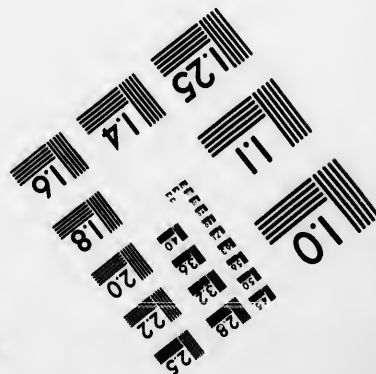
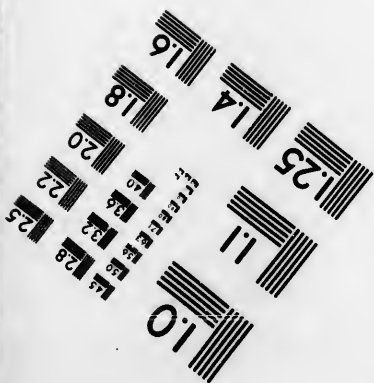
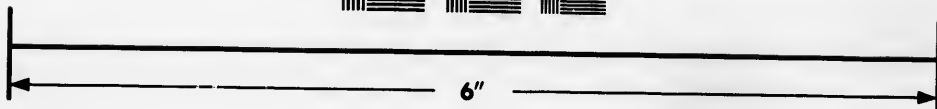
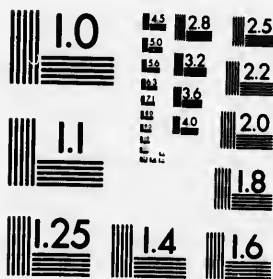


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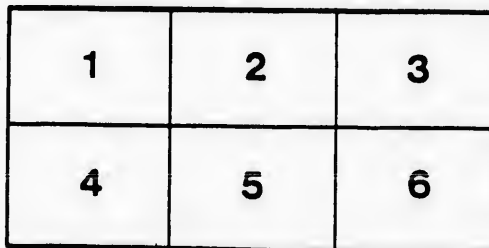
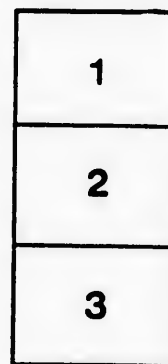
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HEREDITY
IN
RELATION TO EDUCATION.

BY
WENDELL M. M.D. F.R.S.C.
Professor of Psychology, McGill University, Montreal.

Presented with Honors at Ontario Educational Association, 1893.

TORONTO:

WILLIAM BROS. CO., 135 BATHURST STREET, WEST.

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HEREDITY
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BY
WESLEY MILLS, M.A., M.D., F.R.S.C.,
Professor of Physiology, McGill University, Montreal.

(Reprinted from Report of Ontario Educational Association, 1893.)

• TORONTO :
WILLIAM BRIGGS, 29-33 RICHMOND STREET WEST.
1893.



HEREDITY IN RELATION TO EDUCATION.

BY WESLEY MILLS, M.A., M.D., F.R.S.C.,

Professor of Physiology, McGill University, Montreal.

I take the first opportunity to thank the Ontario Teachers' Association for the compliment paid me in affording me an opportunity to address them. Though it has fallen to me to reside during the greater part of the last twenty years in the neighboring Province of Quebec, I can say as regards Ontario's institutions, "I am to the manner born," for I was born, received my Elementary, High School and College (University College) education in this Province. Further, I have had the privilege of teaching in an Elementary School, a High School and a Collegiate Institute under Ontario regulations; and I look back to a portion of this period as affording some of the happiest days of my life.

Among many improvements that I notice as having taken place within the last twenty years, is one that was obvious to me on visiting the High School Section this morning. Most of those present were of mature years. Some had evidently grown gray in the service. This means that, so far, at least, as this department of educational work is concerned, a conditional permanency has been reached, which is in itself a guarantee of considerable progress; in fact, that teaching has become a profession amongst you. I have had the pleasure of meeting here those to whom I sustained pleasing official relations, some former associates in teaching, and several old college friends as well as more recent acquaintances. But amid all this, I to-night experience a feeling of sadness.

I miss from among the educators of this Province a man of much worth and many accomplishments; one probably best known to you as an esteemed High School Inspector—John Milne Buchan. I miss him as you could not, for he, as my teacher, more than any other individual, guided and moulded my youthful life. Of him I must ever think with reverence and gratitude; and I would not be doing justice to my feelings did I not this evening, on making brief temporary contact with that system of education of which he once formed so important a part, pay this tribute to his memory.

I do not know that I can better return the compliment you have paid me than by speaking my views without reserve. I have chosen a subject that may be new and interesting, and one to which I have devoted a good deal of attention: "Heredity in Relation to Education."

It is of course necessary that the education of a country shall be systemized, harmonized and consolidated.

This involves so much machinery, including examinations, inspections, reports, etc., that those concerned are under constant tempta-

tion to take the form for the substance and to mistake the immediate issue for the great end. It will not be denied that this state of things exists or has existed in connection with every attempt to produce what has been termed a system of education. Manifestly system is essential to success. Without system, concerted plans and co-operation, you would not be here to-night.

One of the great problems of the day is the extent to which system should prevail. The answer to this question, which is filled with practical issues, may be inferred in part, at least, from my treatment of education this evening.

The teacher has to do, in reality, primarily with methods, examinations, results, etc., only in so far as these are means to an end—that end being the development of human nature.

The teacher is, or should be, first, last and always, a developer. If he sees no further than methods as set before him by others; if he assumes that the one method will suit all his pupils equally well; if he believes that there is any one invariably best method, he will become after all but a sort of machine.

The educator is concerned with human nature, and must endeavor to study it in as broad a way as possible. To him the knowledge of the development of man from more primitive conditions is the study of all studies. His great aim should be to carry on in some measure this progress, this evolution or unfolding, for we know as yet but indifferently the possibilities for mankind.

Whether man was derived from some form of life lower in the scale or not, it is perfectly clear that he has passed through stages not very distantly removed from the condition of the brutes, or at all events, immeasurably remote from that of the civilized man of to-day.

And the history of the race is in some measure the history of the individual.

The teacher who does not realize this can scarcely understand the peculiar behavior of boys in particular at times. Especially when left to themselves, they seem to act like savages; for the moment they appear to revert to a savage state. But knowing the tendency of human nature to right itself under favorable conditions, the teacher is considerate, hopeful and wise in the guidance of his pupils.

But equally important is the study of the individual, and it is the neglect of this that constitutes, perhaps, the greatest danger of modern education.

We adopt our methods to human nature as we conceive of it, but is the individual as much considered as he was? The tendency of the age is to aggregation of men, to concerted action, to adaptation of methods to the masses, to the average man or boy or girl, while John Smith and Eliza Brown are apt to be regarded as simply units and nothing more.

If I were asked to state what I considered the greatest evil

threatening education or actually existing in education, if not in our entire civilization to-day, I should reply that in my opinion it was just what I have referred to—not recognizing the individual as such in the masses.

Allow me to point out that the available energy of the world is increased in proportion as we develop individuals, *i.e.*, human beings, differing from their fellows. We see this in the passage of a community from a savage to a civilized condition. There is division of labor with differentiation of function. It is better for the community that there should be carpenters, blacksmiths, masons, etc., than that there should be an attempt to make each individual a Jack-of-all-trades.

So in education we should aim to develop those differences that nature has established. So-called education has done much harm by running counter to nature. Evidently then, the great business of the teacher is to study nature with a solicitous anxiety to learn her meaning as to man.

Froebel, after ages of educational blundering by the world, set out on the right path because he, like the one who would enter the Kingdom of Heaven, became as a little child and so understood children and adapted methods to human nature as it is—methods in which their individuality is recognized at the very outset.

Would that we had followed this great genius closer. Would that we were to-day applying his methods in their best aspects to our education more fully. I mean in the sense that we adapted our methods to human nature, as it is, and not chiefly with any so-called end in view, such as fitting the boy or girl merely to sit at a desk in a warehouse or stand behind a counter in a shop.

But our schools, like other institutions, are a reflection of our general state of human progress; and while we have much to be thankful for, I must, with President Eliot, of Harvard University, consider that our school education is still in no small degree a failure; partly because we have failed to grasp the purpose of education, and partly because we do not recognize that men are more than methods after all—that John Smith is more than simply a human unit—that what suits him would not equally well suit John Jones.

Allow me to put the problem of education in a sort of combined biological and psychological form.

It is impossible to conceive of any organism as existing apart from relations to other things that immediately or remotely affect it, in other words, its environment, which term will be used to designate the sum total of all those influences of whatsoever kind that are in any way related to or can affect such organism.

Very often the most important factors in the environment are other organisms of the same kind, and this applies especially in the case of man.

In the discussion of educational problems, it seems to me to be of

vital importance to realize that we must consider man as a whole. Great mistakes have been made and are being made from regarding mind and body apart.

As a matter of fact we never know them apart. We have to do with that complex whole we call man. We only know the mind through the body, and, speaking generally, so far as we can see for every psychological manifestation, there is a correlated or corresponding physical process.

It is of importance not only to concede this in a theoretical way, but to be fully convinced of it, otherwise our education will labor under those misconceptions, irregularities and inadequacies which have beset it in the past.

We get at the mind through the body. To one devoid of all sensation the world is as good as non-existent, and such an individual would be a mere vegetative organism incapable of any appreciable development.

Apart from the senses there are probably no avenues to the mind for us.

The dependence of the mind on the body in this broad way is then clear. It is not, however, very fully recognized yet, that what hinders the development of the body, or stands in the way of physical vigor or growth, must be in a corresponding degree an impediment to the growth and development of the mind.

Modern psychologists are more and more regarding the mind as a growth and development; and undoubtedly when this great fact and the complete inter-dependence of mind and body are recognized, we will be free from misconceptions that have fettered educators of all kinds in the past.

The teacher who realizes this inevitable relation of mind and body cannot be indifferent to the hygienic conditions and physical state of his pupils. The condition of the atmosphere of the schoolroom, the temperature, the quality and the direction of rays of light will be as much considered as the three "Rs," for in fact they are of vastly more importance in the development of the organism, as a whole, with which he is concerned.

Up to this point I have been endeavoring to show that the educator, in proportion as he has correct and comprehensive views of human nature, is supposed to devise methods that accord with them. Even with such views he may not become a very successful teacher, because teaching is an art, and it is one thing to understand in the abstract, and another thing to apply. But given the natural aptitude for the art it is surely plain that the application will be more in harmony with our nature if that be understood. And in the application great skill will be required, so that the individual will not be lost sight of. In fact, it is just here that the art of so many falls short. They lack the insight to recognize just what constitutes the individuality in each case, and to adapt to this.

I will, therefore, endeavor to assist in some measure in the solution of this problem, by calling attention to a guide to the individual nature through the subject of heredity.

From the earliest times heredity or the resemblance of offspring to parents has been admitted, in some vague way at least; and if this were now as clearly recognized for man as it is by breeders of our domestic animals, I would anticipate greater human progress than is likely till sound views on this subject are more widespread and more deeply impressed.

How few have ever seriously sat down and pondered upon such questions as these: Why is my nature such as it is? To what degree am I, and in what measure are ancestors concerned in my being what I am? What am I likely to become?

I presume one might safely affirm that most persons here never directly faced such considerations at all. Probably many would regard it as impossible to account in any approximately satisfactory way for their physical and mental make-up, and would be very apt to refer the latter in no small degree to what is commonly known as education.

But if we were to visit the establishment of some successful breeder of domestic animals, we would find no such hazy mental condition. The breeder does know why his stock is such as it is. You point to some admirable specimen and compare it with another of plainly inferior merit, and ask him the reason. He does not attempt to explain the difference by the pasture, but he tells you that the less valuable animal is a common cross-breed without extended pedigree, while the other is derived from ancestors that he can trace for generations, and the parents of which are now on his farm, the purchase price having been a large one.

The breeder would have been greatly puzzled if such ancestors had produced offspring entirely unworthy of themselves. The same applies to the vegetable world. "Do men gather grapes of thorns, or figs of thistles?" But apparently we often expect this rule to be reversed in regard to human beings. The fact is, man was so much regarded as a creature apart by himself, with laws of his own, laws that were, every now and then at least, interfered with in some inexplicable way, that the public mind got demoralized; for nothing can be so disastrous as to believe that the laws of nature are subject to change.

We may require to modify our views as to what the laws of nature really are, but so far as the world has yet learned, these laws are invariable.

I must confess myself to have had at one time almost unbounded faith in the changes that the environment could work, and especially that part of it that we call education, in the narrower sense. But a close study of heredity, by observation and experiment, in breeding some of our domestic animals for a term of years, has very strongly impressed upon my mind the strength of heredity.

Galton, Ribot, and others have given us the most convincing proofs that heredity is stronger than its antagonist, variation, or than its modifier, environment.

In accounting for variations, for no two beings are quite alike, we must admit great ignorance; however it is impossible to ignore or disbelieve in the effect of the environment.

We know that unless there be some favorable features in the environment the best nature can never develop.

The very same breeder we before referred to might possibly be able to show us an animal that through accident, inadequate feeding, or other unfavorable condition in the environment, had never proved worthy of its parentage; and the observer will meet many cases like this among human beings. They are instructive inasmuch as they illustrate the relative part played by heredity and environment in the total result.

Galton, after most exhaustive and careful examination of large classes of men, as statesmen, judges, commanders, divines, authors, artists and others, shows that of all those that attained great distinction, a fair proportion left posterity worthy of them. He concludes also that if a man be possessed of really high-class native ability, he will rise in spite of the environment, or as Shakespeare has it, "Some men are born great."

But what of the mediocre? Do the same laws as to heredity and environment apply? The best way in my opinion to become convinced on this point is to make an honest and careful study of one's self. It sometimes takes years to realize the extent to which we represent—often in an occult manner—our ancestors; and we must remember that law which Darwin has emphasized, that traits of ancestors tend to appear at the same period of life in the offspring as in the parents. It is further to be remembered that by a study of parents alone we cannot get nearly so good an idea of the heredities of any individual as if more distant ancestors and collateral lines (uncles, cousins) be taken into account.

Indeed the believer in man's evolution from lower forms of life takes a much wider view of the whole subject.

It must be plain that each individual in some measure is the resultant of all those forces represented in ancestors—forces which have been modified in innumerable ways by ancestors, a consideration which greatly complicates the study of heredity. But if any one principle has been established, it is that heredity is stronger than environment. However, we must point out that the weaker the heredity the stronger the environment. Education in the proper sense can do more relatively for a mediocre or weak nature than for a very strong one. A real genius or a criminal will be such regardless of education. So that the practical issue for educators narrows down very much to the question of heredity and environment for the mediocre or sub-mediocre. It is with the latter classes that the

teachers of the land have chiefly to do, though we must not overlook the possible best and wisest that may be entrusted to our care. Our systems are not well adapted to discovering them, especially those of high talent or genius, affairs so tend to averages and mediocrities in all directions these days.

It will now be my aim to indicate how the educator may, by a study of heredity in a practical individual way, as well as heredity as a general fact in nature, increase his usefulness by directing his energies to better advantage from more exact knowledge of the individuals with whom he has to deal.

However skilful the teacher may be in reading the individual from his conduct, the diagnosis (to borrow a medical term) will be much safer if we know the family history and the ancestral tendencies. It is as regards disease, *i.e.*, tendencies of the physical organization, and it is equally so with the mind though not yet so generally recognized.

The teacher who knows nothing of the parents of a child is but poorly prepared to do the best possible in developing that child.

With all the disadvantages associated with the career of a country school teacher who "boarded round," or who was expected to make periodic visits, it cannot be denied that he had opportunities for understanding that all-important home environment of his pupils, and of studying the parents and other relatives, and gathering hints from scraps of family history that greatly helped him who was not a believer that all children are to be treated educationally just alike, all minds to be compressed into the same mould.

With all its imperfections, I am bound to say the individuality of the pupils in the old log schoolhouse was often more developed than in the city public school of to-day, where for a boy to be himself frequently brings with it the ridicule of his fellows, a condition of things that has its effect afterwards on the lad at college.

I find this fear of being considered odd—out of harmony with what others may think one of the greatest drawbacks to the development of independent investigating students at college.

The case is still worse for the girls. When women begin to be really independent in thought, feeling and action, I shall be much more hopeful of the progress of mankind; and happily the dawn of this better day has already begun.

It is scarcely necessary to point out that in the nature of the case the parents are in the best position to learn the hereditary tendencies of their children; but inasmuch as in the large proportion of cases the subject has never been given any serious attention by them, it remains with the teacher to work it out by such means as he can. As with the physician, practice makes perfect in observation, interrogation and diagnosis.

Often a little conversation with the children when at their ease at home will give more information as to their real tendencies than

weeks of observation at school. Parents frequently judge of the natural fitness of their own children for the various callings in life very badly ; and the assistance of the skilled teacher in deciding such matters would be of inestimable value.

By the skilled teacher I now mean the one who is an expert diagnostician of powers, and especially of natural leanings in which heredity plays so very prominent a part. How often is the college teacher, who regards the mistake in the choice of a profession or career as fatal, pained when dealing with certain of his students who plainly should be somewhere else.

Yet it is hard for him to tell a young man that he is out of place. This should all have been settled long ago.

In the course of some lectures on education, given at the Johns Hopkins University several years ago, Dr. Stanley Hall, the eminent psychologist, drew attention to what he called a "life book."

In this a record as impartial as possible of such sayings and doings of each child of a family from infancy to adolescence is recommended to be kept as may be a guide to real tendencies.

Teachers may widen their sphere of influence by making this recommendation according to discretion to at least some of the parents with whom they come in contact. Dr. Hall lays stress on recording the exact words of the child, and on stating everything with extreme accuracy and impartiality, as the fond parents are very apt to put a flattering interpretation on sayings and doings and fail to record the indications of weakness or evil.

It is interesting to paste in also the first letter, first story, first rode sketch, etc., indeed anything that will give a clue to the real nature of the child.

But, as before indicated, the teacher may discover in a visit to the home what may have escaped even the parents.

I know myself of a born artist having been discovered in the very depth of poverty by a physician who was making a professional call. That child has since developed into a distinguished man. Whether innate genius was sufficiently strong to have forced him through and above his environment apart from such early discovery and encouragement, I cannot say. At all events it would in all probability have been a case of devious ways, diverted energy and lost time, if not final, partial or complete failure but for this early recognition.

No doubt the difficulties in the way of meeting all the parents, in the case of a large class in the city school, are considerable, and it may not be feasible to visit all, though much is gained in more ways than one by ascertaining the home environment as well as the hereditaries of the pupils.

When once the teacher has made a somewhat complete and reliable estimate of the tendencies, good and bad, of any pupil and their relative strength, a large part of the problem of development is already solved.

Every human being may be regarded as an organism with a combination of qualities of varying strength, some of which, indeed most of which are good in themselves, but either weak or strong relatively to a common standard or with reference to each other, so that the question of balance is one of the most vital.

The most dangerous of all members of society are those that are ill-balanced and lack self-control. The real criminal organization is of this nature. But so also is the faddist or extremist of any type dangerous, because being ill-balanced he himself tends to lead mediocre minds astray; and much energy that might be better employed must be used to counteract his dangerous doctrines and vigorous efforts.

The question with the teacher then is, How can I develop each nature committed to my charge so as to strengthen its weak parts, physical, intellectual and moral, so that no faculty shall be unduly developed, and that the balance of the whole shall be good, while I do not overlook these faculties that are strong, and on which the success of the individual so much depends? It can, with the utmost confidence, be assumed that in all human beings some powers are by inheritance of different strength from others. Some children are so weak in mathematical perception that they must receive careful and special attention to nurture this up to an approach to the average; while at the same time it must not be made almost the sole standard of intellectual strength or excellence, as I fear has been too much the case in schools within the past twenty years, at all events. An intellect thus weak may have a good deal more than the average capacity for artistic or moral feeling, and men are not mere calculating machines, but rather organisms endowed with feelings that, like the steam-boiler, supply the source of power, the moving forces.

How sadly have we neglected the culture of right feeling in our educational institutions! It was a natural consequence of the misleading, because partial, doctrine that the great purpose of the public school was to teach "the three Rs."

It cannot be too much insisted on, that the great purpose of all education is to furnish a favorable environment (using that term in the widest sense) for the development of the highest type of human beings consistent with the innate inherited tendencies. We cannot make silk purses out of sows' lugs, but we must take care that we do not convert silk purses into lugs by our bungling and lack of insight, all the more likely if we place undue confidence in our educational systems which we call great, because, according to the tendencies of the day, they affect vast numbers.

A study of heredity tends to prevent and mitigate discouragement, and it also shows us how great is the power of the organism to vary with changes of environment. In other words, education, in the true sense, can do much to modify. The world has passed from stages of almost bestial degradation to the present state of civilization through this tendency to vary under environment by processes some of which

we can appreciate, and possibly by others that we do not fully understand. We have every reason to hope for the future; but this should be a rational hope founded on the adaptation of means to an end, and in this the organisms must first of all be considered.

Regarding mankind in this light, it becomes clear to me that, after the parents themselves, the teacher may become the most potent factor in the development of the human being.

He cannot radically alter hereditary tendencies, but it is his great privilege to guide and modify them. In some cases he may require to steer, so as to avoid Scylla and not fall into Charybdis; in others to develop energy in weak natures that only tend to drift along in life. But one thing is certain, that to attain these truly great results, the teacher must be himself very much of a man; and the public would do well if it could but stop long enough in the race for wealth, power or distinction, to consider whether it is taking the right means to find and retain such people. Mankind must study and observe the laws of the heredities of the race to make the greatest possible progress; and next to that, the race must seek out and cherish in every way those that, after the parents themselves, have the greatest influence in moulding and developing—the teachers of youth.

All other questions are subordinate. My colleagues in this noble work, let us in our day and generation realize our great opportunity and seize it.

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