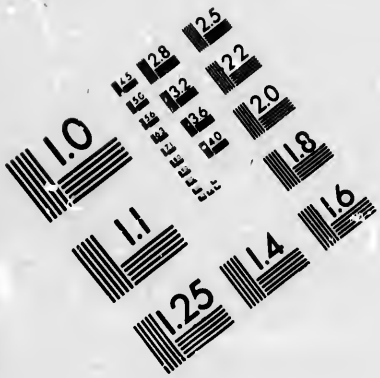

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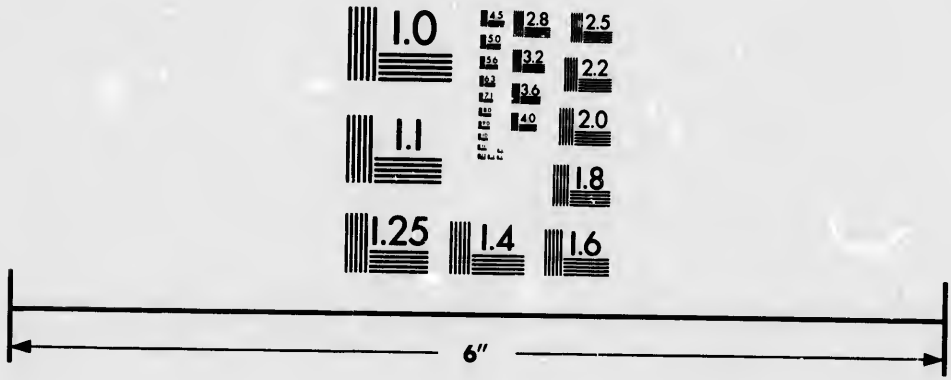

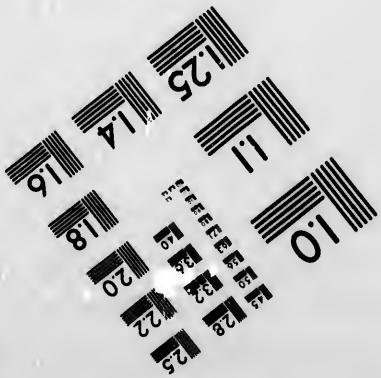

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(716) 872-4503

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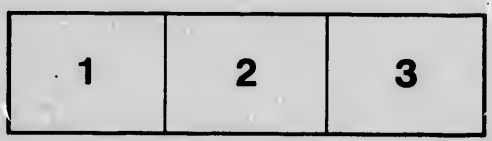

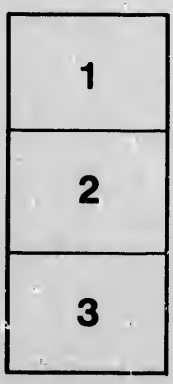

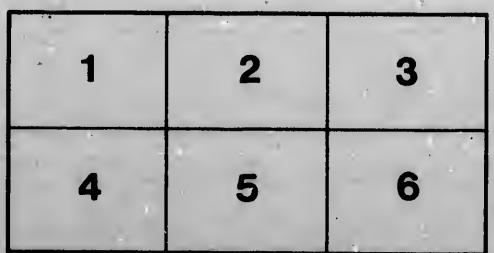

Heredity and Environm

BEGINNING WITH

The Primordia

BY D. V. BEACOCK,

Brockville, Ontario.

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Heredity and Environment, Beginning With the Primordial Cell.

IT has been said, "The child is father to the man," and that if we would comprehend a character, we must trace his birth, his surroundings, the method of his growth, the forces that have shaped him and made him what he is.

The past is fixed; the future lies before us like the block of rough marble before the sculptor. It can be shaped into beautiful designs according to his tastes and fancies, or left untouched with all its beauty and usefulness undeveloped.

The famous inscription of the Oracle of Delphi said, "Man, know thyself." And to do this thoroughly, we have not only to know ourselves but our ancestors as well, and the best way to do this is to begin at the very commencement of life, the primordial cell or germ. We shall then be able to get at the root of health and disease—heredity and environment—the latter two factors having a great deal to do with man's proper development, happiness and misery.

In order that we may properly comprehend the great importance of heredity, it will be necessary to review some of the elementary principles of organic and inorganic nature.

The verdict of modern thought is almost unanimous in asserting that there was a time when the material universe was in a chaotic state—that it was without form; in other words, in a nebulous condition, when the plastic material had been created but the magical touch of the Supreme Intelligence had not yet moulded the chaos into wondrous designs that now furnish food for the souls of finite beings. Architecture was then unknown, and without architecture of what use were the materials—the soft clay or the perfect marble? Beauty and utility were yet latent. But ere long the designs and specifications of the Supreme Architect were revealed, and the product of two mighty forces—vital and physical—by the union of mind and matter, produced a living cell. The Great Architect had united the material with the immaterial, the visible with the invisible, and out of the chaos of a dead universe there evolved the greatest mystery of creation—life.

Now, let us take a retrogressive step and look back into the synthesis of living beings. No analytical or synthetical chemistry can give us the origin of life or tell us what it is. The principle that gives the inert mass the power of life is the secret of the Creator, and will never be comprehended by the finite mind of man. What life is, no one knows. It is said to be the result of the activity of the cells. Now, a cell is the lowest form of life, both animal and vegetable, and from these single cells all life is produced.

Let us examine a simple living cell. If we study it carefully we shall find that it is composed of an unresponsive, powerless mass of protoplasm and a vital force. By the union of these two factors it becomes an independent organism, possessing well-marked functions. This is the first step in the wonderful evolution of life.

Protoplasm (from *protos*, first, and *plasma*, mould, or what has been formed) was first so called by Hugo von Mohl as recently as 1846; and the simplest form of life which first emerges from the inorganic to the organic world consists of protoplasm, or, as Huxley calls it, the physical basis of life. It is a colorless semi-fluid or jelly-like substance, which consists of albuminoid matter. It exists in every living cell, both animal and vegetable. It is just as certain that all individual life, from the most elementary protoplasm up to the highest organism, man, originates in a minute or embryo cell, as it is that oxygen and hydrogen combined in certain proportions make water. Our most delicate means of research throw no light on the purely vital endowments of protoplasm, which not only direct and control its activities, but are transmitted in well-defined characters from parent to offspring. One thing we do know, that there is no life without pre-existing life from which it is derived, and the physical basis through which it acts or is made manifest furnishes no satisfactory explanation as to its real essence and constitution.

It is impossible to procure pure protoplasm for chemical analysis, as it contains many extraneous substances; and even if this could be done, a chemical analysis of living protoplasm cannot be made. And it is a well-known fact that there is evidence to show that there is considerable difference in the chemical properties of living and dead protoplasm. For instance, carmine and other coloring matters do not color living protoplasm, while on the other hand they give a brilliant stain to dead protoplasm.

To illustrate: Analytical chemistry is the pulling down of substances; synthetical chemistry is the building up of a more or less complicated product from its elementary constituents. For instance, if we heat a little sugar to redness in a test tube it leaves a black deposit, which is carbon, while a liquid, which is water, distils over; and on electrolyzing this fluid we resolve it into hydrogen and oxygen, so that we can thus show that sugar is composed of carbon, hydrogen and oxygen. This pulling down or taking to pieces of sugar (analysis) is an easy matter, but the putting these same elements or pieces together again (the synthesis of sugar) is a

very different matter and much more difficult. You may put together carbon, hydrogen and oxygen in due proportions, and shake them all together, or heat them or cool them, and yet you will never get them to combine again so as to make sugar.

The analysis of dead protoplasm, animal or vegetable, is an easy matter, and consists of carbonic acid, water and ammonia. But no chemist has ever succeeded by synthesis, and probably never will succeed in putting these three simple ingredients together again, and thus making protoplasm. Chemical investigation can tell us little or nothing, directly, of the composition of living matter, inasmuch as all such matter must needs die in the analysis. Out of these three simple forms of matter, carbonic acid, water and ammonia, the vegetable world builds up all the protoplasm which keeps the animal world agoing. Withdraw any of these simple elements from the world, and all vital phenomena comes to an end. They are related to the protoplasm of plant life as the protoplasm of the plant is to that of the animal. It will thus be seen that plants are the accumulators of the power which animals distribute and disperse. We must bear in mind that no animal can make protoplasm, but must take it ready-made from some other animal or plant, the animal's highest feat of constructive chemistry being to convert dead protoplasm into that living matter of life which is appropriate to itself. Therefore, in seeking for the origin of protoplasm we have to turn to the vegetable world. The animal can only raise the complex substance of dead protoplasm to the higher power, as one may say of living protoplasm, while the plant can raise the less complex substance, carbonic acid, water and ammonia, to the same stage of *living* protoplasm. The fluid containing carbonic acid, water and ammonia, which offers such a Barmecide feast to the animal, is simply a table richly spread to the multitudes of plants, and, with a due supply of only such materials, many a plant will not only maintain itself in vigor, but grow and multiply until it has increased a million-fold the quantity of protoplasm which it originally possessed, in this way building up the matter of life, to an indefinite extent, from the *common matter* of the universe.

No matter under what guise it takes refuge, whether fungus or oak, worm or man, living protoplasm not only ultimately dies and is resolved into its mineral and lifeless constituents, but it is always dying, and strange as the paradox may sound, could not live *unless* it died.

Notwithstanding all the fundamental resemblances which exist between the powers of protoplasm in plants and animals, they present a striking difference, in the fact that plants can manufacture fresh protoplasm out of minerals and mineral compounds, whereas animals are obliged to procure it ready-made, and hence, in the long-run, depend upon plants for their supply. At the present time we may look upon protoplasm as the basis of physical life in the same sense that some form of it is the essential and active constituent of every living cell or tissue, whether vegetable

or animal, and that it is only formed through the physiological activities of living organisms. In the absence of life, protoplasm cannot be formed, and, so far as we can perceive, there are no manifestations of life without it.

Living substance or protoplasm must be looked upon as constantly undergoing changes that vary with the functions required of it. These changes, without attempting to distinguish between them, as chemical, physical, or more strictly speaking, biological, are most conveniently expressed by the general term metabolism which is both constructive and destructive.

Dr. M. Foster says : "We may picture to ourselves this total change, which we designate by the term metabolism, as consisting, on the one hand, of a downward series of changes (katabolic changes), a stair of many steps, in which more complex bodies are broken down into simpler and simpler waste bodies, and on the other hand, of an upward series of changes (anabolic changes), as also a stair of many steps, by which the dead food, of varying simplicity and complexity, is, with the further assumption of energy, built up into more and more complex bodies. The summit of this stair we call protoplasm."

All work implies waste, and the work of life results, directly or indirectly, in the waste of protoplasm. Every word uttered by a speaker costs him some physical loss, and, in the strictest sense, he burns that his hearers may have light—so much of his body resolved into carbonic acid and urea.* It is one of the fundamental doctrines of physiology that every part of our organism has its own definite term of vitality, and that there is a continuous succession of the destruction of old cells and the formation of new ones in all tissues, and especially in those in which the most active vital changes are going on, as, for example, in the nervous and muscular tissues. Even the most solid portions of the animal frame, such as the bones, and, to a less extent, the teeth, are undergoing a perpetual, although slower change of this nature, and throughout the body there is a continuous removal of effete or worn-out tissues, and a corresponding deposition of new matter. Every blow we strike, every thought we think, is accompanied by the death and disintegration of a certain amount of muscular or nervous tissue as its necessary condition, and thus every action of our corporeal life, from its beginning to its close, takes place at the expense of the vitality of a certain amount of organized structure. This we term molecular† death. It must be clear to every intelli-

* It is said that urea circulates in the blood, and is excreted by the kidneys, and the more mental work the more urea is produced. A fretfulness that produces activity, but no actual results, causes a loss of just so many grains of urea. Therefore, for every footpound of thought you will have a given amount of urea excreted.

† Speaking of molecules, scientists state that a cubic inch of oxygen, at ordinary temperature and pressure, contains so many molecules, that a number equal to the population of our globe might escape every second, and it would take over six thousand years to empty this small space. Or if a single drop of water could be magnified to the size of the earth, the molecules would be the size of billiard balls.

gent mind that this process could not go on forever without the capacity of being repaired.

We therefore have recourse to food to supply the waste. Broadly speaking, the animal body is a machine well adapted for converting potential energy into actual energy. The potential energy is supplied by the food we eat; this the metabolism of the body converts into kinetic or actual energy of heat and mechanical labor. So we may say that our bodies are delicately constructed heat engines.

Energy, like matter, is indestructible and of two kinds—kinetic, or actual, and potential, or positive energy. Our whole life consists but in the transformation of these two different kinds of energy. We procure food which we eat, the greater part of which, under chemical action of various juices of the digestive organs, is absorbed into our system, which thereby enables us to perform a certain amount of work, mental or physical; in other words, to transform a certain amount of potential into kinetic or actual energy. *For a certain amount of work* to be done (without waste or injury to the system), a certain amount of food must be absorbed, that is, digested. If the absorption be in excess of the expenditure, then nature stores this energy up in the form of fat; if the expenditure be in excess of absorption, then nature works upon our bodies and we grow thin. If the absorption equal the expenditure, then we are in a state of what the doctors term physiological equilibrium, in perfect good health.

Energy is expended in building organic substances, or, in other words, in converting food stuffs of any kind into protoplasm, the summit of the double stair of life, and its potential energy is the transformed or stored energy of the above mentioned constructive process.

Man, like all animals, is born of an egg, or ovum, which was the first germ of our existence, and is a small cell about one-hundredth of an inch in diameter, consisting of a mass of semi-fluid protoplasm enclosed in a membrane, and containing a small speck or nucleus of more *condensed* protoplasm. This nucleated cell is itself the first form into which a mass of simple jelly-like protoplasm is differentiated in the course of its evolution from its original uniform composition. This nucleated cell is the starting point of all higher life, and by splitting up and multiplying repetitions of itself in geometrical progression, provides the cell material out of which all the more complicated structures of living things are built up. At first the egg behaves exactly as any other single-celled organism, as, for instance, that of the ameba, which is considered the simplest form of all organized life. One of the simplest forms of this is nothing but a naked little lump of cell-matter, or plasma, containing a nucleus; and yet this little speck of jelly moves freely. It shoots out tongues or processes and gradually draws itself up with a sort of wave-like motion; it eats and grows, and in growing reproduces itself by contracting in the middle and splitting up into independent ameba.

Even if a drop of blood is drawn by pricking one's finger, and carefully viewed with proper precautions and under a sufficiently high microscopic power, there will be seen among the innumerable multitude of little circular discoidal bodies or corpuscles which float in it and give it its color, a comparatively small number of colorless corpuscles, of somewhat larger size and somewhat irregular shape. If this drop of blood be kept at the temperature of the body, they will be seen to exhibit a marvellous activity, changing their forms with the greatest rapidity, drawing in and thrusting out prolongations of their substance, and creeping about as if they were independent organisms. This substance which is so active is simply a mass of protoplasm, and its activity differs in detail, rather than in principle, from that of protoplasm of plant life. The simplest form of life, as it emerges from the inorganic to the organic world, consists of protoplasm. In the earliest state of the human organism, in that in which it has just become distinguishable from the egg in which it arises, it is nothing but an aggregation of corpuscles or cells, and every organ of the body was once no more than such an aggregation. Thus a nucleated mass of protoplasm turns out to be what may be termed the structural unit of the human body, and in its most perfect state it is a multiple of such units variously modified and differentiated. Let us look at this little cell, nestled in a congenial environment. It is alive, it moves, it comes in contact with small particles of inorganic matter; it shapes itself so as to surround them, and the little particles are absorbed into its organism and they become a part of the living cell. That function of the cell which enables it to absorb the latent forces of the inorganic matter unto itself, we call nutrition. If we watch it still further, we shall see that it increases in size, it grows. But this little cell we have been studying has yet a still brighter future: it has a latent force within that has thus far been unobserved. Growth is the balance of repair over waste, and when through assimilation of food into its substance, this cell reaches a certain size, the force of cohesion is overcome by the release of the energy derived from food, and the cell divides equally at the kernel or nucleus, the soft slimy protoplasm distributes itself around each nucleus as the two part company, to grow and divide again in like manner *ad infinitum*. You here see the function of perpetual existence has been added—the function of self-preservation, by making two living things out of one: the origin of parent and offspring, the beginning of reproduction.

The fundamental principles of life were embraced in these four functions: nutrition, growth, motion and reproduction. The living cell being completed, it has since been allowed to work out its own destiny. It began to unfold the mysterious possibilities that were concealed within its little structure, and the unnumbered ages have witnessed a mighty growth and development—a wonderful evolution of life.

Thus far we have learned four functions of the organic world—nutrition, growth, motion and reproduction. We find by experimentation that if we diminish the nutrition the growth diminishes and the motion lessens. If nutrition ceases, growth and motion both cease and the cell dies; the two factors that were combined to form the living cell dissolve, and the organism ceases to be. Let us consider the relation these four attributes of organic life bear to one another. Since living organisms can move, grow and reproduce only by means of nutrition, it is evident that they depend upon nutrition for their continued existence. Therefore nutrition is essential to the other three functions, for without it the others would cease to act and the organism would die.

But nutrition and growth cannot be acquired unless the organism exerts itself in selecting food, and subsequently in assimilating it. Thus we learn that without exercise, or the function of motion, the functions of nutrition and growth will cease. Exercise is, therefore, absolutely essential to nutrition and growth. Without the judicious exercise of each function of an organism the other functions will not be normal; with a little exercise of these functions it may simply continue to exist; but when they cease to act, the organism must die.

In life, as in death, decompositions are continually going on These decompositions are in kind not different, only during life the products of decomposition are removed and after death they remain in the body and thus poison the individual cells—that is, so alter them that their conditions no longer fulfil the requirements of life.

Scientific authorities everywhere are unanimous on this point: *Omnia vivum ex vivo* (all life comes from life), or, as some put it, *Omne vivum ex ovum* (all life comes from an egg), which is only another way of expressing it, as some animals are viviparous and others oviparous.

The germ, in both animal and plant life, is itself simply a detached portion of the substance of a pre-existing living body. Life, therefore, can be produced from a living ancestor only. And the individual as it develops from the egg cell epitomizes the history of the ancestral forms of its species.

Scientifically it seems impossible man can come from such an extremely minute and apparently insignificant speck as the germ constituting all there is in his beginning. We sometimes wonder at the smallness of the egg of the little humming-bird; but even such a shell full of embryonic germs of human beings would be enough to people a city. Think of it! Man, the lord of creation, yet in his beginning such a mere speck that it takes the most cultured eye to discover it and the best microscope to examine! No wonder science stands appalled and scientists sit by as pigmies. We must remember, too, that infinitesimal as is the human egg, it is *not* the germ; this is merely the mass, a comparatively crude mass. The germ within, as with other eggs, is very

much smaller. We speak of the egg as a mere speck. What name shall we use to designate the smallness of this germ? Yet, though so small, it is a complete, living, active, complex organization, a cluster of inspired molecules, wonderfully tenacious, and most mysteriously at work from the first of its impregnated life. Molecule after molecule moves toward the surface of this minute cluster, arranging themselves into three distinct tiers like trained soldiers. The potentiality that resides in this human ameba, that is, the ovum already vivified, lays the foundations of the three embryonal sheets so called, the epiblast, the hypoblast and the mesoblast, the enfoldings of which give us the entire system of primal parts. Every time that you have a reproduction of tissue it has to go through this same process: First, indiscriminate chaos; then completely digested food or peptones; then protoplasmic mass; then the embryonal corpuscles out of which all the tissues arise, as exemplified by all reproduction of structure where there is fracture of the tissues. If they are favorably situated they simply repeat the embryonal condition and series of changes, so that they are indistinguishable from the original material.

Quite as mysterious is the fact that this minute cluster of molecules called a human germ—apparently a mere atom of jelly—not only comprises the beginning of all the vessels, tissues and organs of the matured body, but it brings forth the special characteristics of the parents, holding the potentiality of father and mother wherein heredity is involved, the mental and physical peculiarities, the general bent of disposition, the special traits, tastes, preferences and idiosyncrasies, and often the particular marks, growths, and physical and mental expression. Shakespeare says: "There's a divinity that shapes our ends, rough-hew them how we will." Can anyone doubt it?

Now, since we know that with judicious exercise and normal nutrition there will be normal growth and development, and consequently a normal body, we also know that with normal growth and development and a normal body, it naturally follows that there will be a normal reproduction; for, if the ancestor is normal, the offspring, which is a part of it, must be normal. But if any function of the organism is varied from the normal, it follows that the others will vary from the normal. If there is abnormal exercise, there will be abnormal nutrition; there being abnormal exercise and nutrition, there will be abnormal growth and development, and consequently an abnormal body. With all these abnormal conditions there will be abnormal reproduction; for, if the ancestor is abnormal, the offspring, which is a part of it, must be abnormal, and we call this heredity.

There is a mysterious principle in every living organism that enables it to select from its environment such ingredients as are necessary to produce the different tissues and organs peculiar to its own nature. Thus, if we plant a rose, or a lily, or a grain of corn in the same soil, and give them the same care, each one will

select the ingredients from its environment that are essential to its growth and development, and with that subtle chemistry that is everywhere at work in the organic world, will produce its kind. This law holds good in the animal kingdom as well as among plants. If a number of animals of different species are taken in their infancy and subjected as nearly as possible to the same influences, it will be observed that each will develop into a distinct type, differing in almost every respect from the others. The observance of this law convinces us that the principle of each plant or animal, which enables it to preserve the peculiarities of its species, is an inherent principle which is part of its nature, inherited from its ancestors, and by it given to its offspring. Thus we have a universal law which enables each individual to transmit to its offspring certain essentials that are common to all the individuals of its species. Yet there are differences or peculiarities that distinguish each member of a species from all others. Now, how are we to account for these individual differences? This is the province of heredity and environment. It is a well-known fact that no two persons are identical. It is also a self-evident fact that identical causes will produce identical effects, and that unequal causes will produce unequal effects. We know, too, that the latent powers, the latent possibilities that are concealed in each embryonic life, are variable quantities. We also know for a certainty that the influences which surround these individual lives—the environment—for moulding and shaping into a fixed state the plastic, latent, inherited predispositions are never identical. Therefore, in the question with which we have to deal, we have not only two unknown quantities, but two variable unknown quantities that are never the same or alike in two individuals—heredity and environment. Now, since there are no two persons with identical predispositions, what will be the result if we expose them to equal influences? Or the reverse: If we expose a number of persons of unequal predispositions to equal influences, the result must be unequal. If the environment is an uncongenial one, the person with an inheritance most approaching normal will possess the greatest power of resistance, and consequently will be the last to yield to malignant influences. The inverse of this is also true. Suppose, for instance, that all men were born equal, how long would they remain so if exposed to unequal influences? Dr. Weisman says: "We cannot, by excessive feeding, make a giant out of a dwarf, nor convert the brain of a fool into that of a Leibnitz, or a Kant, by means of much thinking." Spencer says: "There is no political alchemy by which you can get golden conduct out of leaden instincts. The inherited differences of individuals are known as individual predispositions. These predispositions render the individual more or less susceptible to external influences.

Heredity is therefore that law of nature whereby parents transmit to their offspring certain variable powers termed predispositions, which render their offspring more or less *susceptible* to their environ-

ment. Heredity is the condition within the body, and *environment* consists of the influences that act upon it from *without.* To properly adjust these two factors is the rationale of individual development and organic evolution. To balance some *inward* evil with some purer influence acting from *without,* will enable our environment to *correct* our heredity.

Every-day experience familiarizes us with the facts which are grouped under the name of heredity. *Every one of us bears* upon him obvious marks of his parentage, perhaps of remoter relationships. More particularly, the sum of tendencies to act in a certain way, which we call character, is often to be traced through a long series of progenitors and collaterals. So we may justly say, that this character, this moral and intellectual essence of a man, does veritably pass over from one fleshly tabernacle to another, and does really transmigrate from generation to generation. In the newborn infant the character of the stock lies latent, and the ego is little more than a bundle of potentialities. But very early these become actualities. From childhood to age they manifest themselves in dulness or brightness, weakness or strength, viciousness or uprightness, and with each feature modified by confluence with another character, if by nothing else, the character passes on to its incarnation in new bodies. The Indian philosophers call this character karma.

The mysterious manner in which heredity performs its wonders is not yet known. But Sir James Paget said to his class, "We should not throw away what we do not understand." And Hippocrates, the Grecian physician and philosopher, said, "You will, as a rule, find that the form of the body and disposition of the mind correspond to the nature of the country."

The faculties of every animal depend on two causes: First, heredity, or those that have been evolved from the type and become fixed by succession through a long series of ancestors; secondly, adaptation, or those which are acquired by education, including *everything* that places the animal in harmony with its environment.

Let us now take a retrospective view of ancestral inheritances. As we do so, you will find a sympathetic chord has been touched in our nature, for a most melancholy vision is presented to us—diseased bodies, dwarfed and deformed; weak minds, so weak in fact that they cannot see truth, or if perchance they do see it, distort it till it is no longer truth; souls so black that they feast in darkness on the very dregs of perdition. What a vision to behold! And do we call these men? Men who were intended by the Great Creator of the universe to be the crowning piece of His handiwork! What a fearful manifestation of *penalties* for *broken* laws!

There are three causes that lead to all this depravity and misery, viz., an abnormal inheritance, an abnormal environment, and the improper use or abuse of our functions. If the fountain-head of the stream of life is not pure, we cannot expect the waters below

to be pure. If in the laboratory of nature we combine two parts of hydrogen and one of oxygen, we call the resulting compound water; but, in the chemistry of life, if we combine two parts of immorality, which is moral depravity, one part of insanity, which is mental depravity, and two parts of disease, which is physical depravity, who can tell us what the product will be? Do we not have this identical problem to deal with in heredity? Every day of our lives we see this sad debauchery in chemistry, and the experimentation makes the world *shudder* to look at the *fearful results.*

If in the sacred laboratory of wedlock we combine these three ingredients, immorality, insanity, disease, we must remember that the laws of nature are never false. If the resulting compound is not as we would have it, it is because the proper ingredients were not used. We must ever remember that, being in the midst of conflicting influences, it is impossible for man to remain in a state of equilibrium. In the rebellion of influences, the stronger will be victorious, and after each conflict he is either raised one step higher in the scale of life or descends one step lower. By yielding to degrading influences, man's powers are weakened, and he is rendered less able to battle with the lurking foes awaiting him. By yielding to ennobling influences his powers are strengthened, and he is led to still greater conquests.

If we would only make a wise selection of our environment, for, bear in mind, it is the circumstances of the environment from the cradle to the grave that determine our future destiny and a judicious use of our functions, we should always be found in the upward road to perfect development. But if we choose an abnormal environment and aid it by functional inactivity or functional excesses, we shall find, as we are carried downwards in the road to degeneracy, that our only blessing will be ignorance and immorality, poverty and disease. In all nature there are no evils without a remedy, if we but wisely seek it. So it is with evils of heredity. Nature furnishes poisons for the assassin; she also furnishes antidotes for the physician. As we deal with disease so should we deal with crime, as we cannot isolate either from heredity.

Children should be taught by wise mothers and fathers that ignorance of the laws of nature does not necessarily mean innocence in character; it is by *knowledge* that we gain power. A well-known gentleman has said, one who is born with such congenital incapacity that nothing can make a gentleman of him, is entitled, not to our wrath, but to our profoundest sympathy.

Those unfortunate victims who receive moral poisons from their ancestors, and those who receive bodies tainted with impurities, have no moral right whatever to entail upon helpless offspring the bitter fruits of their own ancestral sins. Such homes are the incubators for vice and moral depravity, and it is at their firesides that we find the congenital criminal.

It may appear rather a drastic measure, but there should be a gulf put between congenital criminals and the rest of mankind by

means of compulsory celibacy, by isolating them from the world at large or by physiological annihilation,* which will render posterity safe from such contamination. The pure crystal streams of life should not be allowed to be polluted by the streams that flow into them, otherwise the waters of both will become contaminated. The ideal of a perfect physical nature is perfect health; the ideal of a perfect mental nature is a normal brain; the ideal of a perfect moral nature is a perfect conscience, and the ideal of a perfect being is the blending of these three into one symmetrical whole. A sound mind in a sound body should be the desire of all, and if we have lived in accordance with the natural laws of our constitution, the termination of our lives will have a peaceful and happy ending, when, the intellect unimpaired and the other senses uninjured, the same nature which put together the several parts of the machine, takes her own created work to pieces. In many cases the weary pilgrimage of life is brought to a close with little apparent derangement of mental powers; the final scene may be short and painless, and the phenomena of dying almost imperceptible.

In such an ending the stock of nerve power is exhausted—the marvellous and unseen essence, that hidden mystery that man with all his wonderful powers of reasoning, that physiology with all the aid that science has lent it, and the genius of six thousand years has failed to fathom. In that hour is solved that secret, the mystery of which is only revealed when the book of life is closed forever. Then we may hope, when nature draws the veil over the eye that is glazing on this world, at the same moment she is opening to some unseen but spiritual eye a vista, the confines of which are only wrapped by the everlasting and immeasurable bounds of eternity.

Pope expresses this view of death most pathetically, when he says:

"Vital spark of heavenly flame!
Quit, oh quit this mortal frame!
Trembling, hoping, lingering, flying,
Oh the pain, the bliss of dying!
Cease, fond nature, cease thy strife,
And let me languish into life!

"Hark! they whisper; angels say
Sister spirit, come away!
What is this absorbs me quite?
Steals my senses, shuts my sight,
Drowns my spirits, draws my breath?
Tell me, my soul, can this be death?"

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* Sexual perverts should not be allowed to procreate, and if the merciful act of asexualization was performed on all habitual criminals, it would not only relieve our gaols of more than half of the inmates but would make them industrious and useful citizens.