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FRIDAY EVENING, 8 O'CLOCK.

THE ART OF REARING CHILDREN.
BY PROF. ELMER GATES,
Chevy Chase, Md.

LADIES AND GENTLEMEN: It gives me the very greatest pleasure to address so many of the mothers of America. I hope that some years later I may address a national congress of both mothers and fathers—an international or world's congress of parents. I am very glad that it is to the credit of Washington that the first Congress of Mothers has assembled in our city, and I feel especially indebted to the noble women who have this enterprise in charge.

I wish that I might have time to more fully explain the

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experimental researches upon which I shall base the conclusions of this address; I feel it a serious matter to attempt to speak to you, and through you to other mothers, on this subject of such vital importance—that of the begetting and rearing of children.

I will at once commence at the beginning of my subject explaining a few of those experiments which led to the conclusions I am about to present to you. I wish, in the first place, to assert distinctly that my experiments have been so far almost entirely private, and, when once published and fully explained will have to be confirmed by other experimenters, and then correlated and coordinated with the entire body of the sciences. And when that has once been done I believe that we may expect to have something like an art of rearing children—a science of eugenics! What I have to say upon this subject I believe be fully corroborated in the near future by other investigators, and the mothers of the civilized world will then be in possession of the data that will enable them to scientifically regulate the most sacred of all human functions by the light of biological and psychological science. All hail to that time!

When I speak of heredity, I mean simply the well-known fact that living organisms in reproducing their kind beget their like, the progeny, however, always varying slightly in almost every anatomical and psychological particular from their parents. But heredity does not mean the transmission of characteristics— anatomical or mental—which may have been acquire by the parents during their lifetime and, of course, subsequent to their

own birth. It has even been strenuously denied that it is possible to acquire any character which we have not inherited. Eminent biologists have recently denied that we can transmit to our offspring those qualities or traits of mind and body which we have acquired during our lifetime—that no evidence has been adduced that a father or mother can transmit to their children characteristics which they (the parents) did not inherit. There is thus a difference between hereditary transmission and the transmission of acquired characters. It has been stated that though for ages the Chinese women have had their feet artificially deformed, they have not been known to transmit these defects to their children; that circumcision has not, though

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practiced for generations, transmitted any defect; and that when the tails of mice are cut off for a number of successive generations the progeny still inherit normal tails, there being no definite tendency to transmit mutilations. You will see later on in my remarks that these experiments are inconclusive, because mutilations do not create that kind of structural brain changes which alone, as I have discovered, are the basis of the transmission of acquired characters. Now, in face of these diverse opinions I wanted to discover if parents could transmit acquired characteristics, and how; and also how to prevent the transmission of hereditary or acquired immoral characteristics.

I desire to put myself on record as supporting the doctrine that we can transmit acquired characteristics, and will explain some experiments which prove how we can acquire new capacities which we did not inherit, and how we may avoid transmitting undesirable traits.

The basis of these experiments on heredity are some experiments on brain building which I made earlier in my life, and about which I gave an account, four years ago, in a lecture at the United States National Museum, under the auspices of two of the scientific societies of Washington. In that lecture I stated that I had succeeded in demonstrating to my own satisfaction that conscious mental activities create in special parts of the brain new chemical and anatomical structures which are the embodiments of those conscious experiences, and that the refunctioning of such structures are essential to the remembrance of those experiences; and that by a systematic and taxonomic regulation and repetition of these mental activities belonging to some one definite mental faculty I had succeeded in giving to certain animals more brain cells in that part of the brain where that function is located, and that I gave them more brains and also more mind! The method of doing this I have elsewhere described, and I described it in that

lecture. Briefly, it consisted in giving dogs an unusual and extraordinary training in the use of some one mental faculty, such as the faculty for the discrimination of colors, and in depriving other animals (collie dogs) of the same age and species of the opportunity to use that function (by keeping them, as in the above case, in a darkened

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room), and then, after the first group had been trained twelve months and the second group had been deprived of the chance to use that function for an equal period of time, I killed them and examined their brains, and found some startling results—namely, that mental activity of a definite kind creates in a definite part of the brain a series of corresponding new structures. The dogs that had been kept in the darkness had less than the usual number of brain cells in the seeing areas of the brain, and the cells were smaller than normal; and the dogs that had been trained to discriminate between pitches, hues, tints, and shades of color many times per day for twelve months had a far greater than the usual number of brain cells in the seeing areas of the cerebral cortex—a greater number than any dog of that age and species ever before had, and the cells were also much larger and more complex in their internal structure, and had more dendrites and collateral filaments, and so on. Mind activity, therefore, creates organic structure, and organisms are mind embodiments. But I gave these dogs not merely more brain cells, but more mind than they had inherited—that is, dogs can by brain building get acquired characteristics.

I said in the beginning of my lecture that my experiments would have to be confirmed by others before they could become part of the body of modern science. I am therefore happy to say that one experimenter has done work since I made a public statement of my conclusions which corroborates my basic conclusions. I refer to Prof. Aurelio Lui, of Stephano's laboratory, in Italy, whose researches are described in vol. xx, page 218, and vol xxii, page 27, of the *Revista Sperimentale di Frenatria*, etc, for 1894. I refer to the report in full, but will state that he concludes that as animals more and more acquire the faculty of walking, the corresponding parts of the brain acquire a greater number of brain cells, and that these cells become more complex, and so on. I have mentioned this in order to give you more confidence in my conclusions regarding my experiments on heredity and the transmission of acquired characters.

It fortunately occurred to me to apply this law of brain building to the successive descendants of a male and female Guinea pig for five generations, and I found that the fifth generation

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was born with a far greater number of brain cells than could be found in animals not thus trained. I applied brain building to the seeing areas of these Guinea pigs, and when I had given as many new brain cells representing as many color memories as I could, I then allowed them to propagate, and applied the same brain-building process to two of their descendants, and so on until the fifth generation. The Guinea pigs of this fifth generation were killed as soon as they were born and their brains examined. I found in the seeing areas of these brains a far greater number of cells than I had ever been able to find in the corresponding areas of Guinea pigs whose ancestors had not thus been trained. These experiments prove that acquired characters can be transmitted, and reveal the method for acquiring character that has not been hereditarily transmitted. Other experimenters will repeat my researches, and I am sure will find similar results. The way to create a new character is to cause the mental activities to create new brain structures, and this law promises to lay the basis of a science of begetting children.

It lies in our power to create by voluntary effort previous to the begetting of a child such brain structures as we may desire to transmit. Is this not a momentous opportunity and an awe-inspiring responsibility?

This law is operative in the lowest known forms of life, simple cells, the physiological units, which are also the psychological units of all higher forms of life on earth. If such cells are caused to engage in some one definite mental activity over and over again, generation after generation, new structures will be created in the cells, and those structures will differ as the mental activities differ. Cells *feel* stimuli, and this feeling is a mental activity, and when it is caused to be systematically repeated, a structure will arise which is the embodiment of that kind of mental action. It is *mind* that distinguishes inanimate from animate matter. By this process we do not kill off all those cells which can not respond to the stimulus, which would be the method of survival of the fittest; but we cause all of the cells, without killing any of them, to engage in the excessive repetition of some one of their mental activities, and thus produce new

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structures in the cells, which at the commencement of the experiment the cells did not possess. This seems to prove conclusively that structures and mental characters can be acquired other than those hereditarily transmitted, and that all of the structures and mental capacities created by the brain-building process can be transmitted.

Another experiment of fundamental importance consists in determining the chemical constituents of the human secretions and excretions when the person is under the influence of different emotions. The evil and painful emotions create in a few minutes poisonous chemical products in the fluids of the body. Thus, anger produces a different poison than fear, and sorrow a still different product, and all of the evil and depressing emotions produce katabolic and poisonous products which lower the tide of life, while the good and pleasurable and sublime emotions create in the blood and within the cellular substances of the body a series of anabolic and nutritive products which augment every physiologic and psychologic function. Now it can be shown that these products of the evil emotions interfere with the rate and completeness of cellular development by retardation and by the production of various abnormalities, while the anabolic products promote normal cellular growth. Thus I found that the rate of cellular multiplication in lower organisms—that is, the frequency of cellular segmentation within a given time—is lessened by these poisonous products. The application is this: It is well known that the child during the nine months of gestation grows from a single cell by cell multiplication to a fully developed child, and that during this period at certain times the several developments of certain organs commence; thus at a given period the spinal cord commences to form, at another period the liver, or the heart, or the brain, or a certain part of the brain, and if at the time when an organ is just commencing to form the mother throws into her blood, through harboring some evil emotion, some of these poisonous products, she will feed the child with them, and thus arrest the normal rate of cell multiplication, and that organ will fail to attain normal growth in size and be otherwise vitiated. But if instead of this all of the good emotions are dirigated into activity, then

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the child will get all of the normal nutritive products essential to complete growth of all its parts.

But these emotive products affect also the sperm cell of the male and the egg cell of the female; hence the parents should for at least six months or a year before creating a child avoid all evil emotions and dirigate all good emotions, so that the germ and egg may carry to the conceptive process normal structural and chemical growth, so that none of the evil emotions may have distorted the hereditary desirable qualities, and so that all of the good emotions through their nutritive products may have enabled these germ plasms to convey the desirable qualities. During these fateful nine months of gestation the child ontogenetically repeats

the phylogenetic history of the evolution of life on earth; it passes through all of the stages from the lowest to the highest, and if the normal nutritive anabolic products only feed the child all of these stages will be normally completed, but every evil emotion will arrest or pervert some of these stages by interfering with the rate and character of cell development in the child. Bring into daily use all of the happy, good, moral, aesthetic, altruistic, sublime, worshipful emotions before and during gestation, avoiding absolutely all of the irascible unhappy, painful, critical, immoral, and evil emotions, and you will transmit the better characteristics to your child just to the extent that you have builded their corresponding structures in your brain. Have plenty of normal exercise, plenty to eat, and have plenty of rest and sleep.

Remember that only those characteristics of intellectual and emotive activity which you have structurally builded in your brain previous to the creation of the child can be transmitted to your offspring; hence the parental training should, to produce best results, commence long before the creation of a child, and even these results can be arrested during gestation by wrong emotions. When you put into the brain new structures by mental activity, these structures will be transmitted like all other of your anatomical traits, but during gestation these traits may be augmented by good or perverted by evil emotions. Conscious activities must create memory structures in the brain before the capacities represented by these conscious activities can be

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transmitted. The experiment upon white mice, previously mentioned, in which their tails were cut off for a number of succeeding generations, failed to develop mice without tails, because cutting off tails was not a process of brain building. If you train these mice to use their tails in a prehensile manner, so as to develop in the brains of the mice a new series of more skillful memory structures of muscular motions in their tails for several generations, you will find the fourth generation will be born with greater prehensile tail capacity. This experiment is of fundamental importance in this subject. The mind activity must initiate the change in the brain structures if you would transmit an acquired character.

And now I would like to utter an appeal through you to mothers: The incoming generation looks to you to be well born. It is seen to be a fearful responsibility to bring into the world a human being when we realize that we have it in our power to direct for weal or for woe the intellective and emotive character and moral disposition of the child yet unborn and uncreated. Therefore it falls to the duty of parents to make adequate preparation for the

creation of a child; the whole question of hereditary transmission and mind building and allied subjects should be systematically and exhaustively studied in biological and psychological laboratories, the data carefully verified, and the knowledge diffused in such shape that parents can apply it.

America—the whole world—calls to us for better men and women, and if we do our duty and take advantages of the opportunities offered by science, the next generation will have less sorrow, war, crime, and disease, and the number of defectives will be less.

I wish to reiterate that every conscious experience creates in some part of the brain a definite structure, that every evil emotion creates in you poisons and that good emotions create nutritive products, and you can regulate these conditions at will. Those emotive and intellectual activities of your mind which you have not systematically exercised so as to create structures in your brain before the creation of a child will not be transmitted to that child; and what is transmitted to the fetus at

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the beginning of gestation will be arrested or augmented according to the kind of products thrown into the blood by the mother's emotions. A mother knowing this dare not harbor her heart any of the evil emotions, and knowing that happiness, serenity, love, and all pleasurable emotions create nutritive products, do you think she will neglect to bring into her mind daily and systematically all of these conditions? She will go by herself an hour or more each day, in quiet and silence and away from all distracting influences, and call up each one of the desirable emotional conditions to the fullest possible intensity and joyousness and worshipful adoration; and oh, mother, if it be your privilege to cultivate your good emotions one year before the creation of the child, inhibiting all wrong and selfish emotions, and if it be your further privilege to have had created in your brain all kinds of intellectual structures from a study of the sciences, you will then have a fair chance to create a better child than you could otherwise have done. Our country demands and your mother love craves such a child, and I believe that in bringing about such a state of things we must look most to the influence of the mothers. A wife's love is something for which a man will strive; therefore let the wife give her creative love only when a man is worthy of it, only when he has for some months at least been leading a noble, courageous, and unselfish life. Oh, do not create a child during the months of dark despondency and wrongdoing, if such there be, but wait until life is cheerful and morally clear! A wife can control this fountain of life; she can grant her privileges only for worthy motives, and any man worthy

of them will lead such a life as to deserve them.

Produce great persons—*great persons*—and all other things follow. To create great persons is the divine task of parentage—to give to the world greater and better men and women. America asks for such men and women, and in the words of the poet she says:

Bring me men to match my mountains,
Bring me men to match my plains,
Men with empires in their purpose,
Men with eras in their brains.

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Bring me men to match my prairies,
Men to match my inland seas,
Men whose thought shall pave a highway
Up to ampler destinies.

Oh, the great and glorious task of parentage! It seems to me that the most responsible position in which a man and woman can be placed is that of begetting and rearing a child; it requires the most preparation, the highest knowledge, the greatest self-control, and the supremest patience, self-sacrifice, and love. It seems to me that the religion of the future will center closely around the conjugal life and the cradle, and that science, art, and philosophy will be content to bring their fairest to the hymeneal altar. The mother must not be enthroned merely in our love, but she must sit enthroned over the weal of the incoming generation; she has the making and training of the fathers and mothers of the future.

I believe no possible training after the child is born can equal in importance what can be done before birth.

Oh, mothers of America, my appeal is that you study: laws of life and mind, the laws of transmission of character, and learn enough about your own minds so that you may eliminate all undesirable emotions and dirigate into activity the desirable ones! I believe that only by experimental study can we arrive at the knowledge of parentage we desire.

Can you conceive of a nobler undertaking than that of preparing for the creation of a child? Can you think of anything more beautiful than a mother going off alone into the quiet of her own room, free from all interruptions, for an hour's daily rest and inhibition of all unrestful and evil emotions, and for the dirigation of all the highest aspirations and emotions, and for the

contemplation of the greatest subjects known to the human mind? If you do this you will give a legacy to your child better than gold and rank, and you will bring into your life the greatest and the purest joy you can ever know in this world.

Let me repeat that mind activities build brain structures and according to the systematic character and emotive quality of those activities will be the character of the structures which you will transmit to your child; and after the creation of the

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child the growth during the nine months will be promoted or hindered according as the mother throws into her blood the nutritive products of the good emotions and keeps out of her blood the poisonous products of the evil emotions. According to your skill in doing this will you convey to your child the best and the noblest of all legacies—a capable and moral mind.