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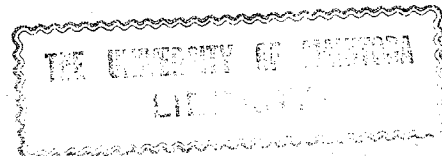
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H E R E D I T Y

BY

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HEREDITY

By

Rev. Edwin Smith.

Heredity is defined by the Encyclopaedic Dictionary as "The tendency which there is in each animal or plant in all essential characters to resemble its parents, so as to be of the same species and even variety as they are, though minute differences are certain to arise. In some cases these differences themselves tend to be reproduced in successive generations: in other cases the movement is in a contrary direction producing a reversion to ancestral types."

"Heredity" says Ribot "is that biological law by which all beings endowed with life tend to repeat themselves in their descendants: it is for the species what personal identity is for the individual. By it a ground work remains unchanged amid incessant variation; by it nature ever copies and imitates itself." According to Weismann it is "the process that renders possible that persistence of organic beings throughout successive generations which is generally thought to be so well understood as to need no special explanation."

---- In what sense is there a law of heredity?

Laws in nature are known only as the result of processes of induction. From the phenomena of nature and life something is inferred to be behind those phenomena regulating their appearance. That something, in obedience to which similar phenomena result from similar conditions, we call laws. Every fact has been declared to be a grouping of laws.

It needs no profound scientific research to discover easily verified facts in abundance which make it evident that heredity is a veritable law holding true at once in the physical, the mental and the moral spheres.

1. By the act of generation all that distinguishes species as species is invariably transmitted.

All that lives tends to repeat itself in the life of its offspring. Trees, every winged fowl, cattle and creeping things and human beings, all according to the language of the first chapter of Genesis "Bring forth after its kind". Men do not gather grapes off thorns or figs off thistles, but as the proverb has it "Like begets like". No question is ever raised concerning the immutability of the law of "Like produces like" so far as it concerns the transmission of the characteristics of the species.

2. Race peculiarities are also invariably transmitted.

The child of a Caucasian parent - of the pure stock - is always Caucasian in color, in figure, in mental aptitudes, in moral tendencies. Everyone knows how the peculiar cast of features that we call Jewish tend to reappear in generation after generation. The vagabondism of the Gipsy is in his blood. The marvellous sagacity of the sheep-dog, which no amount of training would ever confer upon a poodle or fox terrier, comes to it by way of inheritance as part of its birth right.

3. Family and individual characteristics are transmitted.

It is not merely that type persists but individual features, characteristic traits and peculiarities, sometimes of the most minute kind, are transmitted from one generation to another. And so we have the aquiline nose of the Bourbons, the fecundity of the Guises, the musical faculty of the Bachs, and the taste for natural history of the Darwins. On the fact that purely individual characteristics are hereditary are based many of the rules of life insurance. As one writer very happily and sagaciously puts it "the body in which we journey across the isthmus from one ocean to another is not a private carriage but an omnibus;" and be it said it is our ancestors who are our fellow-passengers. Therefore I think we may say with Ribot "Heredity" always governs those broadly general characteristics which determine the species, always those less general characteristics which constitute the variety, and often individual characteristics. Hence the evident conclusion that heredity is the law and non-heredity the exception.

Heredity acts in four ways.

1. Direct Heredity, when the qualities of both parents are transmitted to their offspring. Of this there are two forms:

(a) When the child takes after both parents equally. Of this there are probably no perfect examples.

(b) When the child takes after both but more especially resembles one of them. Here again there are two forms: (1) When the heredity takes place in the same sex; and (2) when it occurs between different sexes - the more common form.

2. Reversional Heredity, Atavism, consists in the reproduction in the descendants of the moral or physical qualities of their ancestors. It occurs frequently between grandfather and grandson, grandmother and granddaughter.

3. Collateral, or Indirect Heredity, which is of rarer occurrence than the foregoing, exists as indicated by its name, between individuals and their ancestors in the direct line - uncle or granduncle and nephew, aunt and neice.

4. Heredity of Influence, very rare from the physiological point of view, and probably not proved in any single case in the moral order. "It consists in the reproduction in the children by a second husband of some peculiarity belonging to a former spouse".

This classification rests on an extended induction of facts which has been made with great care by such general investigators as Lamarck, Darwin, Mivart, and Wallace, and such special students of heredity as Lucas, Morel, Ribot, Galton, Elam and Brooks.

Doubtless there are exceptions to this law, but they are neither so numerous nor so inexplicable as are sometimes supposed.

Perhaps at this stage it would be well to note that there are two laws that govern the transmission of life, viz, the law of Uniformity and the law of Diversity. Under the law of uniformity we find children inheriting the general form and appearance of their parents but also their mental and moral constitutions. Under the law of diversity, we observe deformity and ugliness giving origin to grace and beauty, apparent health producing disease, virtue succeeded by vice, intellect by imbecility, and the converse of all these phenomena. The one ~~xx~~ law accounts for all that comes from the past; the other for all that is new and peculiar in the development of life.

Spontaneity has undoubted play and in cases of genius seems to have supreme control; but it is a question whether a more careful induction of facts would not show what are called exceptions or spontaneous variations from the primitive type to be in thousands of instances only suppressed or exaggerated heredity. The Encyclopaedia Britannica says "Concerning therefore the great difficulty in which the subject is enveloped it will be well to abandon theoretical considerations, and merely to state that characters at least practically new do undoubtedly appear in the offspring. In every group of organisms a degree of variability sufficient to give material for the breeder to work on probably exists."

A very serious fact, however, and a far-reaching question confronts us at this point. The fact is that the word variation is only a general term for the beginning of improvements or of decline. The question is whether man can so control or influence variation as to ensure progress and prevent degeneration? In other words, Can acquired traits be transmitted to descendants? This introduces us to a great discussion in which in our time Herbert Spencer, and August Weismann are the leaders.

Darwin, Spencer and their school, teach that acquired characteristics are transmitted. Darwin supported the doctrine by his theory of Pangenesis. Professor Weismann's theory of Germ-plasm, on the other hand, is fundamentally based upon the great distinction in respect of their transmissibility, between characters that are congenital and characters that are acquired. By congenital characters

is meant any individual peculiarity whether structural or mental with which the individual is born. By acquired characters is meant any peculiarity which the individual may subsequently develop, in consequence of its own individual experience.

It will be observed, these two theories constitute the logical extremes of explanatory thought; and therefore it will be necessary at this stage to state and examine to the best of our ability the pet theories of these two great masters of science.

At the outset it should be noted that they agree as to the fact of heredity and differ but little in their definitions. They are at variance chiefly in explanation of the process by which heredity works.

Darwin's theory of Heredity is the theory of Pan-genesis which will be found to embody altogether seven assumptions, but inasmuch as the fourth, fifth, sixth and seventh assumptions all follow deductively from the first, second and third, it will be necessary to state these only, viz:

1. That all the component cells of a multicellular organism throw off inconceivable minute germs "gemmules" which are then dispersed throughout the whole system.

2. That these gemmules when so dispersed, and supplied with proper nutriment, multiply by self-division, and, under suitable conditions, are capable of developing into physiological cells like those from which they were originally and severally derived.

3. That, while still in this gemmular condition, these cell-seeds have for one another a mutual affinity, which leads to their being collected from all parts of the system by the reproductive glands of the organism; and that, when so collected, they go to constitute the essential material of the sexual element—ova and spermatozoa being thus aggregated packets of gemmules, which have emanated from all the cells of all the tissues of the organism.

In a word it supposes that all parts of the organism generate anew in every individual the formative material which, when collected together in the germ-cells, constitutes the potentiality of a new organism; and that this new organism when developed, resembles its parents simply because all the formative material in each of the parents has been thus generated by, and collected from, all parts of their respective bodies; and hence any change arising in the organism at any time during its life is represented in the reproductive cells. Thus e.g. it is said that there is growing up in our time a race of near-sighted men and women. The habit of seeing objects at short range in course of time made many men near sighted; they handed down the peculiarity to their children who increased it and in time transmitted it; and so congenital near-sightedness became common. In the same

same way the presence of disease in many families is accounted for, and also the possession of exceptional gifts of body and mind. In the opinion of these masters of biological science heredity preserves and transmits the physical, mental, and moral accumulations of the past as surely as, and manifestly as, a parent passes on to his children the fortune which he has acquired.

Weismann's theory of heredity, on the other hand, is the theory of the Continuity of Germ-plasm. Briefly stated it is as follows. The whole organization of any multicellular organism is composed of two entirely different kinds of cells, viz: the germ-cells, or those which ~~go to constitute~~ ^{have} to do with reproduction, and the somatic cells, or those which go to constitute all the other parts of the organism. Now, the somatic-cells in their aggregations as tissues, and organs, may be modified in numberless ways by the direct action of the environment, as well as by special habits formed during the individual lifetime of the organism. But although modifications thus induced may be, and generally are adaptive - such as the increased muscularity caused by the use of muscles, and so on - in no case can these so-called acquired, or "somatogenetic" characters exercise any influence upon the germ-cells, such that they should appear in the next generation as congenital, or plastogenetic characters.

Turning now to the germ cells, these are the receptacles of what Weismann call the germ-plasm; and this it is that he supposes to differ in kind from all the other constituent elements of the organism. For the germ-plasm he believes to have had its origin in the unicellular organisms, and to have been handed down from them in one continuous stream through all successive generations of multicellular organisms. Thus, for example, suppose that we take a certain quantum of germ-plasm as this occurs in any individual organism of to-day.

A minute portion of this germ-plasm, when mixed with a similarly minute portion from another individual goes to form a new individual. But, in doing so, only a portion of this minute portion is consumed; the residue is stored up in the germinal cells of the new individual, in order to secure that continuity of the germ plasm which Weismann assumes as the necessary basis of his whole theory. Thus according to Weismann "reproduction is simply an over growth of the individual". He denies that acquired characters are transmitted however, and insisted that variability is the result of organic changes in the reproductive cells, which changes are the result chiefly of fortuitous combinations of certain elements in the germ cells. Seeing that it is only congenital variations which can be inherited, all variations subsequently acquired by the intercourse of individuals with their environment, however beneficial such variations may be to these individuals, are ruled out as regards the species. He concedes

however

however, that during formative periods of the individual, environment may affect the germ-cells directly. Thus the fact that short-sightedness is increasing he also would doubtless account for by heredity, but, instead of saying that short-sightedness became heredity when first acquired, he would ascribe it to the changed conditions in which men live, and to the effect of these on the reproductive cells, which effect, rather than the habit of the individual, became hereditary. The phrase "direct influence upon the germ-cells is the one that distinguishes Weismann's theory of the possible action of one generation on posterity. He says "I hold that all instinct is entirely due to the operation of natural selection and has its foundation not upon inherited experiences but upon the variations of the germ".

In considering these two rival theories it is to be observed that both Darwin and Spencer had recognized the law that congenital

characters were more likely to be inherited than characters that were acquired during the life of the individual. The difference was held to be one of degree; not of kind.

Darwin and Spencer would say that if the same acquired characters continued to be successively acquired in a number of sequent generations, what was at first only a slight tendency to be inherited would become by summation a more and more pronounced tendency, till eventually the acquired characters might become as strongly inherited as a congenital one. Or more precisely it was supposed that an acquired character in virtue of such a summation of hereditary influence would in time become congenital. Now if this supposition be true it is evident that more or less assistance must be lent to natural selection in its work of evolving adaptive modifications. I may say that to my mind if, functionally-produced adaptations and adaptations produced by the direction of the environment are never transmitted in any degree there would seem to be an incalculable waste, so to speak, of adaptive modifications - modifications laboriously and often delicately built up during the life-time of individuals, only to be thrown down again as regards the interest of the species - and so large an additional burden thrown upon the shoulders of natural selection that it becomes difficult to conceive how even this gigantic principle could sustain it. And, be it remembered, that Darwin held that these causes are necessary as supplements to natural ~~xxxx~~ selection, and Professor Weismann has not yet proved that they are unnecessary. Of course, if it could be proved that the theory of natural selection alone is competent to explain all these phenomena, that of itself would be a presumption in favor of Weismann's position; but until such time as this is done it would seem that appearances at least are in favor of the position of Darwin.

In the second place, in reply to the challenge of Weismann and his followers to furnish experimental proof of the inheritance of injuries or mutilations, I may say that it is no part of Darwin's theory of Pangenesis to prove that injuries or mutilations are transmitted. Darwin's answer to the obvious difficulty touching the non-transmissibility of mutilations is to quote his own words "the long continued inheritance of a part which has been removed during many generations is no real anomaly, for gemmules formerly derived from that part are multiplied and transmitted from generation to generation". Therefore it is no more a part of Darwin's theory than it is of Weismann's to maintain that injuries are transmitted. But, although

Darwin did not believe in the transmissibility of mutilations when these consist merely in the amputation of parts of an organism, he did believe in a probable tendency to transmission when removal of the part is followed by gangrene. For, as he says, in that case all the gemmules of the mutilated or amputated part as they are gradually attracted to that part (in accordance with the law of affinity which the theory assumes) will be successively destroyed by the morbid process; as for example in the case of Guinea-pigs being born with the absence of two toes out of three, of the hind leg, and sometimes of the three, from parents that had eaten up their hind-leg toes which had become anaesthetic from a section of the sciatic nerve. And many other experiments conducted by Mr. Brown-Sequard in the same direction leading to important modifications in various parts. To the same effect is the statement of Mr. Leonard Hill. Two Guinea-pigs were born recently, both of which exhibited a well marked ~~groop~~ ~~of~~ droop of the left upper eye-lid. These Guinea-pigs were the offspring of a male and a female Guinea-pig in both of which I had produced some months earlier a droop of the left upper eyelid by division of the left cervical sympathetic nerve. If we turn from experiments on animals to plants, we find that the same is true. But it is not necessary to multiply instances.

Evidence in favor of non-inheritance of acquired characters.

That there is a great difference between congenital and acquired characters in respect of ~~hereditary~~ heritability is a matter of undeniable fact. But there is a great difference between the certainty of this fact and that of the theory based upon it. The theory as formulated by Weismann is that the distinction is not only great but absolute; or in other words that in no case can any acquired character be ever inherited. All schools of Evolutionists are, and have long been, agreed in regarding the continuity principle as true

in the main. No evolutionist would at any time have propounded the view that one generation depends for all its characters on those acquired by its immediate ancestors, for this would merely be to unsay the theory of Evolution itself, as well as to deny the patent facts of heredity as shown for example, in atavism. The only experimental evidence put forth by Professor Weismann in support of this position is the following:

1. The seeming absence of any experimental demonstration of the inheritance of acquired characters. This evidence presents much less cogency than is usually supposed. And it has been shown that the amount of experimental evidence in favor of the transmission of acquired characters is more considerable than the school of Weismann seem to be aware - especially in the vegetable kingdom.

2. Weismann's own experiment in cutting off the tail of mice through successive generations. But Darwin had previously carefully considered the case of mutilations and explained that their non-transmissibility constitutes no valid objection to his theory of pan-genesis. Furthermore, it may now be added he expressly alluded in this connection to the cutting off of tails as practised by horse-breeders and dog fanciers, through a number of generations without any inherited effect.

While there is much to be said in favor of Weismann's position and though many scientists agree with him the amount of evidence is altogether too small to support the theory constructed upon it; but doubtless the last word on this subject is not yet spoken and the question may remain an open one until such evidence is discovered as will forever put it beyond dispute. I have gone somewhat particularly into this difference of theory because of its important bearing on the science of sociology.

If Spencer is right and acquired characteristics are transmissible, then it is the duty and privilege of the Christian man to work for the creation of such conditions as will put in the place of the tendency toward evil which now exists better traits of character; that, these being transmitted, may result in nobler types of manhood. If Weismann is correct, and the peculiarities of individuals are due to their environment, then the problem is simpler still and all that anyone can do or need do, is to seek to make possible a full and true expression of the normal human life.

PHYSICAL HEREDITY.

According to the law of uniformity, children resemble their parents and this resemblance may manifest itself in the limbs, the trunk, the head, even in the nails and the hair; but especially in the countenance, expression, or characteristic features.

Stature is in many cases hereditary. It is said that the descendants of the guards of Frederick William of Prussia are the most superb specimens of physical manhood in Europe.

Haller states that for three generations his own family, without exception, had been distinguished for great stature.

The facts connected with bodily development are well known to all breeders of cattle or animals; so strictly is each part of the conformation under the law of heritage, that at will the breeder can modify a race, by lengthening or shortening the limbs by increasing or diminishing the fat or the muscle or by accumulating these in particular localities; and all these with almost certainty of calculation. In this manner is the length of the stride of the English racer attained, the colossal strength of the dray-horse, and the development of fat in the beasts intended for the show or market.

With reference to color it is generally a mixture of that of the parents if they be of different races, but if the parents be of the same race the color of the children generally follows one or other parent exclusively; thus the child of a white man and an negro woman is a mulatto in the great majority of cases; but the child of a dark and light parent of the same variety is usually like one or other and not a mixture.

All writers treating of physical heritage mention gait, gesture, and attitude as subjects therein involved: often entire families are left handed even those members who have been withdrawn from it in infancy. Every modification of the senses is liable to ~~re~~production, blindness, long or short sight, quick or slow hearing, absence or acuteness of smell, etc., etc.; particular tendencies also in the indulgence of the taste and special idiosyncrasies are family heritages. Among the curiosities of this subject are the examples of anomalies and monstrosities. Sixd^{ig}itism is not a very uncommon occurrence and usually is observed for two or three generations. The case of Edward Lambert is often cited. His whole body with the exception of the face, the palms of the hands and the soles of the feet, was covered with a sort of carapace of horny excrescences which rattled against each other. He was the father of six children all of whom from the age of six weeks presented the same singularity which was kept up through five generations. Ribot gives a curious instance showing that sometimes one of the parents transmits the entire physical, the other the entire spiritual nature. He says "the most curious incontestable instance of this is the case of Lislet-Geoffrey, Engineer in Mauritius. He was the son of a white man and a very stupid negress. In physical constitution he was as much a negro as his mother; he had the features, the complexion, the woolly hair, and the peculiar odor of his race..... He was so thoroughly a white as regards intellectual development that he succeeded in vanquishing the prejudices of blood so strong in the Colonies and in being admitted into

into the most aristocratic ~~fx~~ houses. At the time of his death he was ^aCorresponding Member of the Academy of Science. The resemblance of internal organization is fully as striking as that of external form between parents and children, though of course not so plainly recognizable. It is scarcely necessary to remark that feebleness and force of constitution are as might be expected generally hereditary. Some families for generations are distinguished by fecundity; such were the Montmorencies, the Condes, the Guises.

Longevity runs in families. In some the line of three score and ten is almost always reached, while others seldom have aged members. The ^{family}Turgot is mentioned as one in which the fifty-ninth year was rarely passed.

Diseases run in families. Nearly all the diseases to which the horse for example is liable are hereditary; even the consequences of hard work will descend to the progeny. We have had proof upon proof that blindness, roaring, thick wind, broken wind, curbs, spavin, ringbone and founder have been bequeathed both by sire and dam of the offspring. And in the human family we need only mention a few, such for example as consumption, rheumatism and insanity. A consumptive is believed to entail on his offspring a tendency to consumption. I have in my congregation here, a number of families in which consumption is beyond doubt hereditary. Here is one instance. The father died of consumption leaving five children, three of whom have since died with the same disease as their father, and the remaining two show traces of it in their system and are living in dread of it every day of their lives. In another case the mother was consumptive and had twelve children, three of whom died in infancy. Within the last three years the mother and one son and one daughter all died of the same disease, and at least three others are similarly affected. There is however scarcely any portion of our subject which bears so grave an interest as the heritage of mental affections - the inheritance of unsound mind. Insanity has universally been recognized as an hereditary disease. M. Esquirol says that one half of the cases among the higher ~~classes~~ ^{classes}, and about one-third amongst the lower have been inherited from parents or ancestors.

What is true of consumption and insanity is true of all nervous diseases, of gout, dyspepsia, skin disease and so on through the list.

This is the place to consider the heredity of the tendency towards intemperance. No one believes that intemperance itself is transmissible; but that the physical condition that makes intemperance easy, and, if circumstances favor, almost inevitable, is transmitted is clearly taught by all students of this subject that I know. Elam quotes the following from the Psychological Journal "The most startling problem connected with intemperance is that not only does it affect the

the health, morals, and intelligence of the offspring of its votaries, but that they also inherit the fatal tendency and feel a craving for the very beverages which have acted as poisons on their system from the commencement of their being. "

Morel, one of the ablest investigators of this subject says "I have never seen the patient cured of his ~~propensity~~ propensity whose tendencies to drink were derived from the hereditary predisposition given to him by his parents."

Dr. Hutchinson says "I have seen only one case completely cured, and that after a seclusion of two years duration. In general, it is not cured; and no sooner is the patient liberated than he manifests all the symptoms of the disease..... Such individuals are sane only when confined in an Asylum."

We have now come to one of the most terrible features of this terrible habit. The vice of one generation when inherited does not appear in the second generation merely as a ~~xxx~~ habit, but in most cases as a disease. This disease known as oinomania is easily distinguished from ordinary intemperate habits. It is described as "an impulsive desire for stimulating drinks, uncontrollable by any motives that can be addressed to the understanding, or conscience, in which self-interest, self-esteem, friendship, love, religion, are appealed to in vain; in which the passion for drink is the master-passion and subdues to itself every other desire and faculty of the soul".

Dr. Elam says again "Theoretically considered, this impulsive tendency may probably be not absolutely irresistible, but practically it is almost, if not altogether so" . And again, "An acquired and habitual vice will rarely fail to leave its trace upon one or more of the offspring either in its original form, or one closely allied. The voluntarily adopted and cherished vice of the father or mother becomes the overpowering impulse of the son or daughter; the organic tendency is excited to the uttermost, and the power of the will and of conscience is proportionally weakened. And it is by a natural law and not by any arbitrary or unjust interpolation of Divine vengeance, that sins of the parents are visited upon their children - that the fathers eat sour grapes and the children's teeth are set on edge".

INTELLECTUAL AND MORAL HEREDITY.

It has been affirmed that heredity operates in the sphere of matter but not in the sphere of mind . This affirmation rests upon a superficial study of facts. The investigations of biologists have been devoted to physiological rather than ~~psychical~~ psychological phenomena; but another class of investigators **THE UNIVERSITY OF MANITOBA LIBRARY** studied the action of the law in the region of ~~domestic~~ animals the phenomena appears to be clear and ~~undoubtedly~~ in their testimony. Dogs descended from parents that had been trained to certain pursuits assume the same habit either without education or with very

very much less than those whose parents had been neglected, e.g. the sheep-dog. We have here in P.E.I. a breed of horses known as Island Chief, that are noted for their intelligence and tractability. They instinctively take to the harness and are willing to be guided by the lines from the first. But we have another breed viz, the Hernando that are the very opposite. They are proverbially hard to break.

Ribot says "This (heredity) holds good also of psychical qualities; a given animal possesses not only the general instincts of the species, but also the peculiar instincts of the race. The negro inherits not only the psychological faculties which are common to all men, but also a certain peculiar form of mental constitution, viz, an excess of sensibility and imagination, sensual tendencies etc.

Dr. Moore says "Our education may be said to begin with our forefathers. The child of the morally instructed is most capable of instruction, and intellectual excellence is generally the result of ages of mental cultivation."

If mind is the product of matter and heredity is a physiological law, then of course it concerns the whole man. But if the spiritual nature is independent, if it dwells in the body like a man in his house then there are distinct phenomena^{to} which the appeal can be made. If there is a mutual relation between the body and the mind, if each modifies the other, and heredity is a law of the material organism, then it must also be a law which so intimately concerns the mind's action as to make its observation essential to any scheme of spiritual philosophy. If heredity can be proved to be a law, determining in any degree, physical characteristics, it can, with equal certainty be proved to be a law affecting the nature of the mental organism.

The investigations of Galton are almost entirely in the sphere of mind, and he has certainly shown that mental and moral characteristics are hereditary; that a child resembles its parents quite as closely in mind as in body. The Bach family is perhaps the most distinguished instance of mental heredity on record. It began in 1550 and lasted through eight generations to the year 1800. In this family are mentioned twenty-nine eminent musicians. As further evidence of mental heredity note the families Beethoven, Mendelssohn, Mozart, among musicians; among scientists the families of Aristotle, Bacon, Bentham, Darwin; among men of letters the family of Addison, Thomas Arnold, Hallam, Macaulay, Seneca and Madame de Stael. These illustrations are sufficient to prove mental heredity.

The moral nature is subject to hereditary law. Children inherit the evil tendencies of their parents and not infrequently the mark of those tendencies is written in evident characters on their organization. All the passions, jealousy, libertinage, drunkenness; all are liable to be transmitted to the offspring especially if both parents are alike affected; and this as has often been proved, not by force of example or education merely, but by direct constitutional

There are many examples to prove that a disposition, a habit of the will, a condition of temperament ~~and~~^{may} be transmitted and may become a force so strong as to be irresistible. Lecky says "There are men whose whole lives are spent in willing one thing and desiring the opposite."

If any law is well established it is the law of heredity as manifested in the transmission of qualities and tendencies that lead to vice, pauperism and crime. A large proportion of the dangerous classes have received from a vicious ancestry, qualities and tendencies which, with their environment they are almost powerless to resist. The virtues and vices of those who have lived in other ages reach into our time and affect us. Disease, habit, moral and intellectual tendencies and qualities, vices and virtues, are all in the stream of heritage which comes from the past. There are exceptions no doubt to this law but the great fact remains beyond challenge, that the past is at work in the present its power reaching down through the ages to all the race, modifying every human life, touching and influencing every individual's thought and will, and more than any other force coloring history.

N HEREDITY AND MORAL RESPONSIBILITY.

Now this doctrine of heredity is, to use a popular phrase, very much in the air. The novelist, the dramatist, the journalist, the educationalist, the moralist, the theologian, and the social reformer have all made it their own, and are all of them ready with this ~~or~~ that application of it to some aspect of our daily life. With many of these applications we need not now concern ourselves; but on the other hand it is impossible to ignore the fact that the doctrine of heredity, as it is held and taught by some to-day, practically robs life of all moral significance. It is not merely that it conflicts with this or that conclusion of morality; but it cuts away the ~~ground~~ ground of all morality and makes the word itself to be meaningless; it is not merely that it takes away this or that doctrine of Scripture; but it makes null and void the truths which the Scripture as it were, assume as the base and groundwork of all. Perhaps that is specially true in regard to a certain type of modern fiction. Life, by writers of the class to which I am referring is literally demoralized. To acquiesce in such teaching, even as a criticism or as an interpretation of life is like consenting to be choked, and there is no man with a spark of humanity left in him but would struggle against it with his last breath. I may say almost without a moment's consideration that it is around the idea of moral responsibility that all the grand problems which emerge from this doctrine of heredity naturally spread themselves and it is to a very brief consideration of these problems that I want just now to turn. Taking for granted the facts of heredity as set forth in this thesis how do these facts affect our ideas of moral responsibility?

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The answer may be put in three-fold form; heredity may increase, heredity may diminish, heredity can never destroy man's responsibility.

Heredity may increase man's responsibility, for if it be true that we inherit evil from the past it is not less true that we inherit good; and if he is to be pitied and dealt tenderly with, who through no fault of his own enters upon a greivous heritage of woe is not he to be visited with stern condemnation who, reaping a rich harvest which other hands have sown, squanders his inheritance in riotous living? We boast sometimes that we are "the heirs of all the ages" and as is the measure of the good of life which has thus unmerited come to us, so also is our responsibility for here as every where else responsibility is but the other side of privilege. So then, heredity may increase man's responsibility. But it may also diminish it, for there are certain hereditary vices like drunkenness for example which are not only vices but diseases; and just in so far as they are diseases as well as vices so far do they call for our pity rather than for our condemnation - a fact perhaps that has not always had due weight given to it by some of our sterner moralists. If to ~~me~~ heredity means a blessing while to another it means a burden, God will not forget though man may. Each one of us shall give an account of himself before God. And if it be true as we sometimes say of our unhappy fellow creatures that they never had a chance in life then it is of their life without its chance, if so be, that they will one day give an account before God. Let us be sure of this, the Judge of all the earth will do right, when we cannot even see what is right.

Heredity may increase, heredity may diminish, heredity can never destroy man's responsibility, and it is just here that we join issue with so much that is being said and so much more that is being implied at the present day. This idea of heredity has so completely fascinated the minds of some that to them man is nothing more than a bundle of transmitted tendencies, the resultant of antecedent forces, a projectile shot forth from the past, whose path he could calculate with mathematical accuracy did he but know the precise character and amount of the hereditary forces that are at work in him. The unquestioned facts of heredity are emphasised to the exclusion of all other facts as though in this and this alone were the key to the whole mystery of the life of man. They tell us plainly whether we are wise or foolish, whether we are good or evil, depends upon a combination of circumstances over which we have no control. Crime, said Mr Edward Bellamy - one of whose books was in the hands of hundreds of thousands of people years ago - is a case of atavism." That is to say a man is not more responsible for that which we call his sin or his crime than he is responsible for the color of his hair or the shape of his nose. This is precisely the conclusion of materialism.

"There is a destiny" says Dr. Maudsley made for all men by his ancestors and none can elude the tyranny of his organization! There is no freedom if man is simply the product of his ancestry and his environment. If sin is to be thought of as the recurrence of ^{an} ancestral trait of misfortune like an unhappy trick of speech or ^{an} inward disease, there is an end forever, at once, of all religion and of all morality.

It is important to remember that though the physical conditions of heredity have been more minutely studied in modern times, the moral perplexities of it were keenly felt long ago and are expressly noted in scripture. The exiles in Babylonia, conscious that the calamities that had crushed their nation were due in large measure to sins in which they themselves had not been direct sharers, allowed themselves to settle down into a dull despairing fatalism that finds expression for itself in the cynical sceptical proverb; "the fathers have eaten sour grapes and the children's teeth are set on edge", as though they had said, our father's sins have fixed our destiny; of what use is it to strive against the inexorable fate that binds us? They put the same sinister interpretation on the apparent facts as many of our pessimistic writers do. Man's antecedents they said, constitute his fate; he has no hope; freedom is an illusion; God is unjust.

It is important to mark the prophet's answer for after all, these years I am not sure the philosophers and theologians not to say novelists and poets have got beyond the insight of the prophet Ezekiel. The prophet's words it will be remembered were not meant as ^{the} complete philosophy of responsibility, but they were meant to stay the mouths of men who pleaded the sins of the fathers as an excuse for their own wrong doing. And as such they were valid not only for Ezekiel's day but for our day. The prophet meets the complaint of the people with two words from the mouth of God "Behold all souls are ~~Mine~~" that is to say every individual soul is related to God. We are related to the past; that is the fact upon which those to whom Ezekiel spoke laid the emphasis, but we are also related to God. We derive from the past but that which we derive from the past is not the whole of us - We derive also from God. "As the soul of the Father is Mine, so also the soul of the son is Mine." Weighted as we may be with sins which are not our own we have each of us a moral life that is our own, received direct from God.

The second word of the prophet follows from it as a natural corollary, "all souls are Mine; therefore the soul that sinneth it - and no other - shall die. That is the charter of the individual soul. What does it mean? That it is never our past that condemns us, that a man's past can be a man's ruin only in so far as he allies himself with it and makes it his own. We are related to the past; therefore the facts of heredity cannot be denied and must not be overlooked; but that which we derive from the past is not the whole of us. We are also related to God and through that relationship the strength

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of the grace of God can come to us. ~~We xxx xxxx kxx~~ And it is that two-fold fact concerning every man that makes a man a responsible being. I have dwelt at length upon these words of the prophet because I believe that we have here not only a direct confutation of materialism but also the germ of much that in our day is being accepted as the best answer to many of the vexed questions concerning freedom and personality.

It is only when we turn away from these facts which, when the approach is made from the side of physical science seem the nearest and most imperative, that we realize that there is another realm whose phenomena are somewhat less distinct perhaps, but no less certain and commanding - phenomena which modify conclusions that would otherwise be inevitable. Some choices are clearly independent of, and even in opposition to, both what is known of the individual hereditary bias, and what would be expected from his environment. These lead us into a new world and to the study of a new set of forces. By a distinct and evident act of choice, when all known hereditary influence would keep them where they are, men frequently repudiate their old associations and without the slightest compulsion choose a new environment. Whatever unbelievers of Christianity may assert concerning other things they would not deny that great changes are wrought in character and conduct by what is called conversion; and but little observation is needed to show that there are facts outside the physical series as unquestionable and probably as numerous as those within it, which have a claim on the attention of all who seek a scientific explanation of the life of man. When the phenomena of conversion in thousands of instances are studied scientifically what is discovered? "Events without a physical cause; an absolute revolution in character and life due neither to any discoverable element of heredity, nor to any difference in environment. Due to what then? Either to a sovereign act of will, or to a change of spiritual environment which Christians call the presence of the Holy Ghost - probably to both". And should it be conceded that such changes are the result of ~~the~~ Spirit's work in man it would still remain true that even the Spirit of God does little without the consent of the individual. Every great moral change in man is the result of a definite choice of the individual as a pure act of will. If the Spirit of God compells any to virtue then freedom in them is a fiction as truly as if their character were due to irresistible heredity or to any other compulsion.

^ Another illustration is that of a person whose life has been spent in dissipation - both the result and the confirmation of an inherited tendency to drunkenness. His life for fifty years is that of an inebriate. Now on the ~~ground~~ that the material organization is absolute master we can expect nothing but that he will go on irretrievably to a drunkard's death. Suddenly, however, he alters his course. He does it no doubt in response to motives but motives which

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are not physical, and cannot be stated in physical terms. Of such there are two explanations and two only. One is that the power of God has manifested itself, and that, something has been done for that man by a power outside of himself acting along the line of the man's own will; and the other is that the will has asserted itself and taken the seat of authority and control in the man's life. They ~~now~~ ~~xxx~~ who deny such a thing as Divine intervention are thus forced to assert the freedom of the will, because they see one whose course has been absolutely fixed by heredity and environment, has changed that course without help. We have now reached this point, the evidence which indicates that freedom is a fiction is balanced by facts on the other side which indicate that it is a reality. But there remains yet one witness to be examined namely Consciousness. It may seem to be abandoning the field of science to fall back in this discussion on the testimony of consciousness but, however much we try to escape from it, consciousness always asserts itself and never utters one uncertain sound concerning fundamental questions. It bears clear and positive evidence to freedom. If consciousness is a reliable witness the case is proved, even if the problem is not fully solved.

Against this citadel therefore Dr. Henry Maudsley in his book entitled "Body and Will" directs his heaviest ordnance. But it does not appear to me that he proves his assertions. Scarcely any deliverance of consciousness is more uniform and universal - semper, ubique, ab omnibus - than that of freedom. That man is free, that man can choose, that man is responsible for his choice, all life, aye, even our very language, is built upon that idea. Our penal establishments, the whole framework of society, rests upon the supposition of man's responsibility; and if from facts like these, which so to speak, voice the universal consciousness, a man turns to question the voice within, the answer is even more final, absolute, irresistible. I know I am free. I know I can choose. I know I am responsible for my choice. "Our wills are ours we know not how". We cannot sound the mysteries of our frame, but "our wills are ours to make them Thine". Consciousness in spite of all voices that attempt to smother it utters its unceasing assertion of freedom. "The fact of freedom" says Ribot leads to the fact of personality, and the individual personality leads at last to the source of all personality. The most that we can say is that we know that we are free, but our freedom is modified by heredity and environment, and by the fountain of all personality from which we have sprung, but which we know little

"So nigh is grandeur to our dust,
 So near is God to man,
 When duty whispers low, 'Thou must',
 The youth replies 'I can'".