SOME CONSIDERATIONS CONCERNING HEREDITY AND ENVIRONMENT.

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The State's Burden: During the two years ending July 31, 1906, there were under the institutional care of the State of Minnesota about 6,300 insane; 1,240 feeble-minded and epileptics; about 1,400 adult criminals; and 490 delinquent children and youths. The cost of the care, training, and treatment of these people amounted in the aggregate to over $2,162,000, and the interest at six per cent on the fixed investments for this purpose—over $6,500,000—amounted to $78,000 more. These figures are large, and when it is remembered that—at least in the case of the defectives—the accommodations provided were from twenty per cent to thirty per cent short of meeting the requirements, we have one tangible standard by which to measure the amount of human abnormality in our midst.

Is this Condition Increasing? By the general consensus of opinion it is, though the increase is not so great as it appears; a portion of the apparent increase being due to the broader application of state care and supervision.

Can this Condition be Prevented? Our answer is, "No," but it can be improved. Our interest in this question centers both in the individual cases—the sufferings and misery they represent—and in the general tendency of the race. If it could be shown that as a whole the physical, intellectual and moral conditions of the race were improving, we should still strive to lessen the number of individual cases of degeneracy for their own sakes and for the welfare of their friends and associates; and, if it could be shown that the tendency of the race is toward physical, intellectual and moral decline, the situation would be fraught with self-evident cause for serious alarm.

Some diseases and ills have a specific cure. It was my privilege, a few years ago, to spend some time with S. H. Rumph, of Marshallville, Georgia, the "father" of the famous Alberta Peach (named for his wife). In describing the methods employed in cultivating this fruit in his famous orchard of several hundred thousand trees, he stated that one of the essential elements of success was the protection of the trees and fruit from animal and vegetable parasites, especially the San Jose Scale and Dry Rot. The trees of the orchard are often sprayed as many as seven times a year. One season Mr. Rumph's workmen missed a row at a critical time, with the result that the fruit on the entire row failed to mature, while that on the trees on both sides was healthy and abundant. The Bordeaux Mixture was a specific.

But there is no specific known for degeneracy. There is no antiseptic to destroy the germ of mental and moral canker, nor fairy wand to dispel the gnomes and goblins of wretched families.

The subject of prevention, however, is worthy of attention. The little that is known of heredity and the much that is known concerning the influence of environment, throw helpful light upon the situation and, upon the whole, are rich in helpful suggestions. Thousands of facts bearing upon human heredity have been collected, studied, and classified, and while diverse and contradictory hypothesis have apparently been proven from these facts, and thus the whole subject characterized by confusion, yet, through it all, and by the light of modern discoveries, there are strong indications of the true laws by which it is governed.

Heredity can be studied quite satisfactorily in animal breeding where the psychological factor is eliminated, and much valuable information has thus been collected, but it is in the domain of plant breeding that the most rapid progress is being made. In plant life the investigator can produce so many hundred individuals simultaneously, representing all kinds of combinations, and follow so many successive generations, all in a comparatively short time, that tendencies or laws can be more quickly recognized, and verified by repetition, than is the case with animals.

In fact, the studies and experiments in propagating peas made by an Austrian monk by the name of Mendel, about forty-three years ago, laid the foundation for a true science of heredity. Mendel selected varieties of peas in pairs, each of which was distinctly different from its fellow, either in color of flower, length of stem, wrinkling of pod, smoothness of seed cover, or position of flower on stem. By cross-fertilizing he in time discovered a definite law, which may be roughly stated as follows:

First: The dominant parent gives its characteristics to the first generation.

Second: The second generation partakes of the characteristics of the dominant grandparent in the ratio of three to one and of the recessive parent inversely in the ratio of one to three. One-fourth of the individuals in this second generation transmit the dominant characteristics, one-fourth the recessive characteristics in perpetuity, while one-half transmit the dominant and recessive characteristics in the ratio of three to one respectively, as in the first generation. (Illustrated by chart of nettles.)

A modification of the law is shown in a partial blending in the intermediate progeny. (Chart of Jalapa.)

This illustrates the operation of the Mendel law, and in its simplest form. When more than one pair of characteristics is taken into account, the operation of the law becomes more complicated. It is to be noted that the dominant factor is always a positive or aggressive one, representing a higher state of evolution. Color represents aggressiveness; lack of color, inertia. You will also notice that while the influences of the dominant and recessive parents are latent in certain individuals, they exist, as shown by their re-appearance in succeeding generations.

The law is manifested clearly only when dealing with varieties of the same species, or very closely allied species, but is the beginning of what promises to be a large development in our knowledge of heredity in the near future. It is by the application of the principles represented by this law that Burbank is attaining such wonderful success in originating fruits and flowers, combining the good qualities of different stocks.

This law, so far as tested, has been shown to hold good for animals; namely, in the cases of the silk worms, snail, fowls, mice, rabbits and guinea pigs.

In the human being there is less opportunity to verify the law, because there is such a heterogeneous cross-breeding and because, for evident reasons, definite experimental breeding cannot be undertaken. Many observed phenomena, however, point toward the application of this law to human heredity. The color of the eyes, hair, shape of the nose, and other anatomical characteristics in children, are usually the distinct inheritance of one parent; and the blending of characteristics in any given tissue or organ is a more rare occurrence. Where blending exists, as, for instance, in the color of the skin, between the Caucasian and the African, it is explained by what is termed the Theory of Mosaics. That is, by this theory it is assumed that given tissue areas are exclusively dominated by one parent; other tissue areas, by the other parent; and that in structural arrangement these areas are arranged in geometrical order, forming the completed Mosaic. The blending is thus apparent instead of real, each separate area of tissue holding to its inherited dominance or recession.

Other facts of heredity should be noticed; as, for instance, **Atavism**, or the resemblance to a grandparent or other not remote ancestor; **Reversion**, where there is a reappearance of a previous state of the species in the process of evolution, a turning back to a lower state of development—the latter phenomenon is often shown in children of parents who are of radically different nationality or race; **Spontaneous variation**, which is illustrated in plants by the four and five-leaf clover, and in man by supernumerary toes and fingers. Again, when there is a marked divergence from a type, there is an apparent tendency for the divergence to become hereditary. An interesting illustration of this is given by Adami in a polydactylous family:

"In 1620 two brothers landed from England and settled at Woburn, Massachusetts, and these, according to family history, married two sisters. The family and the descendants of the one brother having since then shown no abnormality; in the children of the other brother, N. X. (himself, according to tradition, polydactylous), polydactylism presented itself. He had ten sons, whose descendants are now scattered through North America. For the next two generations it was dormant, or at least there are no records of its existence. In the direct line of my informant it has indeed been dormant for three generations. His great-grandfather was free, the other members of that generation were affected; his grandfather was also free, as was his father, although an uncle and aunt were affected. Of his father's twelve children, eight were affected, the conditions being for the

first time complete in himself. By complete is here meant that not only did the condition affect all his members, so that he had six fingers and six toes, but all the accessory digits were perfectly formed. What is more, his young son has them all perfectly complete. Another characteristic of the family history is that whereas the daughters of the family may show the effect, it tends to die out with them; their children have normal digits. In this way, according to our patriarchal method of determining the family, the defect tends to remain familial, descending only through the males. The potency of the 'blood' of this family is, in other respects, strongly pronounced; there is a succession of large families, and the different members exhibit a great family likeness, so great that my informant could salute a stranger traveling in the West with, 'Good morning, Mr. X.,' and have him return the salute, 'Good morning, Mr. X.,' with the further remark, 'I see you have the family sign (referring to his six fingers). I do not possess it, but my father did, and so does one of my eight children.' And, on inquiry, the consinship between the two was found to be at least beyond the third degree of removal."

Another interesting study in heredity is presented by the same author in his recent work on pathology in a chart illustrating the hereditary tendency to bleeding. It is well known that in some people the blood when escaping from a wound will not coagulate and thus stop the flow, and such people are always in imminent danger of fatal hemorrhage from the slightest wound. One of the interesting facts in this heredity is the transmission of the tendency by the females, while they are rarely themselves bleeders. Although the males are bleeders, they do not appear to transmit the tendency to their descendants.

I wish to emphasize the following conclusions that seem to represent the generally accepted views of the best authorities:

First: The constant presence of ancestral tendencies, either latent or manifest, and the additional fact that the latent tendencies may become manifested in later generations.

Second: That, broadly stated without accepting the definite mathematical law of Galton, the father and mother both contribute jointly, upon the average, about one-half to the child's stock of potentialities, and the other ancestors contribute in a decreasing ratio proportional to the distance.

Third: That the positive aggressive characteristics of one parent, as compared with the more negative ones of the other, will tend to dominate the progeny.

Fourth: That some deviation from type will occur either in progression or recession that no known law will explain and for which there is no known prevention.

Fifth: That decided aggressive variations tend to reproduce themselves in succeeding generations.

Sixth: What is said of anatomical is true of physiological and functional potentialities, hence moral and mental characteristics will have an inherent bias, or tendency.

This brings us, then, to a consideration of the subject of **environment** and the influences that affect the development of the individual, and it is here that a special field of usefulness is brought home to all families. The developmental period covers four distinct stages: First, the pre-natal; second, infancy; third, childhood; and fourth, adolescence. I can undertake to refer to only a few principles to be observed, and to touch, as it were, a point here and there.

When the embryo of the future human being begins its development, it starts with the potentialities derived from inheritance. Its future depends upon the relative dominance of these potentialities and the character of the influences that shall thereafter be brought to bear upon it. Its first requisite is nutrition. Nutrition, while always important, is the one all important need of this early organic entity. Consequently the mother should be in good health and spirits to insure a normal and healthy blood supply, which is essential to this nutrition. Right here I wish to emphasize the fact that there is little reliable authority for the belief in "maternal impressions," although fright, shock, or unusual hardship might interfere with the proper nourishment of the mother, and thus indirectly contribute to the ill nourishment of the developing organism, and, of course, should be avoided. What is more to be feared, however, is constitutional diseases, probably not suspected by any one but the family physician, that keep the blood of the mother in a poisoned state and thus interfere with nutrition. This leads me to question whether there is a single sane reason why candidates for the marriage state should not be required to present clean bills of health and a reasonably good heredity.

Infancy: (The stage from birth to seven years.) If the nutritive potentialities in the embryo have progressed normally and the child meets no untoward reception at the threshold of visible life, it passes in an apparently healthy condition into the stage of infancy, which covers a period of seven years. This is the stage of rapid brain growth, special sense education, motor coordination and speech. It is the age when the tissues are passing, as it were, from a plastic condition to that of definite functioning, the period when the brain through the organs of special sense is acquiring impressions by the thousands, and all the different tissues and organs are, as it were, becoming acquainted with one another and learning their mutual relations and duties.

During the several stages of the developmental periods from birth to maturity, the inherited potentialities are to be matched against environmental influences. The development of the physically healthy infant into a mentally and morally healthy adult, depends upon its powers of resistance to destructive influences. Hereditary taints are "weaknesses of the defenses." There are enemies to life and character ever present, and the duty of the parent, friend and teacher is to build up the defenses. During the different stages different weaknesses are more apt to become manifest; hence their separate study. The essential method of treatment, however, is the same for all stages, and all training and treatment is for the double

purpose of developing the individual to his greatest capacity as an individual and a social unit, and of enabling him to leave to his posterity an improved set of potentialities.

Nutrition, then, must still be considered first, for upon a healthy body, healthy tissues, and cells of all kinds, must depend the largest possibilities for healthful and forceful characters. While this is true during the whole period of life, it is especially true during the developmental period, and most emphatically true in infancy and childhood. (Mrs. Roosevelt's practice. Helen McCarthy in L. H. J., October, 1908, page 72.)

Next in importance, but not in evolution, I should place the training of the will and the development of the habit of self-control. The men and women that make the real progress in every station of life and those who reach the greatest eminence, the truly great, are not the geniuses of momentary brilliance, but those whose acts and labors are incited by a steady, irresistible purpose. There is no stronger element of "defense" than the will, and he who, when the hereditary promptings to evil stir his blood and incite his mind to the performance of wrongdoing, can ward off the evil and wend his righteous way undisturbed, becomes a prince among his fellows and may give to his descendants the richest possible heritage.

As an infant develops it becomes "all eyes and ears." This is the stage of impressions, and upon the character of these impressions will depend quite largely the future adult. The foundation of right ideals is essential to the right exercise of the will. Infancy is the imitative period. There is no question of the utmost importance of the laying of a foundation for the right moral development at this time, especially if there are unfavorable tendencies. This is not done best by didactic instruction, but by constant example. "The knowing of right from wrong should always be associated in the child's mind in the doing of it by every one with whom he comes in contact. No doubt up to seven years morals are more of an automatic habit than of a real conscience." (Clouston.)

There are children who seem devoid of a conscience and who are instinctively deceitful and dishonest. This condition, I think, is rightly ascribed to bad inheritance. Those of us who have had the handling of such children, the so-called "moral imbeciles," realize the importance of early impressions and environment for them. In fact, as we usually see them, they present practically hopeless problems because the opportunity for early and correct environment is passed. Much, however, can be done by early training of the physical activities and the minimizing of literary training which is to them only an auxiliary for wrongdoing. By confining their activities to the limitations of a custodial institution, just so many cases are diverted from lives of crime to those of real, though limited, usefulness.

The Period of Childhood: (Girlhood and boyhood, seven to fifteen.) From seven to fifteen brings its peculiar problems of development. The normal boy, as well as the normal girl, is a bundle of unlimited muscular

and mental activities that are becoming more and more coordinated. Here again the demand for wholesome environment is imperative. The opportunities are larger and should be utilized for living, as much as possible, in the open air and sunshine. It seems almost trite to say that the food should be plain, simple and nourishing. "The boy or girl during school life should always be plump and hard in muscle, free from headache, cheerful and sleep well." If this is not the case, a cause should be sought. Possibly eye strain, polypi in the nose and throat, or other pathological conditions easily determined and remedied, may account for the symptoms.

It is during this stage that the distinctively "backward" children are noticed, and quite a percentage of feeble-minded children may not be recognized until they are started to school. The latter must be counted out of the race. The backward child, however, is not to be cast aside. He is slow to comprehend, but he exhibits a tenacity of purpose. While he seems to accomplish but little at any one time, in the course of a year he makes definite permanent progress. He shows fairly good judgment in such matters as are comprehended by his experience. The feeble-minded child, on the other hand, lacks application, and such as he has he manifests in a variable manner. What he seems to learn one day he forgets the next. His judgment is but little developed. The backward boy, if from a good home, may make a good, honest citizen. The feeble-minded child will find his best home among his kind in the village of the simple, protected from adverse fortune and the opportunity to further vitiate the stock.

Adolescence: (Fifteen to twenty-five.) From fifteen to twenty-five is another critical stage in development. The tendencies that will dominate the adult begin to assert themselves. Hereditary weaknesses and elements of strength, modified as they may have been by previous training and environment, become definite. Neurotic tendencies may develop into active insanity, epilepsy or dementia. The purposes of life have now taken shape. The impressions and resolutions now formed characterize the future life of the man or woman. The foundations already laid must determine largely the superstruction, for there is but little oppportunity to remedy former mistakes.

The most important considerations, in handling children and adolescents, having reference to the welfare of the race, are, in my judgment:

First: The proper determination and classification of the units that make up this passing juvenile army.

Second: A diverting of the unfit into those paths of usefulness that shall minimize their effect upon posterity.

Third: The determination and application of the best methods of training and education as applied to the fit that shall in each case make for the highest type of manhood and womanhood respectively.

In connection with adolescence, a word should be said about marriage. While this is a matter to which radical measures cannot be applied, it is one that can be improved by the application of common sense, if people will agree to profit generally by the available knowledge. While the wisdom of the ages teaches that the best marriages are governed by absorbing love, adolescence is a period of wild fancies, many of which are ephemeral, and this fact should be considered in the management of early attachments and the education of the young themselves. The time will come when this relation will not be generally assumed without mature deliberation, as is the case with some sects, and the family histories will be studied carefully in the interests of the candidates. As Dr. Clouston suggests, these histories are usually known after marriage. Why should they not be disclosed before? Attempts to conceal them would be presumptive reason for prohibiting the union. It is not inconceivable that an advisory commission of experts could be provided for certain districts, to which cases involving doubt could be referred as hypothetical cases, without disclosing the personal identity. This would be a transitional method, anticipating the time when family pedigrees will be matters of public record.

In the matter of education, while I would concede absolute liberty of action to women as I would to men in the choice of educational training, profession, political franchise, or anything else, it seems to me that, as a rule, their education should, from the nature of their relative relation to the future of the race, be different from that of men. That is to say, I do not believe that our young men and young women should be made to feel that they should necessarily follow the same curricula. While no plan of education is to be commended either for man or for woman that does not recognize the necessity of coordination of physical, intellectual and moral development, yet, keeping in mind the fact that woman's function is to nourish and man's to energize their offspring, the future prolonged demands upon the mother's energy and vitality will be so much greater that she is more liable to lower her stock of reserve energy by overstrain of too long duration or too strenuously conducted intellectual activities, than is the case with men. The only thing, it would seem to me, that would justify such strenuousness would be her choice of a profession that contemplates deprivation from the opportunity of motherhood. On the other hand, she should have every educational privilege that conduces to the development of stronger, broader, better balanced intellectual and physical womanhood.

In this brief and imperfect discussion I have tried to point to some of the principles that, recognized and acted upon in the raising of children, would tend to improve the stock. It has been assumed that in each stage of development there would be in a given population a more or less uncertain percentage of individuals that would be unfit. We may expect that, even from the most carefully arranged marriages, and under the most favorable conditions of development known, there will be an occasional congenitally idiotic, deformed, or imperfectly developed infant. An occasional child will fail to develop normally, and the result will be an a-social or anti-social being. The phenomenon of breaking down of the "defenses" will occur with the occasional individuals in all stages of life. For, as we all know, many grow into maturity only to break down under

some adverse strain. There are others who go through life possessed with similar limitations, but who will happen never to be subjected to any assault too strong for their "defenses." From this it will be readily seen that the early recognition of any form of degeneracy is an advantage to the social welfare because of the opportunity thus afforded for eliminating it as a genetic factor. The best form of elimination, consistent with altruistic sentiment, is isolation. The most danger lies in the freedom of the borderland cases of insanity, the habitual criminal, the chronic inebriates of all classes, and of vitiated stock contributed by the idle scions of the rich, all of whom at present are at liberty to propagate and introduce their potentialities for degeneracy into the purest stock. The partially redeeming considerations are:

First: That positive aggressive parental characteristics are more dominant in the majority of the progeny. Nature tends to correct evil and to build up, if it has a fair chance.

Second: That training and environment can be made to reduce the potentialities for evil.

Third: That proper educational training, physical and moral, can and does improve the general stock of manhood and womanhood.

Fourth: That the extremely vitiated tend to segregate from the better class and their stock tends to die out.

The growing sentiment among penologists in favor of the indefinite sentance for criminals will doubtless result eventually in eliminating the habitual criminal from society, and this will be a vast step in advance.

If this line of argument is of any value, it shows that, while there is no specific for degeneracy, there is a distinct opportunity for every well organized family to contribute to the final realization of a minimized amount of it, and when that time arrives, our descendants will be wiser than we, and the experience and discoveries that shall in the future be their heritage may, let us hope, lead them to its final discovery.

Dr. Tomlinson: I was reminded, when Dr. Rogers was reading his paper, of a statement by Maudsley, in which he says a person may be ever so conscientious, ever so upright, and ever so anxious to do right, yet he will lie about his family history with perfect equanimity. In other words, people will unintentionally and unconsciously tell what is absolutely untrue with regard to themselves and their families, or they will ignore conditions existing in them which are positive evidence of the disease which is manifested in the person under observation. I have made numberless personal observations that verify this statement.

Dr. Rogers has expressed the present conclusions with regard to heredity so far as it is physical. There is an element, however, that enters into heredity which, when we come to apply the term in its social aspect, is entirely different. We see a person who is deformed; we do not think of that deformity as being an hereditary condition. We see a person lacking in certain characteristics which may interfere with his personal usefulness; we don't speak of heredity with reference to him. We use the term heredity only when apparently it bears some relation to the mental qualifications of the individual. Then, too, it is customary to describe certain constitutional diseases as hereditary; and there has been a world of discussion with regard to the use of the term in this direction.

There is, practically speaking, as we know now, from the biological standpoint, no such thing possible as the inheritance of disease. It is a biological impossibility. The person, through conditions present in the parents, may be susceptible to untoward conditions in the environment which will result in the development of the disease, but the development of disease is independent of the parentage of the individual affected. For instance, take tuberculosis. The children who become tuberculous don't become so because their parents were tuberculous. If they could be preserved from coming in contact with the tubercle bacillus, they would not have tuberculosis. The vitality in the parents may be so lowered by disease that the resistance of their progeny has been materially lessened, and for that reason the children of tuberculous parents, subjected to the source of infection, become tuberculous. It is a matter of common observation that in a family where there is tuberculosis there are several members of the family who never become tuberculous; and yet people never stop to think of this in discussing this question of heredity.

We are frequently asked whether this or that disease is hereditary, as if the disease developed in the child because it existed in the parents. Just as the experiments of Meudel showed the tendency in plant life toward the transition of normal characteristics from parent to child, so we have resulting the same kind of transmission if these dominant characteristics are pathological. In other words, if a man who is the victim of some physical disease which was present in his parent's family marries, there will be a tendency to the dominance in his children, or a proportion of them, of this susceptibility to this particular physical affection, just as everybody knows, as a matter of tradition, that certain families are disposed to rheumatism, that the lungs of others are easily affected, that others have intestinal affections, and that there are certain families who have catarrhal affections. If a physician lives in a town long enough, he will observe that certain members of certain families, under the influence of fatigue, excitement, overwork, or mental disturbance of any kind, will be sure to develop some acute form of disease. Here is a manifestation in a pathological way of the same tendency which Dr. Rogers describes with regard to the manifestation of the dominant tendency in plants. It is important to remember that in the economy of the organism all of the different parts have a certain function to perform, and the health of the organism depends upon the performance of all of these functions normally. If one part fails to perform its function, it means that the rest of the organism is to that extent interfered with, and if this failure is considerable, it means that the interference may be a serious one.

The nervous system dominates the functioning of all the different organs of the body; that is, it acts as the controller and the director of

all these activities, with the consequence that they preform all their functions under the direction and the control of the nervous system. At the same time the nervous system itself, in its turn, is dependent on all these other functions for its vitality because it does nothing toward its own maintenance. Therefore, if there is a defect present, that defect—even if it be purely functional—simply establishes a temporary vicious circle, because if the welfare of the whole is interfered with the welfare of the parts is interfered with. If this defective condition subsides, then the organism recovers. On the contrary, if it persists, there is established as the normal for that individual something which is lower than that of the average individual. Therefore, if he is subjected to what is an ordinary strain, it becomes in him an extraordinary strain, and, instead of meeting it and resisting it, he may fall under it. If he is subjected to any cause of disease under these circumstances, you will see how much more readily the disease would fasten itself upon him and how much more likely it would be to be persistent and chronic.

In the lowest forms of animal life there are three primary functions: Avoidance of danger, obtaining food, and reproduction of the species. All of the activities which finally develop in the nervous system, even in its most highly developed form, are simply modifications of these three primary functions. When Dr. Rogers made the remark with regard to the difference between the sexes during the period of adolescence, there came into my mind the poet's statement:

"Love is of man's life a thing apart; 'Tis woman's whole existence." That has a physical bearing as well as an aesthetic one. The nervous system and the function of generation in woman are so intimately associated that they cannot be separated; while they may be separate in man. During the child-bearing period the woman cannot get away from that relation. Every act in her life, everything in her environment, bears upon her capacity for generation and upon the welfare of her progeny. The significance of these things is apparent when we come to consider what the results are and why we have individuals who are not social, who are abnormal, and who, therefore, are the subjects of custody either on account of their conduct or on account of their want of capacity to control and care for themselves. It can be readily understood, as a simple proposition, that the animal with the capacity for attention, direction, and control—using these terms in their ordinary sense—will be the animal that will maintain its own individual capacity to the best advantage, avoid sources of danger to the best advantage, and be best able to reproduce its kind. Even in the most highly developed nervous organization, with the most complex activities, which we call mental capacity, it still remains true that those elements of capacity which are most potential for the welfare of the individual are the power of attention, direction and control; and that those individuals who are below the mark physically and therefore unable to keep up the pace, or who are below the mark mentally and therefore fall behind in social and industrial competition, are the people who are lacking in all three or

some one of these directions. The lack of capacity for attention interferes with the ability to learn; lack of capacity for direction interferes with ability to apply; while lack of capacity to control interferes with the ability to so direct the activities of the nervous system that the object toward which we aim may be obtained with the least friction and the most benefit. I haven't the time to go into details—nor you the patience to listen—to illustrate that good manners, complaisance, and agreeable speech, are simply continuously complicated modifications of the effort either to attract another individual sexually, to avoid sources of danger, or to gain some advantage, and these faculties have simply grown up into their abstracted form by being constantly stored and transmitted from generation to generation, as tendencies in the individual, which are brought out by the conditions in his environment.

Another important thing for us to recognize is that those qualifications which set the abnormal individual apart are the ones that are common to the lower forms of animal life or to the human organism in the earlier stages of its career; that is, brutal selfishness, abject fear, suspicion, explosive violence, all are characteristics of the animal, and, when they appear in the highly developed individual, are the evidence of recession. Just as Mendel describes his recessive manifestation in the forms of the plants with which he experimented, so when development in an individual, who has apparently developed normally up to a certain stage, stops and he begins to go backward, we determine the extent of his going backward by the extent of his recession in this direction. The rapidity with which the recession will take place, and the extent to which it will go, will always be in direct ratio with the degree of defect in the individual originally; that is to say, in a person in whom defect is so slight as to be classed as instability, there may be only a temporary and a slight manifestation of this recession, and it may be only under aggravated circumstances. If the instability is extreme, then the manifestation will be more marked and more extreme proportionately.

We have to remember further in this connection an equally important thing, one that is not generally recognized. We commonly find some individual who has evidence of defect in the development of the nervous system who, in spite of untoward conditions in the environment, does not go backward rapidly, or goes backward temporarily and comes up to the normal again; while we find another individual with apparently a slighter degree of defect who, on the contrary, goes down more rapidly than we think he should and stays down; and we are met by the criticism that there is nothing in the claim because here it is not proven, but it has been lost sight of that there is physical as well as mental defect; and that the reason one rebounded and came up again was because the rest of the organism was more nearly normal, and the other stayed down because his physical capacity was below the normal, and he was not capable of maintaining persistent mental effort. Therefore, in studying these individuals, as well as in applying corrective and preventive measures, the primary obli-

gation upon the physician, as well as upon the philanthropist, is to determine what kind of an animal he is dealing with. Before we think of his mental capacity we must think first of his physical capacity. If we overlook this and bend our energies simply to ordering his environment, we fail completely or succeed only partially; whereas, if, on the contrary, we first study him with regard to his capacity physically to maintain his vitality, we are then in a position to determine just exactly how we should supply the conditions in the environment so as to maintain development, to check that which is harmful, to stimulate that which is useful, and to develop him as far as possible in those directions which are so absolutely essential to his welfare, which I designated as attention, direction, and control.

MINUTES OF QUARTERLY CONFERENCE OF BOARD OF CONTROL AND EXECUTIVE OFFICERS OF MINNESOTA STATE INSTITUTIONS, OFFICE OF THE BOARD, ST. PAUL, MINNESOTA, NOVEMBER 5, 1908.

FORENOON.

Present: Members of the Board—S. W. Leavett, Chairman; P. M. Ringdal. Superintendents—Coleman, Yanz, Welch, Kilbourne, Tomlinson, Dow, Tate, Rogers, Merrill, Whittier, Randall, Wolfer.

Present by Invitation: M. N. Voldeng, M. D., Superintendent State Hospital, Cherokee, Iowa.

Meeting opened with paper by M. N. Voldeng, M. D., Superintendent State Hospital, Cherokee, Iowa. Subject, "State Board Administration of Public Institutions."

Discussion followed until hour of adjournment.

AFTERNOON.

Conference reconvened at 2:30 o'clock.

Present: Members of the Board—S. W. Leavett, Chairman; P. M. Ringdal. Superintendents—Coleman, Yanz, Welch, Kilbourne, Tomlinson, Tate, Rogers, Merrill, Whittier, Randall, Wolfer.

Present by Invitation: M. N. Voldeng, M. D., Superintendent State Hospital, Cherokee, Iowa.

A paper was read by A. C. Rogers, M. D., Superintendent Minnesota School for Feeble-Minded and Colony for Epileptics, Faribault. Subject, "Some Considerations Concerning Heredity and Environment."

Discussion followed. Conference adjourned.