to "agencies that are actually at work, and upon which there can be no hesitation in speaking." (p. 352.)

He now takes in succession a series of factors which affect the natural ability of nations. He first stresses differential fertility and says that the wisest policy is that which retards marriage among the weak and hastens it among the vigorous classes. He was the first, I believe, to draw attention to the fact that many social agencies have been "strongly and banefully exerted in the precisely opposite direction." He points out how a very slight difference in fertility of two classes of the community will in one or two centuries enormously change the constituents of a population. He indicates that early marriage not only increases fertility, but by causing more overlapping of generations largely increases population apart from increased fertility. After referring to the rapidly waning influence of any subsection of a race which postpones marriage, Galton continues:

"It is a maxim of Malthus that the period of marriage ought to be delayed in order that the earth may not be overcrowded by a population for whom there is no place at the great table of nature. If this decline influenced all classes alike, I should have nothing to say about it here, one way or another, for it would hardly affect the discussions in this book; but as it is put forward as a rule of conduct for the prudent part of mankind to follow, whilst the imprudent are necessarily left free to disregard it, I have no hesitation in saying that it is a most pernicious rule of conduct in its bearing upon race. Its effect would be such as to cause the race of the prudent to fall, after a few centuries, into an almost incredible inferiority of numbers to that of the imprudent, and it is therefore calculated to bring utter ruin on the breed of any country where the doctrine prevailed. I protest against the abler races being encouraged to withdraw in this way from the struggle for existence. It may seem monstrous that the weak should be crowded out by the strong, but it is still more monstrous that the races best fitted to play their part on the stage of life should be crowded out by the incompetent, the ailing, and the desponding.

The time may hereafter arrive, in far distant years, when the population of the earth shall be kept as strictly within the bounds of number and suitability of race, as the sheep on a well-ordered moor or the plants in an orchard-house; in the meantime, let us do what we can to encourage the multiplication of the races best fitted to invent and conform to a high and generous civilisation, and not, out of a mistaken instinct of giving support to the weak, prevent the incoming of strong and hearty individuals." (pp. 356-7.)

¹ This point is very important, for superficial critics of eugenics have asserted that Galton advocated 'Spartan' methods of mating. The creation of a superior intellectual caste, with a religious feeling against mating outside it, and a national encouragement of its early marriage and its fertility formed Galton's policy. The adequate endowment of superior motherhood so that women of marked intelligence shall have greater freedom in the choice of the father of their children is possibly the only considerable addition which has been made since by cautious eugenicists to Galton's positive policy.

The above is one of the most noteworthy passages in which Galton condemns the teaching of unrestricted birth-control¹. And its wisdom appears convincing to any but Neo-Malthusian fanatics! The imprudent, the feckless, and the feeble-minded by their very nature will not control their births, and the higher intelligences will and do. Birth-control is poison to a race which has not legislatively organised a differential fertility of its castes; it is death to a race which has not regarded its own fertility in relation to that of its neighbours and possible enemies. The fear France exhibits before Germany to-day, even after a successful war, is largely the outcome of her neglect of these Galtonian axioms².

Galton's condemnation of unthinking birth-control is followed by a still stronger condemnation of the teaching of the Catholic Church, which chose to preach and exact celibacy from its most earnest devotees.

"The long period of the dark ages under which Europe has lain is due, I believe to a very considerable degree, to the celibacy enjoined by the religious orders on their votaries. Whenever a man or woman was possessed of a gentle nature that fitted him or her to deeds of charity, to meditation, to literature or to art, the social condition of the time was such that they had no refuge elsewhere than in the bosom of the Church. But the Church chose to preach and exact celibacy. The consequence was that these gentle natures had no continuance, and thus by a policy so singularly unwise and suicidal that I am hardly able to speak of it without impatience, the Church brutalised the breed of our forefathers. She acted precisely as if she aimed at selecting the rudest portion of the community to be, alone, the parents of future generations. She practised the arts which breeders would use, who aimed at creating ferocious, curish and stupid natures. No wonder that club law prevailed for centuries over Europe; the wonder rather is that enough good remained in the veins of Europeans to enable their race to rise to its present, very moderate level of natural morality." (p. 358³.)

But the destruction of moral gentleness was not the only or perhaps the most culpable result of Catholic policy. Galton cites the effects of the Inquisition, of the martyrdom and imprisonment of original thinkers in Spain, Italy and France.

"The Spanish nation was drained of free-thinkers at the rate of 1000 persons annually for the three centuries between 1471 and 1781."

In Italy

"in the diocese of Como alone more than 1000 were tried annually by the inquisitors for many years, and 300 burnt in the single year of 1416."

In France during the seventeenth century three to four hundred thousand

¹ Darwin strongly supported Galton's opinion; see *More Letters of Charles Darwin*, Vol. II, p. 50.

² It would be amusing, were it not sad, to note how large and influential a section of Galton's creation, the English Eugenics Education Society, has recently been satisfying its thirst for education at Neo-Malthusian rather than Galtonian springs.

³ Galton refers to a relic of this monastic spirit which in his day gave an able young man a fellowship at the University, not in order that he might marry, but on condition that he did *not*. That is now abolished, but the lay councils of academic institutions are still imbued with the ignorance of the Catholic Church, they just as effectually check the fertility of the able by allowing only celibate pittances to the young men and women whose instinct impels them to make research and learning their calling in life. Such a layman recently pointing to the list of the ill-paid staff of the Galton Laboratory wanted to know why it should be maintained, if there were so few students to be taught!

Huguenots perished in prison, at the galleys, on the scaffold or in attempting to escape, and an equal number emigrated. The Huguenots

“were able men, and profoundly influenced for good both our breed and our history.”

This cruel policy degraded future generations, for it brought

“thousands of the foremost thinkers and men of political aptitudes to the scaffold, or imprisoned them during a large part of their manhood or drove them as emigrants to other lands.”

Thus it came about that the Church,

“having first captured all the gentle natures and condemned them to celibacy, made another sweep of her huge nets, this time fishing in stirring waters, to catch those who were the most fearless, truth-seeking and intelligent in their modes of thought, and therefore the most suitable parents of a high civilisation, and put a strong check, if not a direct stop, to their progeny. Those she reserved on these occasions, to breed the generations of the future, were the servile, the indifferent and again the stupid. Thus as she—to repeat my expression—brutalised human nature by her system of celibacy applied to the gentle, she demoralised it by her system of persecution of the intelligent, the sincere, and the free. It is enough to make the blood boil to think of the blind folly that has caused the foremost nations of struggling humanity to be the heirs of such hateful ancestry, and that has so bred our instincts as to keep them in an unnecessarily long-continued antagonism with the essential requirements of a steadily advancing civilisation.” (pp. 358–9.)

Such is Galton’s terrible indictment of the effect of the Roman ecclesiastical policy. It has not been refuted, and it cannot be, except either by denying the value of original thinking to mankind, or demonstrating that originality of mind is not an hereditary characteristic. It is little wonder that eugenics has met with small appreciation from Catholic writers. Yet the charge has no longer other than historic value; the will to persecute may still exist in the ecclesiastically minded, but there is little force behind it; the old religions, except in savage races, have lost their hold on tribal imagination; we are seeking new religious ideals. And, as for the Roman Catholic celibacy, it may now, with a few if notable exceptions, be looked upon as a eugenic rather than a dysgenic factor.

Galton finally points out how in a young colony

“the strong arm and enterprising brain are the most appropriate fortunes for a marrying man,” but in an old civilisation the factors at work are far more complex.

“Among the active ambitious classes, none but the inheritors of fortune are likely to marry young.”

Men of moderate but more than average ability will not do so because

“their future is not assured except through a good deal of self-denial and effort.”

Men of great ability, even if they marry young, think of social position and desire to found families and are attracted by wealth in the first place. Thus Galton holds that in an old civilisation there is a steady check on the fertility of the abler classes, so that the race gradually deteriorates, until

“the whole political and social fabric caves in, and a greater or less relapse to barbarism takes place, during the reign of which the race is perhaps able to recover its tone.” (p. 362.)

“The best form of civilisation in respect to the improvement of the race would be one in which society was not costly; where incomes were chiefly derived from professional sources, and not much through inheritance; where every lad had a chance of showing his abilities, and, if highly-gifted, was enabled to achieve a first-class education and entrance into professional

life by the liberal help of the exhibitions and scholarships which he had gained in his early youth; where marriage was held in as high honour as in ancient Jewish times; where the pride of race was encouraged (of course I do not refer to the nonsensical sentiment of the present day that goes under that name); where the weak could find a welcome and a refuge in celibate monasteries or sisterhoods, and lastly, where the better sort of emigrants and refugees from other lands were invited and welcomed, and their descendants naturalised." (p. 362.)

Such was the gospel of national welfare that Galton taught in 1869—more than half a century ago—then as now indicating a fundamental truth. What progress have we made towards his ideal in the fifty intervening years? Well, we have the educational ladder, and men can and actually do to some extent mount it. But wealth, especially in these last years, has grown a still more destructive factor of social stability, and the relatively low fertility of the abler families has been emphasised, not reduced. Yet, if the need for race-betterment has become greater, the recognition of that need has undoubtedly become more widespread; and that recognition we owe, not a little, to the labours of Galton in the last ten years of his life.

The last chapter of Galton's work reads somewhat quaintly now, partly in the light of later researches by others, and partly because of the progress Galton himself made later in hereditary theory. He adopts Darwin's theory of Pangenesis which was clearly much exercising his mind at this time. He speaks twice of the "gemmules"—i.e. the germs thrown off by each cell and carrying its hereditary qualities—as "circulating in the blood" (pp. 363 and 367) and even propagating there¹. Darwin did not at this time correct the error, if error it was, in Galton's interpretation, although he wrote very enthusiastically about the book. Galton illustrates what he considers would be the results of the theory of Pangenesis by a series of rather quaint analogies in the midst of which we find his theory of stability—later more fully developed—illustrated by the oscillations of a rocking-stone stable until violent movement throws it over into a new position of equilibrium. In a footnote, pp. 371-2, we find Galton, on the basis of Pangenesis, feeling his way towards the Law of Ancestral Heredity—namely that the influence of an individual ancestor in the n th generation diminishes in geometrical progression. He states that the treatment of heredity on the basis of Pangenesis

"seems well within the grasp of analysis, but we want a collection of facts, such as the breeders of animals could well supply, to guide us for a few steps out of the region of pure hypothesis." (ftn. p. 372.)

Herein lies the germ of the quantitative or statistical theory of heredity. Again Galton points out that the artificial breeder of fish by taking milt from the male and allowing it to fall on the ovum deposited by the female can produce a new individual life, and that the characteristics of this individual are largely under his control, if he has studied the parents. But

¹ "Mr Darwin maintains, in the theory of Pangenesis, that the gemmules of innumerable qualities, derived from ancestral sources, circulate in the blood, and propagate themselves, generation after generation, still in the state of gemmules, but fail in developing themselves into cells; because other antagonistic gemmules are prepotent and overmaster them, in the struggle for points of attachment, etc." (p. 367.)

"all generation is physiologically the same, and therefore the reflections raised by what has been stated of fish are equally applicable to the life of man." (p. 375.)

"Nature teems with latent life, which man has large powers of evoking under the forms and to the extent which he desires. We must not permit ourselves to consider each human or other personality as something supernaturally added to the stock of nature, but rather as a segregation of what already existed, under a new shape, and as a regular consequence of previous conditions. Neither must we be misled by the word 'individuality,' because it appears from many facts and arguments in this book that our personalities are not so independent as our self-consciousness leads us to believe. We may look upon each individual as something not wholly detached from its parent source—as a wave that has been lifted and shaped by the normal conditions of an unknown, illimitable ocean. There is decidedly a solidarity as well as a separateness in all human, and probably in all lives whatsoever,.....

It points to the conclusion that all life is single in its essence, but various, ever varying and interactive in its manifestations, and that men and all other animals are active workers and sharers in a vastly more extended system of cosmic action than any of ourselves, much less of them, can possibly comprehend. It also suggests that they may contribute, more or less consciously, to the manifestation of a far higher life than our own, somewhat as—I do not propose to push the metaphor too far—the individual cells of one of the more complex animals contribute to the manifestation of its higher order of personality." (p. 376.)

This wonderful final passage of Galton's work foreshadows the doctrine of the continuity of the germ-plasm, the one eternal, amid transitory individual bearers of the life-giver. But it goes further, it reminds us that on the theory of evolution all present forms of germ-plasm are ancestrally related, are all descended from a single primary form of plasma to which we can give the name Life. This is the solidarity of all living forms which Galton refers to, and which leads him to look upon the living Universe as a pure theism—if indeed he did not mean a pure pantheism. It needed the imagination of a great scientist to give such a turn to the inspiration of the poet :

Was wär' ein Gott, der nur von aussen stiesse,
Im Kreis das All am Finger laufen liesse,
Ihm ziemt's, die Welt im Innern zu bewegen,
Natur in sich, sich in Natur zu hegen,
So dass, was in Ihm lebt und webt und ist,
Nie Seine Kraft, nie Seinen Geist vermisst¹.

How many men have talked glibly of the continuity of the germ-plasm without realising the solidarity of all life which flows from it! How few reading Galton's views on the *religious* nature of eugenic belief have grasped how closely his doctrine of race-betterment was associated with the pantheism, to which his view of the germ-plasm had led him. For Galton the Deity was synonymous with Life in its entirety and he asked us to aid Life struggling to fuller expression by elevating the race of man. Georgians may term this idea the sentimentality of a mid-Victorian; but after all it is less of a dogma than that of some of their number, who tell us that the Deity is limited in his powers and ask us to come—in some unexplained manner—to his assistance.

Hereditary Genius is one of the great books of the world, not so much by what it proves, as by what it suggests. Detailed proof was to come afterwards, step by step. Its publication formed the central epoch of Galton's life and nearly all his later work may be seen therein to take its origin. If

¹ Goethe, *Gott und Welt. Proemion.*

it met with a cool reception, it was because the world was not ripe for it. Two men, however, perceived its value; Darwin wrote: "I congratulate you on producing what I am convinced will prove a memorable work" (see our Plate I, Vol. 1); and Alfred R. Wallace said of it in the just-born *Nature*¹:

"Turning now to the concluding chapters of the book, we meet with some of the most startling and suggestive ideas to be found in any modern work....These concluding chapters stamp Mr Galton as an original thinker, as well as a forcible and eloquent writer, and his book will take rank as an important and valuable addition to the science of human nature."

Those judgments, not contemporary newspaper opinions, have stood the test of time.

C. PAPERS CLOSELY ASSOCIATED WITH THE THEME OF HEREDITARY GENIUS

Two further popular papers are closely related to Galton's *Hereditary Genius* and may be considered here. The first is entitled: "Statistical Inquiries into the Efficacy of Prayer"; it appeared in the *Fortnightly* for August 1872². It led to a certain amount of controversy in the pages of *The Spectator* in which Galton took part, but it also so pained—I think unreasonably—many worthy folk that Galton was treated for a time as a very flippant freethinker. His opponents asserted first that the desire to pray is intuitive in man, and secondly that the cogency of intuition is greater than that of observation. If the word 'intuitive' be interpreted to mean 'instinctive' and the words 'to pray' be interpreted 'to cry out in despair or in agony,' then the terrible cry of the young rabbit when the stoat springs upon him—a cry which is made to no one in particular—is an intuitive prayer. But if prayer means an appeal for temporal aid to a supernatural power, then the savage does not pray until the missionary teaches him. As Galton points out, obedience to dreams, belief in incantations, fear of witchcraft, fetish worship and tabu are intuitive, for they occur in uncivilised peoples all the world over. In modern civilisation the mother replaces the missionary and the child is taught with caressing earnestness to pray for temporal blessings, and in distress to appeal for aid to an all-seeing and all-loving deity. What wonder that this nursery-theology pervades human life, and being associated with a child's earliest and deepest feelings, should come to be looked on as intuitive! The habit of prayer, until its source has been analysed, is held to be of primeval origin. The theologians who accept the *objective* efficacy of prayer—i.e. not merely its subjective value to certain natures, but its power to produce temporal blessings—are the descendants of those who only a few centuries ago believed in the efficacy of auguries, of ordeals, of ecclesiastical blessings and cursings, in the existence of demoniacal possession and the value of exorcisms, in the possibility of witchcraft and of miraculous cures. All these the English Church has now suppressed as of 'superstitious' origin. But it was the more or less unconscious use of statistics which demonstrated the idle character of these 'intuitive' beliefs. Observation proved greater than

¹ March 17, 1870, Vol. 1, p. 501.

² Vol. XII, N.S. pp. 125-35.

the cogency of intuition in these cases; then why should the theologians of to-day, if summoned on the grounds of observation or statistics to give up a belief which has far less claim to be considered an intuition, start with naïve indignation, as at a previously unheard-of and most unreasonable interference¹?

I do not think Galton propounded his thesis of the statistical inefficacy of prayer—as Clifford in other like matters stated he did—with the view of “drawing” *The Spectator*. He came to his topic naturally and unexpectedly. In his study of the ‘Divines’ for his *Hereditary Genius*, he had been struck by “their wretched constitutions” (see our p. 101). To obtain a measure of this Galton investigated their age at death, and compared it with that of other classes. Using *Chalmers’s Biography* and *The Annual Register*, Galton found

| | | |
|-------------------------------|-------|----------------------|
| Artists | 64·74 | } Mean age at death. |
| Men of Literature and Science | 65·22 | |
| Clergy | 66·42 | |
| Lawyers | 66·51 | |
| Medical Men | 67·07 | |

Galton holds that the clergy are a far more ‘prayerful class’ than lawyers or doctors, and yet, although the numerous published collections of family prayers are full of petitions for temporal benefits, and the prayers of the clergy are for protection against the perils and dangers of the night and of the day and for recovery from sickness, such prayers appear to be futile in result². The above statistics are for eminent men, and therefore may be supposed to be in the case of ‘Divines’ for those of marked piety. Galton also cites Guy’s data³ which provide the following figures:

| | | |
|-------------------------------|-------|----------------------|
| Members of Royal Houses | 64·04 | } Mean age at death. |
| Artists | 65·96 | |
| Medical Men | 67·31 | |
| Men of Literature and Science | 67·55 | |
| Lawyers | 68·14 | |
| Clergy | 69·49 | |
| Gentry | 70·22 | |

The members of the Royal Houses are the persons whose longevity is most widely and continuously prayed for, and they have the least average length of life! But the mass of clergy—as distinct from eminent divines—have a longer life than the mass of lawyers or medical men. Galton attributes this to the easy country life, family repose, and sanitary conditions, but his critics might well have attributed the result to the greater prayerfulness of the lesser clergy. The greater length of life of the clergy as a whole is now a well-established actuarial fact, but probably to-day no one associates it with prayerfulness. Galton gives a good many illustrations of the want of efficacy in prayer, e.g. the relatively short lives of missionaries, the distribution of still-births as between clergy and laymen being wholly unaffected by

¹ Letter of Galton to *The Spectator*, 1872, August 24. In editorials and correspondence the discussion lasted from the issue of August 3 until that of September 7.

² *Fortnightly* (*loc. cit.*), p. 129.

³ *Journal of R. Statist. Society*, Vol. xxii, p. 355.

piety, the fact that the nobility are peculiarly subject to insanity notwithstanding that our Liturgy prays that they may be endued "with grace, wisdom and understanding," the fact that insurance offices make no differences in the insurances of pious and profane persons, or of ships fitted out for pious or profane purposes, although they are for ever measuring slight differences of risk, etc.

In his last paragraphs Galton turns to the *subjective* value of prayer:

"Nothing that I have said negatives the fact that the mind may be relieved by the utterance of prayer. The impulse to pour out the feelings in sound is not peculiar to man. Any mother that has lost her young, and wanders about moaning and looking piteously for sympathy, possesses much of that which prompts men to pray in articulate words. There is a yearning of the heart, a craving for help, it knows not where, certainly from no source it sees." (p. 135.)

The paper concludes with a fine statement which at least emphasises the religious comfort Galton found in his own pantheistic views and from which freethinkers without those views may still draw consolation:

"A confident sense of communion with God must necessarily rejoice and strengthen the heart, and divert it from petty cares; and it is equally certain that similar benefits are not excluded from those who on conscientious grounds are sceptical as to the reality of a power of communion. These can dwell on the undoubted fact, that there exists a solidarity between themselves and what surrounds them, through the endless reactions of physical laws, among which the hereditary influences are to be included. They know that they are descended from an endless past, that they have a brotherhood with all that is, and have each his own share of responsibility in the parentage of an endless future. The effort to familiarise the imagination with this great idea has much in common with the effort of communing with a God, and its reaction on the mind of the thinker is in many respects the same. It may not equally rejoice the heart, but it is quite as powerful in ennobling the resolves, and it is found to give serenity during the trials of life and in the shadow of approaching death." (p. 135.)

I now turn to the last popular appeal which Galton made for conscious race-betterment for more than 30 years. As he himself has said, the time was not ripe for such a programme as he had in mind, and he did not recur to the topic until 1901. The paper appeared in *Fraser's Magazine* in January 1873¹, under the title: "Hereditary Improvement." It opens as follows:

"It is freely allowed by most authorities on heredity, that men are just as subject to its laws, both in body and mind, as are any other animals, but it is almost universally doubted, if not denied, that an establishment of this fact could ever be of large practical benefit to humanity. It is objected that, philosophise as you will, men and women will continue to marry, as they have hitherto done, according to their personal likings; that any prospect of improving the race of man is absurd and chimerical, and that though inquiries into the laws of human heredity may be pursued for the satisfaction of a curious disposition, they can be of no real importance. In opposition to these objections, I maintain, in the present essay, that it is feasible to improve the race of man by a system which shall be perfectly in accordance with the moral sense of the present time." (p. 116.)

Galton holds that conscious race-betterment must arise as soon as the

¹ Vol. VII, New Series, pp. 116-30. I may, perhaps, be permitted to interpolate here a remark, which is true if pessimistic. The impression which has remained to me from younger days of the relatively high intellectual standard of mid-Victorian magazines has been confirmed by my re-examination of them for the purposes of this biography. These old magazines—many of them now dead—are full of good work by the best minds of that age, both literary and scientific; the magazines of to-day—from big to small—are almost entirely written by professional journalists to amuse an uncultured public. The writers bear as a rule names which have made no permanent mark on literature, science or politics, and their readers leave these productions to litter the railway carriage or the sea-beach.

mass of educated men shall have learnt to appreciate the truth of the ordinary doctrines of heredity. In this paper he begins his long inquiry as to the relative influence of nature, or as he here calls it 'race,' and nurture.

"There is nothing in what I am about to say that shall underrate the sterling value of nurture, including all kinds of sanitary improvements; nay I wish to claim them as powerful auxiliaries to my cause; nevertheless, I look upon race as far more important than nurture. Race has a double effect, it creates better and more intelligent individuals, and these become more competent than their predecessors to make laws and customs, whose effects shall favourably react on their own health and on the nurture of their children¹.....Constitutional stamina, strength, intelligence, and moral qualities cling to a breed, say of dogs, notwithstanding many generations of careless nurture, while careful nurture, unaided by selection, can do little more to an inferior breed than eradicate disease and make it good of its kind." (pp. 116-7.)

Galton points out that the mass of the population is never likely to enjoy sanitary conditions as good as are now enjoyed by the wealthy classes, but in these classes we frequently find narrow-chested men, delicate women and sickly children; they are very far from possessing those high physical and mental qualities which are the birthright of a good race. Their physical and mental failures are much more frequent than the sickly and misshapen contingent which is found in the stock of any of our breeds of domestic animals. The best environment will not free mankind from weaklings, they can only be 'bred out.' Galton considers that the forms of civilisation at present prevailing tend to spoil a race, and two of their chief factors are the following:

"The first is, the free power of bequeathing wealth, which interferes with the salutary action of natural selection, by preserving the wealthy, and by encouraging marriage on grounds quite independent of personal qualities; and the second is the centralising tendency of our civilisation, which attracts the abler men to towns, where the discouragement to marry is great, and where marriage is comparatively unproductive of descendants who reach adult life." (p. 117.)

Galton at this time believed strongly in the evil influences of town-life, and we shall shortly discuss a paper by him on the subject. He thought town-life selected those who are able to withstand best zymotic diseases and impure and insufficient food, but such a population is not necessarily foremost in the qualities which make a nation great. But to this it may be replied that if town-life does attract some abler men, it also attracts the men who can stand behind a counter, or operate a machine, but whose physique is quite inadequate to plough a straight furrow or to collect the sheep from the high moor. The problem cannot really be answered by a comparison of existing factory operatives and rural labourers, unless we know the nature of the town-immigrants at the time of their migration. Galton appears to me on safer ground when he turns to the mental characters and emphasises his earlier conclusions that the intelligence of men to-day has not kept pace with the growing complexity in trade and profession, nor with the increasingly difficult duties of the citizens of modern large nations.

"Great nations, instead of being highly organised bodies, are little more than aggregations of men severally intent on self-advancement, who must be cemented into a mass by blind feelings of gregariousness and reverence to mere rank, mere authority, and mere tradition, or they will assuredly fall asunder.....But the case would be very different in those higher forms of

¹ The 'hard cradle' may be a distinct advantage, as the biographer has observed in visiting the kennels of wealthy breeders of pet dogs.

civilisation, vainly tried as yet, of which the notion of personal property is not the foundation, but which are, in honest truth, republican and cooperative, the good of the community being literally a more vivid desire than that of self-aggrandisement or any other motive whatever. This is a stage which the human race is undoubtedly destined sooner or later to reach, but which the deficient moral gifts of existing races render them incapable of attaining. It is the obvious course of intelligent men—and I venture to say it should be their religious duty—to advance in the direction whither Nature is determined they shall go; that is towards the improvement of their race. Thither she will assuredly goad them with a ruthless arm if they hang back, and it is of no avail to kick against the pricks.....For my part, I cling to the idea of a conscious solidarity in Nature, and of its laborious advance under many restrictions, the Whole being conscious of us temporarily detached individuals, but we being very imperfectly and darkly conscious of the Whole. Be this as it may, it becomes our bounden duty to conform our steps to the paths which we recognise to be defined, as those in which sooner or later we have to go. We must, therefore, try to render our individual aims subordinate to those which lead to the improvement of the race. The enthusiasm of humanity, strange as the doctrine may sound, has to be directed primarily to the future of our race, and only secondarily to the well-being of our contemporaries. The ants who, when their nest is disturbed, hurry away each with an uninteresting looking egg, picked up at hazard, not even its own, but none the less precious to it, have their instincts curiously in accordance with the real requirements of Nature. So far as we can interpret her, we read in the clearest letters that our desire for improvement of our race ought to rise to the force of a passion; and if others interpret Nature in the same way, we may expect that at some future time, perhaps not very remote, it may come to be looked upon as one of the chief religious obligations. It is no absurdity to expect, that it may hereafter be preached, that while helpfulness to the weak, and sympathy with the suffering, is the natural form of outpouring of a merciful and kindly heart, yet that the highest action of all is to provide a vigorous, national life¹, and that one practical and effective way in which individuals of feeble constitution can show mercy to their kind is by celibacy, lest they should bring beings into existence whose race is predoomed to destruction by the laws of Nature. It may come to be avowed as a paramount duty, to anticipate the slow and stubborn processes of natural selection, by endeavouring to breed out feeble constitutions, and petty and ignoble instincts, and to breed in those which are vigorous and noble and social." (pp. 118-20.)

I have given nearly the whole of this lengthy passage because it contains the whole gospel of eugenics—then termed by Galton (p. 119) 'viriculture.' The world, in a crude sort of way, looks upon Galton as a 'eugenist,' but hardly knows what the word means, still less recognises why it was a religious faith to him. Of his pantheism, based upon the solidarity of nature as evidenced by the continuity of the germ-plasm, it realises nothing; that he wanted race-improvement in order that men might be good socialists in the highest sense—which their lack of intelligence at present denies them—has scarcely been whispered. Even now if I characterised Galton as a freethinking pantheist, who desired to reach a socialistic state by breeding supermen for intellect—and every word of this characteristic is a literal fact—I should be accused by the bulk of his acquaintances of misrepresentation, and by many of his friends of sensationalism, the explanation being, that Galton wrote far more than he spoke of his philosophy of life, while the majority of men talk more of their heroes than they read of their written thoughts;

¹ And again p. 123: "We shall come to think it no hardheartedness to favour the perpetuation of the stronger, wiser and more moral races, but shall conceive ourselves to be carrying out the obvious intentions of Nature by making our social arrangements conducive to the improvement of their race." I cannot but believe that Nietzsche took his doctrine of scorn and contempt for the feeble—with the cynicism (I should like to write the 'sardony') of a social invert—from Galton.

whence we can easily explain why the popular conception of a great leader of thought is nearly always vacuous, for it lacks that terse characterisation of individuality which can spring only from first-hand study of a man's mind.

Galton's thesis is that artificial selection in our race is lowering its type; the 'typical condition' of a race is that in which there is a moderate amount of healthy natural selection and fair conditions of nurture. He illustrates the lowest quarter of a race by statistics of French conscripts in which 30% were rejected in 1859. He estimates that some 5% of these may have been rejected owing to injury or accident, but holds that one-quarter of the French youths are naturally and hereditarily unfitted for active life. To illustrate the uppermost quarter he cites the lads of the *St Vincent* training-ship for seamen of the Royal Navy, where about one boy in four applicants is admitted, and he cites the conditions physical, mental and moral for admission.

"When I stood among the 750 boys who composed the crew, it was clear to me that they were decidedly superior to the mass of their countrymen. They showed their inborn superiority by the heartiness of their manner, their self-respect, their healthy looks, their muscular build, the interest they took in what was taught them, and the ease with which they learnt it.....If the average English youth of the future could be raised by an improvement in our race to the average of those on board the *St Vincent*, which is no preposterous hope, England would become far more noble and powerful than she now is.....The present army of ineffectives which clog progress would disappear, and the deviations of individual gifts towards genius would be no less wide or numerous than they now are; but by starting from a higher vantage ground they would reach proportionately farther." (p. 123.)

I think many of us would now admit not only the advantage but the possibility of such a degree of betterment of our race. But it may be permissible to doubt whether Galton's solution of 1873 was a feasible one.

"My object is to build up, by the mere process of extensive inquiry and publication of results, a sentiment of caste among those who are naturally gifted, and to procure for them, before the system has fairly taken root, such moderate social favour and preference, no more and no less, as would seem reasonable to those who were justly informed of the precise measure of their importance to the nation." (p. 123.)

The "extensive inquiry and publication of results" were to be undertaken by the organisation of a widely extended "Eugenics Records Society," with branches all over the country, which was to collect and digest information as to the physique, mentality and ancestry of individuals.

"My proposition certainly is not to begin by breaking up old feelings of social status, but to build up a caste *within* each of the groups into which rank, wealth and pursuits already divide society, mankind being quite numerous enough to admit of this sub-classification." (p. 123.)

It is abundantly clear that in 1873 Galton had not fully realised how unprepared the nation was for such a scheme. In the first place had such a society or institution been created, it would have met with an impenetrable barrier of real, if mistaken, opposition to what would have been looked upon as prying inquiries. But still more important factors of failure would have been the absence of any properly trained mental, medical and physical anthropometricians who could have carried out adequate researches of this kind. The work cannot be done by untrained, however enthusiastic, volunteers,

but only under the direction of first-class scientists, and the very sciences these men were to be adepts in—experimental psychology, medical history and physical anthropometry—were either unborn or in the most infantile stages at that date. Had the sciences existed, and the scientists been forthcoming in adequate numbers, the cost of Galton's network of Eugenics Record Offices would have been prohibitive! All this Galton very soon realised, and it forms the key to his later labours—he set about creating, or at any rate building up from feeble beginnings, the requisite branches of science. He later differentiated the science of eugenics from eugenics propagandism, and realised how the latter, if not adequately based on the former, might easily, if not discreet, delay rather than accelerate the spread of fundamental truths.

We are, fifty years later, scarcely yet ripe for the registration of the fitter and abler members of our society. Indeed, while the youth of our professional classes is now far more open to an appreciation of the fundamental importance of sex-questions on the future of the race, the main conception of eugenics has scarcely reached the artizan classes, and many of the fundamental ideas of trades-unionism are retrogressive from the racial standpoint¹. Galton's belief that racial improvement must depend on the creation of a caste in each social class, a caste which will seek intermarriage, and to which social recognition will give differential opportunities for starting a home and founding families, will long outlive the scheme by which he proposed in 1873 to attain it. We may, however, learn something still from Galton's proposed national register. For example, that he did not think it would be immediately adequate and successful:

“A vast deal of work would be, no doubt, thrown away in collecting materials about persons who afterwards proved not to be the parents of gifted children. Also many would be registered on grounds which our future knowledge will pronounce inadequate. But gradually, notwithstanding many mistakes at first, much ridicule and misunderstanding, and not a little blind hostility, people will confess that the scheme is very reasonable, and works well of its own accord. An immense deal of investigation and criticism will bear its proper fruit, and the cardinal rules for its successful procedure will become understood and laid down. Such, for example, as the physical, moral and intellectual qualifications for entry on the register, and especially as to the increased importance of those which are not isolated, but common to many members of the same family. It will be necessary also to have a clear idea of the average order of gifts to aim for, in the race of the immediate future, bearing in mind that sudden and ambitious attempts are sure to lead to disappointment. And again, the degree of rigour of selection necessary among the parents to insure that their children should, on the average, inherit gifts of the order aimed at. Lastly, we should learn particulars concerning specific types, how far they clash together or are mutually helpful.” (p. 126.)

And again, referring to voluntary marriage within the caste:

“So a man of good race would feel that marriage out of his caste would tarnish his blood, and his sentiments would be sympathised with by all. As regards the democratic feeling, its assertion of equality is deserving of the highest admiration so far as it demands equal consideration for the feelings of all, just in the same way as their rights are equally maintained by the law. But it goes further than this, for it asserts that men are of equal value as social

¹ Wages as a standard of craft-ability, and as a rough measure of capacity for founding a home and family, have been not entirely, but very largely interfered with by Trade Union action.

units, equally capable of voting, and the rest. This feeling is undeniably wrong and cannot last. I therefore do not hesitate in believing that if the persons on the register were obviously better and finer pieces of manhood in every respect than other men, democracy notwithstanding, their superiority would be recognised as just what it amounted to, without envy, but very possibly with some feeling of hostility on the part of beaten competitors." (p. 127.)

Thus Galton ploughed his lonely furrow, or rather Odysseus-like ploughed that track of the restless sea which carried him between the Charybdis of Democracy and the Scylla of an Hereditary Peerage; and the unwonted path gave him few social or political comrades. Men do not trouble when a brand-new halo is affixed to their old sanctities, but to suggest even that the old halo would befit better a new sanctity than a worn-out fetish is sacrilege indeed.

There is still a law in France, due to Colbert in 1669, touching the widespread oak forests; it runs:

"in none of the forests of the State shall oaks be felled until they are ripe, that is, are unable to prosper for more than thirty years longer."

Thus France legislated for the parquet-floors and wine-casks of to-day, for she did not repeal the ordinance when oak became of little service for shipping.

"Is not man," asks Galton, "worthy of more consideration than timber? If a nation readily consents to lay costly plans for results not to be attained until five generations of men shall have passed away, for a good supply of oak, could it not be persuaded to do at least as much for a good supply of Man? Marvellous effects might be produced in five generations (or in 166 years; allowing three generations to a century). I believe when the truth of heredity as respects man shall have become firmly established and be clearly understood, that instead of a sluggish regard being shown towards a practical application of this knowledge, it is much more likely that a perfect enthusiasm for improving the race might develop itself among the educated classes¹." (p. 120.)

Thus testifies Francis Galton, much as George Fox had testified two centuries earlier. Both were men with a strong religious enthusiasm behind their doctrines. But the former, who combined knowledge with intense conviction, has so far failed relatively to the latter, who combined forcible ignorance with intense conviction. Are we to attribute the difference to the 'atmosphere' peculiar to their ages, to market-place methods, or to the fact that while Fox appealed to the individual's dubiety as to his own future, Galton asked the individual to consider the welfare, not of himself, but of his offspring? The sanctions behind past religious beliefs will be found in the great mass of men to have a selfish origin, welfare now or in the future.

It is conceivable that Galton's teaching, depending largely on the intensification of the herd-instinct; may need another ice-age, or defeat in a war greater even than the 'Great War,' to impress itself upon our race. The immediate future social history of Germany may not be uninteresting from this standpoint to the philosophical onlooker.

We have seen that Galton in his last paper laid stress on the ill-effects on race of town-life, and that in an earlier paper he had fully recognised the importance of measuring the relative influence of nurture and of nature.

¹ Let us remember that the passion to breed animals and to breed them for points is almost instinctive in the Briton, and we see why our race ought to be foremost in the study and practice of eugenics.

We now turn to certain papers dealing with these points. The first paper we have to notice is entitled: "The Relative Supplies from Town and Country Families to the Population of Future Generations"; it was the first paper Galton read before the Statistical Society of London¹.

"This is an inquiry into the relative fertility of the labouring classes of urban and rural populations, not as regards the number of children brought into the world, but as regards that portion of them who are destined to live and become the parents of the next generation. It is well known that the population of towns decays, and has to be recruited by immigrants from the country, but I am not aware that statistical measurement has yet been attempted of its rate of decay. This inquiry is part of a larger one, on the proportionate supply to the population from the various social classes, and which has an obvious bearing on investigations into the influences that tend to deteriorate or to improve our race. If the poorer classes, that is to say, those who contain an undue proportion of the weak, the idle, and the improvident, contribute an undue supply of population to the next generation, we are justified in expecting that our race will steadily deteriorate, so far as that influence is concerned. The particular branch of the question to which I address myself in this memoir is very important, because the more energetic of our race, and therefore those whose breed is the most valuable to our nation, are attracted from the country to our towns. If, then, residence in towns seriously interferes with the maintenance of their race, we should expect the breed of Englishmen, so far as that influence is concerned, to steadily deteriorate." (p. 19.)

It will be seen that Galton makes two great assumptions: (a) that the population of the town decays, and (b) that the most energetic of our race are attracted to the towns. Now there is no doubt that a considerable number of energetic men do come from the country into the towns, but also many weaklings and the general human refuse also migrate, and it is not at all clear where the balance of gain may lie. If there be a large contingent of the loafing, pauper and even criminal sections of the community who have come from country to town, the want of fertility in the town may be in part due to this selection.

Captain John Graunt in his "Observations on the Bills of Mortality," 1662, was perhaps the first to assert that the town was recruited from the country, but he had the marked experience of London being rapidly refilled after great plagues. Galton got Dr Farr to provide him with the size of family of 1000 mothers between ages 23 and 40 from Coventry, and the same series of mothers from the rural districts of Warwickshire; the former were the wives of factory hands, and the latter of agricultural labourers. He does not say, however, whether the wives of the factory hands were employed or not, and he does not know whether the ages at marriage of the town wives were differentiated from those of the rural wives. Now the town returns show 510 wives under 32 and the rural returns only 466. It follows therefore that the town wives were *younger* in the selection made than the rural wives; or quite apart from the possibility of an evil influence of town-life on fertility, we might well anticipate that the 1000 town wives would show fewer children. Accordingly, I reconstructed Galton's table, by considering the ages of the wives and reducing the town and country

¹ *Journal*, March 1873, Vol. xxxvi, pp. 19-26. Galton was elected to the Society in 1860 and served on the Council from 1869 to 1879.

populations to a standard population (the average of the two) of wives. The following resulted:

| Mother's age | Number of wives | | Number of children | | Average number of children per wife | | Standard Population | Standard population. Total children | |
|--------------|-----------------|-------|--------------------|-------|-------------------------------------|-------|---------------------|-------------------------------------|-------|
| | Factory | Rural | Factory | Rural | Factory | Rural | | Factory | Rural |
| 24 and 25 | 107 | 91 | 137 | 130 | 1.28 | 1.43 | 99 | 127 | 142 |
| 26 and 27 | 122 | 104 | 209 | 190 | 1.71 | 1.83 | 113 | 193 | 207 |
| 28 and 29 | 132 | 119 | 304 | 279 | 2.30 | 2.34 | 125.5 | 289 | 294 |
| 30 and 31 | 120 | 119 | 299 | 368 | 2.49 | 3.09 | 119.5 | 298 | 369 |
| 32 and 33 | 128 | 124 | 371 | 403 | 2.90 | 3.25 | 126 | 365 | 410 |
| 34 and 35 | 132 | 120 | 430 | 401 | 3.26 | 3.34 | 126 | 411 | 421 |
| 36 and 37 | 100 | 117 | 369 | 395 | 3.69 | 3.38 | 108.5 | 400 | 367 |
| 38 and 39 | 100 | 128 | 354 | 469 | 3.54 | 3.66 | 114 | 404 | 417 |
| 40 | 59 | 78 | 208 | 276 | 3.52 | 3.54 | 68.5 | 241 | 242 |
| Totals | 1000 | 1000 | 2681 | 2911 | 2.68 | 2.91 | 1000 | 2728 | 2869 |

From this table we see that Galton overlooked the fact that his Coventry sample consisted of *younger* women than his rural Warwickshire mothers, and therefore would naturally have fewer children. The average difference on the standard population is only .14 of a child, or if we take the *average* interval between births to be 2.5 years, it follows that a postponement of marriage on the average for four months would explain this difference¹. Thus far Galton's paper would not justify any statement as to deterioration arising from town-life. The lesser apparent fertility would be fully accounted for by emigration of the younger women into the towns and a slight postponement of marriage. Galton next proceeds to take the influence of mortality on the town and rural populations. Failing other data he applies to Coventry the mortality table of Manchester and to the rural districts of Warwickshire that of the 'Healthy Districts.' I do not think either of these steps is justifiable, nor again the method by which he applies these life-tables. He draws the conclusion that:

"the rate of supply in towns to the next adult generation is only 77 per cent., or say, three-quarters of that in the country. In two generations the proportion falls to 59 per cent., that is the adult grandchildren of artisan townfolk are little more than half as numerous as those of labouring people who live in healthy country districts." (p. 23.)

This conclusion has been often cited as if it were rigorous, whereas it is rather an illustration of the grave difficulty of inquiries of this nature, even

¹ This suggestion is supported by the fact that as the women get older there is a less difference between their number of children, e.g. Mothers 36-40, Factory 3.59 and Rural 3.52, or the town is in excess.

when undertaken by a man of keen insight¹. If the social conditions be such that young mothers with a slightly postponed age at marriage are collected in one district and old mothers with no such postponement in a second, it is clear that the fertility of the first would appear very much larger than the second, and need not in any way be due to differences in environment. The question of whether a town population is decadent is really not touched by this paper; that the gross fertility was less in Galton's instance he demonstrated, but gross fertility means very little without a knowledge of the distribution of the ages and durations of marriage in the population. The main value of the paper lies in Galton's recognition of the problem as of first-class importance.

The idea of the above paper—comparison of the effect of town and country life—was the basis of another paper by Galton at a somewhat later date. It is entitled "On the Height and Weight of Boys aged 14 in Town and Country Public Schools"². Galton's conclusion in this paper is as follows:

"It appears that the boys of the above-mentioned ages in the country group are $1\frac{1}{4}$ inch taller than those in the town group, and 7 lbs. heavier; also that this difference of height is due, in about equal degrees, to retardation and to total suppression of growth; and lastly, that the distribution of heights in both cases conforms well to the results of the 'Law of Error'." (p. 174³.)

Galton appears to have been inclined to ascribe the differentiation as not "altogether due to bad effects of nurture on the individual boys" but "much of it to the town-life of their parents, and probably of other ancestors." (p. 181.)

Galton's data for country schools consist in the measurement of 296 boys aged 14 at Clifton, Eton, Haileybury, Marlborough and Wellington, i.e. essentially of boys of the Upper Middle, professional and administrative classes. His town boys are from Christ's Hospital, City of London School, King Edward's School at Birmingham and Liverpool College; these schools in 1871 drew boys largely from the Lower Middle, shopkeeping, clerking and similar classes. Galton's conclusion that the boys of the former series of schools were of better physique would, I feel sure, be confirmed to-day, but, I think, it is a *class* and not an environmental distinction. He did not record the categories of town and country origin in the boys at these schools, but only says that it is fair to assume their origins in bulk to be country and town respectively. Again, I think, although he made some, he did not make adequate allowance for the fact, that while in the first grade public schools the most numerous boys were those aged 15, in the lower grade public schools, the town schools, the boys of 14 and in the case of Birmingham the boys of 13 are most numerous. In other words, at 14 the boys are

¹ The President of the Royal Statistical Society cited it on February 16, 1922 at the Galton Centenary Celebration of the London Eugenics Education Society, without a word of comment or of caution in his speech. *Eugenics Review*, Vol. xiv, p. 4.

² *Journal of the Royal Anthropological Institute*, Vol. v, 1876, pp. 174-80.

³ We have in this paper an early practical application of Galton's method of percentiles; the 'median' and the 'quartiles' are provided.

already leaving the 'town' schools, while they appear to be still coming to the 'country' schools. The former are doubtless going out into business and other occupations, and the boys that leave earliest will, as a rule, be those most fully developed. Galton has clubbed together his schools so that we cannot separate them out, but one would anticipate that Liverpool College, if it draws from Lancashire, would racially have a low stature. Here again Galton reached a right conclusion, if the data on which he bases it are open to criticism. If we take, as the Galton Laboratory has done, adjacent rural and urban districts in Worcestershire or Staffordshire and compare the children of like ages in the *primary* schools, then the balance of physique is in favour of the rural. In doing this we work within the same social class, we attempt to get the same local race, but we cannot be certain that the town occupations have not attracted the less physically fit parents.

D. HEREDITY IN TWINS

It seems best to consider here two papers on the subject of twins, because although they to some extent were associated with Galton's ideas on heredity, yet they sprung, I think, from his work on the influence of environment. The first paper is entitled "The History of Twins, as a Criterion of the Relative Powers of Nature and Nurture¹." Among the claims which twins have to attention, Galton tells us, is the fact that:

"their history affords means of distinguishing between the effects of tendencies received at birth, and of those that were imposed by the circumstances of their after lives; in other words, between the effects of nature and of nurture. This is a subject of especial importance in its bearings on investigations into mental heredity, and I, for my part, have keenly felt the difficulty of drawing the necessary distinction whenever I attempted to estimate the degree in which mental ability was, on the average, inherited. The objection to statistical evidence in proof of its inheritance has always been: 'The persons whom you compare may have lived under similar social conditions and have had similar advantages of education, but such prominent conditions are only a small part of those that determine the future of each man's life. It is to trifling accidental circumstances that the bent of his disposition and his success are mainly due, and these you leave wholly out of account—in fact they do not admit of being tabulated, and therefore your statistics, however plausible at first sight, are really of very little use.' No method of inquiry which I have been able to carry out—and I have tried very many methods—is wholly free from this objection." (p. 391².)

Accordingly Galton turns to try and appreciate what *relative* effect nature and nurture have. Galton's scheme was to consider twins who were closely alike in youth and whether after being separated they grew unlike, and again whether twins who being unlike in childhood were subjected to the same nurture grew more alike. Galton collected his material by circu-

¹ *Fraser's Magazine*, Nov. 1875, issued with revision and additions in *Journal of the Royal Anthropological Institute* (1875), Vol. v, pp. 391–406, 1876.

² The passage is clearly written before the idea of correlation had reached Galton's mind. The true test is whether the degree of association in mental characters between relatives is the same as that between physical characters. If it be, then it is exceedingly improbable that nurture on the one hand should have produced exactly the same quantitative association as nature on the other, for we can always select physical characters which are not materially influenced by nurture.

larising twins or relatives of twins, and 'snowballed' by asking them for the addresses of other twins, which he remarks led to a continually widening circle of correspondence. Finally Galton obtained information concerning 94 sets of twins (see his statement in second paper). He considers their resemblances in the case of 35 twin-sets—each of like sex—in which there was detailed evidence of close similarity. He finds that this likeness—mental, physical and pathological—is maintained even when life has carried the twins into different environments; they appear to have the same illnesses at the same times. The answers showed that in the bulk of cases the resemblance of body and mind continued unaltered up to old age and under very different conditions of life; in other cases dissimilarity was attributed wholly to some form of illness or accident which had befallen one twin and not the other. Galton then turns to the 20 sets of twins he had detailed accounts of unlikeness between. He has not a single case in which his correspondents speak of originally dissimilar characters having become assimilated through identity of nurture.

"The impression that all this evidence leaves on the mind is one of some wonder whether nurture can do anything at all beyond giving instruction and professional training. It emphatically corroborates and goes far beyond the conclusions to which we had already been driven by the cases of similarity. In these the causes of divergence began to act about the period of adult life, when the characters had become somewhat fixed; but here the causes conducive to assimilation began to act from the earliest moment of the existence of the twins, when the disposition was most pliant, and they were continuous until the period of adult life." (p. 404.)

And then follows the passage cited on p. 8 of our first volume.

There is another passage also which is of great suggestiveness and may be cited here:

"Much stress is laid on the persistence of moral impressions made in childhood, and the conclusion is drawn, that the effects of early teaching generally must be important in a corresponding degree. I acknowledge the fact, but doubt the deduction. The child is usually taught by its parents, and their teachings are of an exceptional character for the following reason. There is commonly a strong resemblance, owing to inheritance, between the dispositions of the child and its parents. They are able to understand the ways of one another more intimately than is possible to persons not of the same blood, and the child instinctively assimilates the habits and ways of thought of its parents. Its disposition is educated by them, in the true sense of the word; that is to say, it is evoked earlier than it would otherwise have been. On these grounds I ascribe the persistence of habits that date from the early periods of home education, to the peculiarities of the instructors, rather than to the period when the instruction was given. The marks left on the memory by the instructions of a foster-mother are soon spunged clean away." (p. 405.)

Consider, says Galton, the history of the cuckoo, which is reared exclusively by foster-parents!—Neither its note, nor its habits, nor its sympathies are influenced by those of its foster-parents. Galton concludes generally that with reasonable care in the collection of our data, we may ignore the many small differences in nurture which characterise individual cases.

The reader of Galton's first paper may possibly hold that he ought to have given more of his data, but it must be remembered that his paper was written originally as a popular article for *Fraser's Magazine*, and Galton was not yet a practised statistician. His material is worthy of a fresh analysis,

and we hope that this may be forthcoming. At the same time his general conclusion that the differential effects of nurture within the range of existing social or possible political conditions are extremely small has been amply confirmed by other methods of approaching the problem.

Galton felt that this conclusion was very essential in its bearing on his theory of the heredity of the mental characters. The two principles together—i.e. inheritance of ability, and the relatively small influence of nurture as compared to nature—form the basis of his scheme for racial betterment. While Galton always acknowledged the importance of a good physique, and suggested that marks should be allotted to it in competitive examinations, he was deeply impressed with the fact that the future lies rather with the man of brains than with the man of muscles; he repeatedly asserted, however, that the man of ability was very often of good physique, and the stock wherein the two were combined was the ideal stock for race-betterment.

In his second paper on twins, entitled "Short Notes on Heredity, etc., in Twins¹," Galton turns somewhat more to the numerical and physiological sides of the subject.

"The word 'twin' covers different classes of events—those in which each twin is derived from a separate ovum, and those in which they come from two germinal spots in the same ovum. In the former case they are enveloped, previously to their birth, in separate membranes; and in the latter in the same membrane. Now it appears that twins enveloped in the same membrane are invariably of the same sex, and these according to the cases of Späeth, who has evidently taken great pains to secure reliable data², are 24 per cent. of the whole number." (p. 329.)

Galton finds great variation in the statistics as to twins of various types, but concludes that about twice as many twins are born of the same sex as of opposite sex³. This would mean that Späeth's percentage should have been 33% instead of 24%. It seems probable that the divergence arises from Galton's "twice" being a rough approximation. He considers that twins do not marry as often as other people and are less fertile. He contradicts, however, the popular belief that both twins whether of the same or opposite sexes *never* have children, for he had many instances to the contrary. He says that as far as he is aware nothing corresponding to the 'free-martin' of cattle occurs with the human twin. Still the infertility of twins Galton considers to be so great that it renders the question of direct inheritance of twinning difficult. He accordingly asks whether the number of twins among the uncles and aunts of twins is in excess of the probable on the basis of the non-inheritance of the twinning tendency. Galton shows from Ansell's *Statistics of Families* that there is 1 twin born to every 100 births,

¹ *Journal of the Royal Anthropological Institute* (1875), Vol. v, pp. 324-29, 1876.

² "Studien über Zwillingen," *Zeitschrift der Wiener Gesellschaft der Aerzte*, 1860, Nos. 15 and 16.

³ Let x = number of single membrane or 'like' twins, y = number of double membrane or 'unlike' (i.e. only as like as normal siblings). Then according to Späeth, $x = \frac{1}{4}(x + y)$, nearly. Now in x all twins are of the same sex, and in y only half will be of the same sex; hence total number of all twins of same sex = $x + \frac{1}{2}y$ and of different sexes = $\frac{1}{2}y$, but $x = \frac{1}{4}y$, and accordingly $\frac{x + \frac{1}{2}y}{\frac{1}{2}y} = \frac{5}{2}$, or there are 1.7 times as many twins of same sex as of unlike sex.

or say 2 persons twins in 101 persons. Now in his own data for 94 sets of twins he found that they had 1065 uncles and aunts, and among these were 27 sets of twins or 54 twins in 1065 persons, or, say, 1 person a twin in 20. Galton accordingly concludes that twins are far more frequent among the relatives of twins than in the general population or twinning must be an hereditary character. Galton further noted that on the father's side there were 538 uncles and aunts with 28 twins among them, and on the mother's side 527 uncles and aunts with 26 twins among them. Hence he concluded that the hereditary tendency to twinning was the same in the male and female lines¹.

Two other interesting points are given in this paper: (a) the case of a woman in a family remarkable for twins, whose single children were polydactyle, but not the twins, and (b) a pedigree—unfortunately omitting single births—in which the intermarriages of three twinning stocks show eight sets of twins, one triplet, and one quadruplet².

I have endeavoured in this chapter to trace one strand of Galton's labours, that which shows him passing from the human side of geography to anthropology, and so to heredity and race-betterment. The reader, who has had the patience to follow my analysis of Galton's papers, will have observed that Galton was becoming more and more conscious that a statistical treatment of both anthropology and heredity was necessary, and he steadily set himself to understand the then existing statistical processes and to develop them where necessary. I have not hesitated to indicate the statistical weakness displayed in some of the papers discussed in this chapter, because it was Galton's growing consciousness in this matter that largely led to his later contributions to statistical theory.

In 1872 Mrs Galton's mother had died and in 1874 Galton's mother

¹ Assuming one person in fifty to be a twin, Galton's 94 sets of twins lead us to a table of the following character:

| | | Uncle or Aunt | | |
|------------------------|----------|---------------|----------|---------|
| | | Twin | Not-twin | Totals |
| Nephew } or Niece } | Twin | 108 | 2,022 | 2,130 |
| | Not-twin | 2,022 | 102,348 | 104,370 |
| Totals | | 2,130 | 104,370 | 106,500 |

If we assume for a moment that twinning is the result of some practically continuous variable exceeding a certain value, the correlation for uncle and nephew would be .1817, rather low for this relationship (.2 to .3), although such a value has occurred for physical characters occasionally. It is possible that Ansell's value for the frequency of twin births is somewhat exaggerated.

² A number of pedigrees of twinning stocks were presented some years ago to the Galton Laboratory, and will ultimately be published, but having been collected because of the twinning frequency, it is not easy to use them for measuring the intensity of heredity in twinning.

(Violetta Darwin) also passed away. We may conclude this chapter with an extract from *L. G.'s Record*, for it indicates that the large amount of work which Galton published in 1874 must have been done amid much stress.

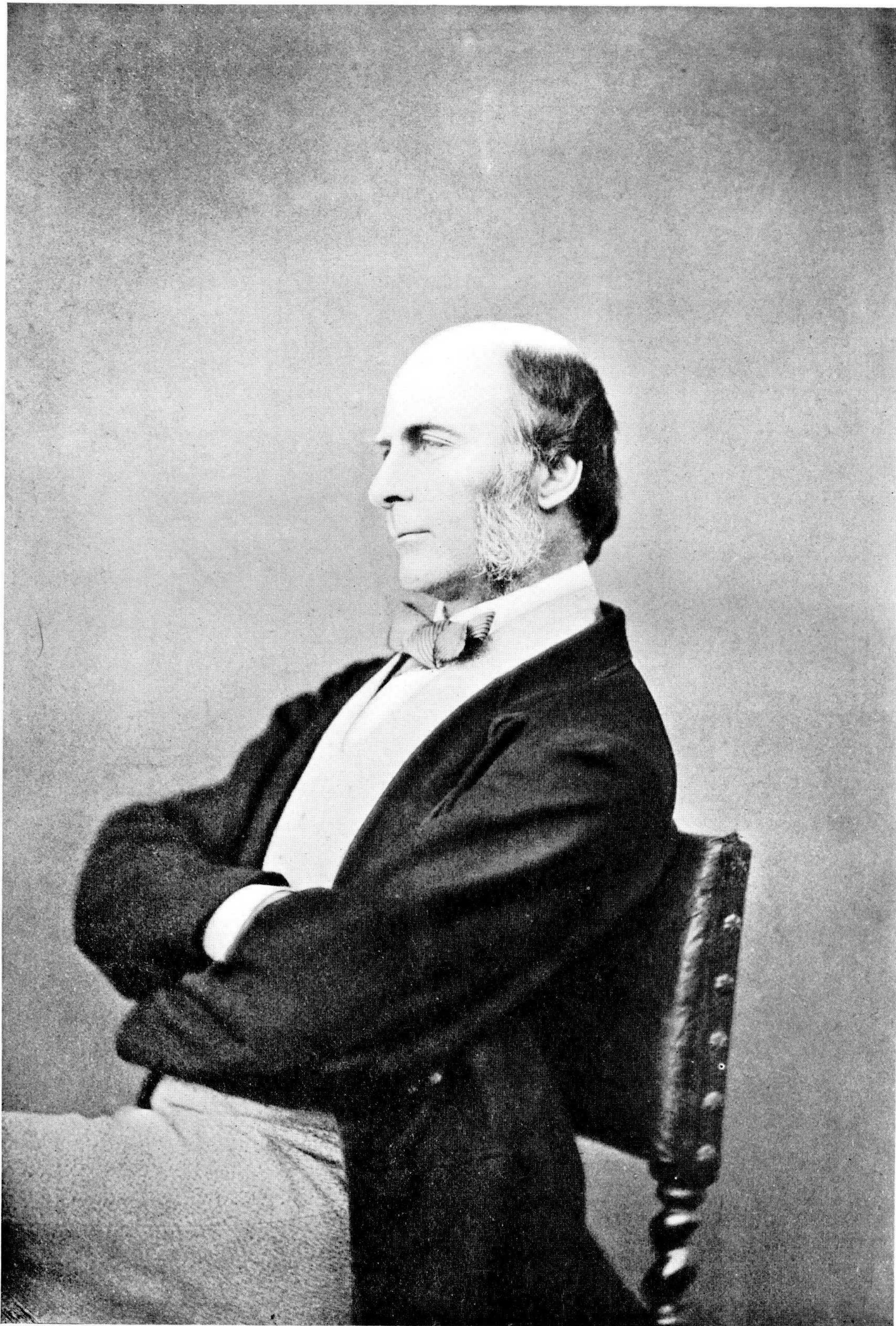
"1874. Uneasy from the very beginning about dear Mrs Galton. Frank went to see her early in February, and she died February 12th aged 90. This coming so soon after my dear mother made a sad blank; both homes gone. We went to dear Emma ['Sister Emmy'] at Easter for a week and then made a few days visit to Winchester, Salisbury and Lyndhurst, the weather not good. At Whitsuntide we visited the Jenkinsons and greatly enjoyed their lovely country. George and Josephine [Canon Butler and his still well-remembered wife, Mrs Josephine Butler¹] came to us at the end of June. We were prevented going away by domestic bothers, which have made the whole of this year sadly trying..... We paid many visits during July and at the end went down to Cornwall spending a fortnight with Adèle and Milly ['Sister Delly' Mrs Bunbury and her daughter, afterwards Mrs Lethbridge] and visited Boscastle and Tintagel. After this we went to N. Devon till September, when we visited the Groves at Cheetle near Blandford. On the 14th I broke a blood vessel and was very near dying, but thro' God's mercy I came back to life and felt so peaceful and happy in my quiet sickroom, that it was not a time of misery. And all were so kind and good to me, and Frank especially, that I felt sustained by love. We moved to Bournemouth as soon as I was able and then in November to dear Emma, and found her well in her newly arranged house. We came home November 18th. Very severe weather soon set in and lasted to the end of the year. Frank was ill in December and had Dr A. Clarke². We had a quiet dull Xmas, no going out, and Frank had to give up his promised lectures at Newcastle³. His book on the Nature and Nurture of Scientific Men came out in December; occupied on inquiry about Twins. On the whole a year of sad memories."

And yet Galton published one fundamental book, *English Men of Science*, and three memoirs in this year and wrote at least four others! He depended singularly little upon a stable environment; yet it must be remembered that years were not needed then for the collection of data and its numerical reduction, as in the case of modern biometric studies.

¹ One of the protagonists for social purity. I remember many years ago, one evening in Grindelwald, being struck by a very commanding personality, one of the most 'regal' women I had yet met; it was Mrs Josephine Butler, Mrs Galton's sister-in-law.

² "What a pleasant man Dr Andrew Clarke is. He examined me most thoroughly, pronounced it a concurrence of irregular gout with influenza and that my heart was weak. I mend, but not overfast." Letter of Galton to George Darwin, Xmas Day 1874. Strange to say Sir Andrew Clarke's directions for treatment, principally diet, have survived almost the half-century. Perhaps the wisest was: "Walk at least half-an-hour twice a day, and do the most important headwork after breakfast, *not* after dinner."

³ The manuscript draft of these lectures has survived.



Francis Galton when about fifty years of age.