Female education from a medical point of view : being two lectures delivered at the Philosophical Institution, Edinburgh, November 1882 / by T.S. Clouston.

FEMALE EDUCATION

From a Medical Point of View

BY

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Lecture I.

THERE are a good many reasons why physicians should have opinions about the education of youth rather different from those held by most of the public and of the professional educators. Their whole art is founded on the study of the human being—his beginning, his development, his course, his decay, and his death. All his structures and all his functions are carefully inquired into. A doctor must now-a-days be a physiologist, and a physiologist includes the mental as well as the bodily functions of man in his range of inquiry. In fact, it is one of the peculiarities of the physiological mode of studying human nature that man is looked on as a whole—body and mind together—a unity, in which they cannot be studied apart from each other. Then the practical aims of modern medicine, founded on this enlarged study of man, are getting to be more and more concentrated on measures for the prevention of diseases, and not merely for their cure. To prevent disease one must control the conditions of life. Especially in youth, when the human being is most amenable to influences for good and evil that affect the whole future life, must one regulate the conditions of life, if health is to be preserved. The doctor finds that health means far more than a good digestion. It means a conscious sense of well-being all over, contentment, power of work, capacity to resist evil influences, and, to some extent, good morality. It means a sound mind in a sound body. The process and the method of education undoubtedly influence health strongly. If the educator has damaged the health, the doctor is expected to put it right. An important part of the physician's duty is to study the sum-total of a man's hereditary tendencies,

and his bodily weak or strong points, what is commonly called his constitution. He finds that education in many of its modern forms may be either a most helpful or a most dangerous process to many constitutions. In fact, the modern physician is rather disposed to set up as the skilled engineer of the human machine, and the authoritative exponent of its proper treatment in all its departments, both when it is working rightly as well as when it goes wrong.

A careful study of the qualities and capacities of one's material is the very first thing to be done before determining the tear and wear to which it is to be subjected, or arranging the work it is to do. This is a comparatively easy matter, when an ordinary machine is to be made, however complicated. The iron and the steel of the locomotive can be most accurately tested. Yet all prudent engineers allow an enormous margin for casualties. The actual strain put on is not half of what the machinery could really bear. Who would subject the plates of a boiler to a pressure just up to their bursting point? Nature in her mechanics usually makes much more allowance than engineers do. The heart of an animal could send five times the amount of blood that it has to propel at twice the rate of the normal blood current. The arterial pipes that contain and conduct the blood to the extremities are of sufficient thickness and strength to resist five times the pressure put on them day by day. The stomach in a healthy man has usually the power of digesting twice or thrice the amount of food really needed for nourishing the body. Woe betide the diners out, if it stopped short just at the point when enough for nature's wants had been digested! This principle of having a reserve of spare power beyond the ordinary daily needs, only to be called into operation on rare and special occasions, is nature's principle throughout the whole region of life. She scatters seeds by the million where thousands only can grow.

There is a law of nature, too, that lies at the very root of the principles I am going to advocate to-night. It is this, that

every living being has from its birth a limit of growth and development in all directions beyond which it cannot possibly go by any amount of forcing. Man cannot add one cubit to his stature. The blacksmith's arm cannot grow beyond a certain limit. The cricketer's quickness cannot be increased beyond this inexorable point. The thinker's effort cannot extend further than this fixed limit of brain-power in each man. This limit is fixed at different points in each man in regard to his various powers, but there is a limit beyond which you cannot go in any direction in each faculty and organ.

The capacity for being educated or developed in youth, the receptive capacity of each brain, is definitely fixed as to each brain of each young man and woman.

Then the important laws of hereditary transmission of weaknesses and peculiarities and strong points must be studied and kept in mind, so far as we know them, by the educator of youth. To hear some persons talk, you would imagine that every youth and maid had a constitution as free from faults and weak points, and as little liable to go wrong as a forty-shilling watch. Nothing is more certain than that every man and woman is like their progenitors in the main. It takes generations for new conditions of life to eradicate hereditary peculiarities, and then they are always tending to come back. These hereditary peculiarities in youth are mostly not seen as actualities that can be pointed out, and proved to exist by any outward signs. They exist as potentialities only, and come out as actual measurable and ascertainable facts at certain ages, or under certain conditions. A young man who inherits gout strongly may for the first five-and-twenty years of his life be absolutely free from any trace of the disease. Yet we are warranted in inferring that something is there which must be taken into account in the diet and conditions of life, if we wish to contract and eradicate the tendency. Many nervous diseases and conditions are the most hereditary of all, and we have good reason to think that, in those subject to them, the conditions of life, and the treatment to which the brain and the

rest of the nervous system are subjected during the period of the building of the constitution—that is during adolescence from thirteen to twenty-five—are of the highest importance in hastening and accentuating, or retarding and lessening, those nervous peculiarities. The problems of the hereditary transmission of qualities and tendencies to disease are some of the most wonderful in nature, and they are as yet by no means clearly elucidated. Many of them, as yet, cannot be brought under any law. In our present state of physiological knowledge, it is, for instance, a quite inconceivable thing what takes place when we have two generations of perfectly healthy persons intervening between an insane great-grandmother and an insane great-grandchild. The grandparent and the parent carried something in their constitutions which was never appreciable to us at all. Yet it was there just as certainly as if it had broken out as a disease. It is one of the future problems of physiology and medicine to deduce the exact laws of heredity in living beings, and to counteract the evil hereditary tendencies through conditions of life. To do the latter we shall undoubtedly have to begin early in life, and we shall have to control the education especially, and make it conformable to nature's indications, laws, and conditions.

Another law of living beings to be kept in mind is this: There is a certain general energy in the organism which may be used in many directions, and may take different forms, such as for growth, nutrition, muscular force, thinking, feeling, or acquiring knowledge, according as it is called out or needed. But its total amount is strictly limited, and if it is used to do one thing, then it is not available for another. If you use the force of your steam-engine for generating electricity, you can't have it for sawing your wood. If you have the vital energy doing the work of building the bones and muscles and brain during the year that a girl grows two inches in height, and gains a stone in weight, you can't have it that year for the acquisition of knowledge and for study. If by undue pressure

you do call up and use for education the energy that ought to go towards growth and strengthening of the body, you produce a small and unhealthy specimen of humanity, just like those plants which have had their flowers unduly forced, and are deficient in bulk and hardiness, and won't produce seed. Nature disposes of her energies in a human being in due proportion to the wants of each organ and faculty. There is a natural and harmonious relation which each bears to the other. This relation is different in different persons, and at different periods of life. The ploughman takes up most of his energy in muscular effort and in the repair of waste muscle, and he has little left for thinking. The student uses his up in the mental effort of his brain, and has little left for heavy muscular work. No doubt nature is sometimes prodigal of energy, and provides enough for the high-pressure working of both the brain and the muscles in some cases. But this is not the rule, and should not be assumed as applicable to many persons. At the different periods of life nature uses up her available energy in different ways. She allocates it in babyhood chiefly to body growth, in early girlhood partly to growth and partly to brain development; in adolescence, the period of which I am to speak chiefly to-night, her effort is evidently to complete the building up of the structures everywhere, to bring to full development the various functions, to strengthen and harmonise the whole body and the brain, so that they shall be able to produce, and do in the succeeding years of full maturity all that they are capable of. It is certainly not a period of production, but of acquisition. If the original constitution derived from ancestry has been good, if the conditions of life in childhood have been favourable, if the education has been of the right kind, developing the whole being in all her faculties equally and harmoniously after nature's plan, and if the period of adolescence has crowned and completed every organ and every faculty, no faculty being unduly called on to the impoverishment of the others, then we expect, and indeed must have, a woman in health, which means

happiness, with the full capacity for work, for production, and for resisting hurtful influences, and for living her allotted time. But this can only result from a harmonious and healthy *development*, which we may take as the physician's word to denote education in his sense. It can only result from regarding the woman as a unit, body and mind inseparable ; it can only result from the educator's efforts being on the lines of nature's facts, and nature's harmonies, and nature's laws.

Another fact in regard to the vital energies and forces of the human body is this: That you may use up by an undue push and pressure at one time of life the power that ought to have been spread out over long periods. We see this daily in men who have had trying or excited lives and occupations. Some of them wear out soon, and grow old soon, and are old men with no energy or vitality left at fifty. What you put into one period of life you want at another. If with ten tons of coal in the tender you keep your locomotive running at sixty miles an hour for the first two hours, you don't expect it to do this for long. Each period of life has its peculiar forces and energies in which it is specially rich. In adolescence the strong points, mental and bodily, are very marked. I shall specially allude to them by-and-by. It is sufficient to say here that they are not thinking or intense repression of all the general energies so as to concentrate them in mental work. This may be done, but the question is, Is it well to do it? Does it make life more complete and happy to do so, looking at life as a whole? A physician, like a philosopher, must look on life from the cradle to the grave, not on one portion of it only, as the educationalist is perforce obliged to do, having nothing to do with it afterwards. Like many architects and contractors building our houses for us, they turn out an article finished up to the standard of the time, and then hand it over to you. They never see it again. Its future does not concern them much. I have often proposed that your architect and contractor should be bound to come and look at your house every five years for

the first twenty, and should get certain deferred payments at these periods according as the work is standing, and no defects developing. So I would have the educator's reputation depend, not at what he has turned out at twenty-one, but on the result at forty or fifty or sixty. Education is a preparation for the work of life, not a thing that is good in itself. If it has helped life to be healthy, happy, successful, and long, then it has been good; if in any degree it has caused disease, unhappiness, non-success, then it has been bad.

There is another vital fact in the constitution of human nature that needs to be taken into account—at least I for one believe it to be a fact. It is this, that one generation may, by living at high pressure, or under specially unfavourable conditions, exhaust and use up more than its share of energy. That is, it may draw a bill on posterity, and transmit to the next generation not enough to pay it. I believe many of us are now having the benefit of the calm, unexciting, lazy lives of our forefathers of last generation. They stored up energy for us; now we are using it. The question is, Can we begin at adolescence, work at high pressure, keep this up during our lives (which in that case will be on an average rather short), and yet transmit to our posterity enough vital energy for their needs? How often it has happened in the history of the world, that people, who for generations have exhibited no special energy, blaze out in tremendous bursts of national greatness for a time, and then almost die out! The Tartars under Genghis Khan, the Turks when they overawed Europe, the Arabs when they conquered Spain are examples. We must take care that this does not happen to us. How often we see a quiet country family that has, for generations, led quiet humdrum lives suddenly produce one or two great men, and then relapse into greater obscurity than before, or become degenerate and die out altogether.

Another fact in the body and mind history of human beings is this, that there are certain physiological eras or periods in life, each of which has a certain meaning. The chief of such

eras are childhood, puberty, adolescence, maturity, the climacteric, and senility. We have to ascertain, What does nature mean by these eras? What does it strive to attain to in each period? What are the ideal conditions of each? No one of these periods can be studied from a bodily point of view alone, or from a mental point of view alone. They must be regarded from the point of view of the whole living being, with all its powers and faculties, bodily and mental. Not only so, but in most cases the inherited weaknesses must be taken into account too. Those eras of life cannot be fully understood looked at with reference to the individual. Their meaning is only seen when the social life, the ancestral life, and the life of the future race are all taken into account. And this is what makes some proper attention to those eras so very important from the social as well as the physician's point of view. If they are not understood, and so are mismanaged, not only the individual suffers, but society and the race of the future. Particularly the era of adolescence is important, for it is the summer ripening time in the vital history. If the grain is poorly matured, it is not good for either eating or sowing.

Such is the physician's, or perhaps I should rather say the physiologist's, way of regarding a woman, her development, and her education. It is because we don't think the average parent and the professional educator in the technical sense always takes this wide view, but that the professional enthusiasm of the latter takes account of, and tries to cultivate one set of faculties only, viz., the mental; because we think the public mind is getting to regard as all-important in female education what we think is not so important, and so to take little account of what we regard as of supreme importance to the individual and to the race—viz., the constitution and the health—that I think that the physiological view of female education should be brought forward and presented to the public mind more frequently than is the case; while the bad results in after-life of disregarding nature's laws, as these results come under the

notice of the physician, should be strongly and clearly brought before the general mass of parents and educators. It is not a matter that concerns the physician and his immediate patient only. It concerns the whole of the people.

I shall now enter more into detail in illustration of the general principles I have mentioned, as applied to that period of the life of a young woman when the chief part of her education is going on. I am not going to speak much of the period of childhood, or up to the age of thirteen or so. Before that time it is no doubt important that education should be conducted on physiological principles, with due regard to the growth of the whole organism, and therefore without too many hours of mental work, with plenty of play and rest, and in well-ventilated school-rooms. During the period of childhood few girls will overwork themselves. If it is done, it is by outside pressure, and any bad effects are usually temporary, and easily got over by a little rest, and a good holiday in the country.

The era of adolescence is one of the greatest importance from a bodily and mental point of view in young men and women, but especially in the latter. Bodily, the child eats, sleeps, grows, plays, and does what she is told. Life has no seriousness. Everything in the body and mind is inchoate and unformed. Nothing indicates permanence. There is great and constant muscular energy, noise, sound sleep, quick digestion. The delights of life consist in sweets and games, the imagination is shallow, the affections are instinctive, "character" is nascent; there is no morality in any correct sense, and no real religious sentiment. There is little liability to nervous diseases except those affecting the muscular system; there are no neuralgias, no liability to mental diseases, and most other diseases are sharp and soon over. It is very different with the girl when adolescence commences. Then bodily energies of a new kind begin to arise, vast tracts of brain quite unused before are brought into active exercise. The growth assumes a different direction and type, awkwardness of movement becomes possible, and on the

other hand a grace never before attainable can be acquired. The bones begin to cohere and solidify at their ends, and the soft cartilage joinings to get firmer. The tastes for food and drink often change. Bread and butter and sweets no longer satisfy entirely. Stronger and more stimulating foods are craved. The carriage and walk changes. The lines of beauty begin to develop. But the mental changes are even more striking. All that is specially characteristic of woman begins to appear; childish things are put away; dolls no longer give pleasure. For the first time distinct individual mental peculiarities show themselves. The affective portion of the mental nature begins to assume altogether new forms, and to acquire a new power. Literature and poetry begin to be understood in a vague way, and the latter often becomes a passion. The imagination becomes strengthened, and is directed into different channels from before. The sense of right and wrong and of duty becomes then more active. Morality in a real sense is possible. A sense of the seriousness and responsibility of life may be said then to awaken for the first time. The knowledge of good and evil is acquired. The religious instinct arises then for the first time in any power. Modesty and diffidence in certain circumstances are for the first time seen. The emotional nature acquires depth, and tenderness appears. The real events and possibilities of the future are reflected in vague and dreamlike emotions and longings that have much bliss in them, but not a little too of seriousness and difficulty. The adolescent feels instinctively that she has now entered a new country, the face of which she does not know, but which may be full of good and happiness to her. The reasoning faculty acquires more back-bone, but is as yet the slave of the instincts and the emotions. A conception of an ideal in anything is then attainable, and the ideal is very apt to take the place of the real. The relations and feelings towards the other sex utterly change, and the change makes its subject liable to tremendous emotional cataclasms, that may utterly overmaster the rest of the mental life. There is a subjective

egoism, and often selfishness, tending towards objective dualism. There is resolute action from instinct, and there is a tendency to set at defiance calculation and reason. All those changes go hand in hand with bodily changes and bodily development. There is a direct action and interaction between body and mind, all through. Accompanying all these there is, when health is present, a constant ebullition of animal spirits, a joyous feeling, a pleasure in life for its own sake, and there is a craving for light and beauty in something. There should not only be enough energy in the body and mind to do work, but there should be some to spare for fun and frolic, which is just nature's pleasant way of expending vital force that is not needed at the time for anything else.

For the origination, for the gradual evolution of all these mental changes into perfect womanhood, there are needed corresponding bodily developments. Without these we should have none of those marvellous mental and emotional phenomena properly evolved and developed. If the health is weak, the nutrition poor, the bodily functions disordered and imperfect, and the nervous force impaired, we are liable to have the whole feminine mental development arrested or distorted. If undue calls are made on the nervous force, or the mental power, or the bodily energies, the perfection of nature cannot be attained, and womanhood is reached without the characteristic womanly qualities of mind or body. The fair ideal is distorted. The girl student who has concentrated all her force on cramming book knowledge, neglecting her bodily requirements; the girl betrothed who has been allowed to fall in love before her emotional nature was largely enough developed; and the girl drudge who has been exhausted with physical labour—all alike are apt to suffer the effects of an inharmonious, and therefore an unhealthy, mental and bodily constitution. The body and the mind go in absolute unison, just as the blush on the maiden's cheek comes and goes with emotion, as the brightness and mobility of her features go with mental vivacity and happiness.

All those mental and bodily changes are not sudden, nor fully completed and brought to perfection at once; it takes on an average from ten to twelve years before they are fully completed. All that time they are going on, and during that time there is an immense strain on the constitution. All that time the whole organic nature is in a state of what we call instability; that is, it is liable to be upset in its working by slight causes. The calls on the inherent vital energy to carry on and to bring to the harmonious perfection of full womanhood all these combined bodily and mental qualities I have referred to, during these ten or twelve years, is very great indeed.

We physicians maintain that this period is one of momentous importance, and we have good reason to know this, for we are often called on to treat diseases that arise then, and, having originated then, have been fully matured afterwards. The risks and the dangers to body and mind are then very great indeed. We count it a fearful risk to run, not merely that actual disease should be brought on, but that a girl capable of being developed into a healthy and happy woman, with a rounded feminine constitution after nature's type—the only type that secures happiness and satisfaction to a woman—should by bad management, misdirected education, or bad conditions of life, grow into a distorted, unnatural, and therefore unhappy woman, who cannot get out of the life that she has only to live once all that it is capable of yielding her. Like all the other physiological eras of life, that of adolescence only comes once. If the developing process, which is its chief characteristic, is not completed, then it is missed for life. Whatever is done then is final; whatever is left undone is also final. If a woman is not formed at twenty-five, the chances are she will never be so; if she is not healthy then, she probably won't be so. Who in his senses can deny that it is far better for nineteen women out of twenty to be healthy than to be intellectually well educated? No acquirements of knowledge can possibly make up for health in after life. There is an organic happiness that goes only with good

health and a harmoniously constituted body and mind. Without that organic happiness life is not worth having. Cheerfulness is one of the best outward signs of this perfect health, and what woman has not missed her vocation in the world who is not cheerful? A general sense of well-being is the best conscious proof of perfect health. It underlies all enduring happiness. It means good and harmonious development of mind and body, properly working functions, and satisfied organic needs. Any method of education that impairs this must be bad and one-sided.

Here it may be necessary to correct a too common notion that the brain only subserves mental work. To hear the common expression, "brain work," one would imagine that muscular exercise, ordinary employments, and digestion could go on without the brain's working at all. No idea could be more mistaken. The brain is a most complicated organ in structure and function, that regulates the working of every portion of the body, that has certain portions of it devoted to motion and feeling, and passion, and digestion, and body-growth, and nutrition, etc. It is the one organ that dominates all the others, regulating and harmonising all their functions. If one side of it is injured during growth, the opposite side of the body is left stunted and partially paralysed, as well as the mental power weakened. If undue calls are made on one part, the other portions suffer. Now this wondrous, and as yet only partially known organ has grown most of its growth, in so far as mere bulk is concerned, by the time adolescence begins. But its higher qualities—its force, its power of producing varied energies—are then only nascent. They develop during this period. It is then that the brain needs plenty of rest in sleep, fresh air, pure blood, good nourishing non-stimulating food, and work that develops but does not exhaust. The mental portion of the brain is no doubt the highest, and undue calls on that portion exhaust more than any other part. As I said, only a certain amount of energy or work is possible by any amount of

stimulation. The brain has most diversified functions, but it has also a solidarity of action. No part is sick without all the other parts suffering. No function is overtaxed without all the other functions being weakened. Overtaxing of the mental function is specially weakening. In mature life, after the body is fully developed, such an overtaxing can be repaired by rest. The injury is merely temporary. If a man overworks his brain in business or study, and gives himself too little sleep, and gets an attack of indigestion, it means that he has taken up the brain energy that ought to have gone towards digestion in mental work. But he stops work, goes to the country, and his recuperated brain soon acquires force enough to stimulate the stomach to secrete its juices and do its work. But if in adolescence, before the bones are knit, and the growth completed, and the feminine nature far advanced towards perfection, if the brain that is in the process of doing all these things is year by year called on to exert its yet imperfect forces chiefly in acquiring book knowledge by long hours of study, and in consequence the growth is stopped, the blood is thinned, the cheeks are pallid, the fat destroyed, the wondrous forces and faculties that I have spoken of are arrested before they attain completion, then when the period of growth and development ceases, the damage is irreparable. There is no time or place of organic repentance provided by nature for the sins of the schoolmaster. Life has to be faced with an imperfect organism, its work and duties done with impaired forces, and its chances of accidents met without a stock of reserve power. This is a poor look-out for the individual; but when motherhood comes, and sound minds in sound bodies have to be transmitted to posterity, how is it to be then with the future race? This aspect of the question of female education during the period of adolescence is of absolutely primary importance to the world. Yet it is wholly ignored in many systems of education. What is the use of culture, if it is all to end with the present generation? What a responsibility to transmit to future generations weak bodies and

over-sensitive brains, liable to all sorts of nervous disease! Nothing can be more certain than that the qualities, good and bad, acquired in one generation are sent on to the next. The world may be all the better of a generation of healthy, ignorant, and happy mothers, who can produce stalwart forceful sons and daughters (not that I wish this Lecture to be an apology for health and ignorance), but the world must be worse for a system of stopping full and harmonious development in the mothers of the next generation. My plea is, that as nature is harmonious in mental and bodily development, we should follow on her lines, and not set up an educational standard for ourselves that is one-sided, because it takes no proper account of the constitution of the body and brain at all, only considering one brain function—the mental.

Along with these developments of mind and emotion during adolescence there are, unfortunately, too apt to develop hereditary weaknesses, especially of the nervous kind. Physicians then meet with hysteria, neuralgia, nervous exhaustion, insanity, etc., for the first time. As normal individualities of bodily form and mental character then arise, so abnormal developments arise too where they are inherited or brought on by unfavourable treatment. This law is found to prevail in human constitutions—if you give nature a good chance by specially favourable conditions, and by counteractive measures early in life, she tends to eradicate evil hereditary tendencies, and to return to a healthy type, if the evil has not gone too far in the ancestry or in the individual. Unfortunately there are very few families indeed, now-a-days, free from tendencies to some hereditary disease or other. Our modern life tends to develop the brain and nervous system, and undue development means risk of disease always. What the profession of medicine specially desires to guard our population now against, is our becoming a nervous race. We want to have body as well as mind: otherwise we think that degeneration of the race is inevitable. And, therefore, we rather would err on the safe side, and keep the mental part of the human

machine back a little, while we would encourage bulk, and fat, and bone, and muscular strength. We think this gives a greater chance of health and happiness to the individual, and infinitely more chance of permanence and improvement to the race. This applies to the female sex, we think, more than to the male. Man's chief work is more related to the present (from a physiological point of view), woman's chief work to the future of the world. Why should we spoil a good mother by making an ordinary grammarian?

It will be said, as a hereditary fact, that most great men have had mothers of strong minds. I believe this to be true, but it is not a fact that many great men have had what would now be called "highly-educated" mothers. On the contrary, very few such men have had such mothers. There were usually an innate force and a good development of mind and body in the mothers of such men, who usually had led quiet, uneventful, unexciting lives. I am inclined to believe that if the mothers of such men had been in adolescence worked in learning book knowledge for eight or ten hours a day in a sitting posture; if they had been stimulated by competition all that time, and had ended at twenty-one by being first prizewomen (as probably most of them had the power of being); if this had befallen them, then, I think, their sons would have been small and distorted men, instead of being the lights of the world.

One great argument for the "higher education" of women is that it makes them fitter companions for highly-educated men. This view should be looked at in the light of the ideal women that have been created in literature by men and women of genius. If genius has the instinct to discover the highest qualities, and to portray them for our instruction, we should get guidance here. Women have been painted by our poets, dramatists, and creative writers of fiction by the thousand. Many persons would accept the ideals thus sketched for them as a surer guide than the laboured deductions of the scientists. Men of genius ought to have known the kind of women whose

companionship they liked, and whose influence on them was best. While they have had to create every kind of woman in peopling the ideal worlds they have made for us, it is certainly very remarkable that the ideal type of the very highly book-educated woman of the modern educationalist is scarcely met with at all. In the "Princess" of our poet-laureate the fancy cannot be said to be a serious or imitable one. Though the sentiment of the "sweet girl-graduates with their golden hair" is this:

> "Oh! lift your natures up,
> Embrace our aims: work out your freedom, girls;
> Knowledge is now no more a fountain sealed.
> Drink deep until the habits of the slave,
> The sins of emptiness, gossip, and spite,
> And slander die. Better not be at all
> Than not be noble."

Yet the poet paints the sweetness so as altogether to overpower the learnedness in the picture, and the Princess' ideal and purpose come to nought. And Lady Psyche's dream of likeness and equality is as far as ever from being realised.

> "Everywhere
> Two heads in council, two beside the hearth,
> Two in the tangled business of the world,
> Two in the liberal offices of life,
> Two plummets dropt for one to sound the abyss
> Of science and the secrets of the mind.
> Musician, painter, sculptor, critic move;
> And everywhere the broad and bounteous earth
> Should bear a double growth of these rare souls,
> Poets, whose thoughts enrich the blood of the world."

Shakespeare's women are certainly not of the learned sort. Their years of adolescence were not taken up in getting up book-knowledge exclusively. Their emotional nature was not dried up by the strain of intellectual work in youth. Their constitutions were not spoiled by study. They had fair faces, and

womanly forms, and warm affections, and strong impulsive passions, and mother-wit, and keen discernment, and most vigorous resolution, but nothing that we would call learning—not one of them. Portia, who acted the most learned part of all Shakespeare's women, vehemently describes herself as

"An unlessoned girl, unschooled, unpractised."

George Eliot has created for us a whole host of young women, all real, all true to nature. Herself a woman, and a genius of the highest order; penetrating, learned, accomplished, subtle, and with a power of discriminating language unequalled in our generation; a wife and mother too—she was the best-fitted woman of the age unquestionably to draw for us a picture of young womanhood, highly educated in knowledge, up to the educationalist's ideal. Where do you find such a character in her writings? Dorothea in "Middlemarch" had exactly the makings of the successful omnivorous young female students of the present day; intellectual, conscientious, hyper-conscientious—as such young women so often are to their cost—"studious, her mind was theoretic, and yearned after some lofty conceptions of the world. . . She was enamoured of intensity and greatness." She was self-sacrificing to a fault. She was often ardent, and not in the least self-admiring. Yet Dorothea is not highly educated in the modern sense. Perhaps a modern educationalist would say that that was the reason poor Dorothea made such a mess of it, and threw herself away first on a selfish, shallow old brute, thinking he was a hero, and then on the least interesting fellow in the book.

One of the finest studies of adolescence in the female sex, from the mental side, is Gwendolen Harleth, in "Daniel Deronda." The picture is worthy of study by all persons, who take an interest in human nature. Gwendolen was neither good nor studious. She was idle in learning, and she was selfish. She had a vast amount of subjective egoism, tending towards objective dualism, resolute action from instinct, a setting at defiance of calculation

and reason, yet acting most reasonably towards the end in view. She was full of sentimentality, of inchoate religious instinct, of a desire for notice. Yet she was undeniably a fine young woman, and is a type of a large mass of the young women whom our modern educationalists would like to set to work for eight hours a-day, from the age of thirteen to twenty, acquiring book-learning. I confess I more agree with Hannah More's notion of education for such a girl: "I call education not that which smothers a woman with accomplishments, but that which tends to consolidate a firm and regular system of character, that which tends to form a friend, a companion, and a wife. I call education not that which is made up of shreds and patches of useless arts, but that which inculcates principles, polishes taste, regulates temper, cultivates reason, subdues the passions, directs the feelings, habituates to reflection, and trains to self-denial—that which refers all actions, feelings, sentiments, tastes, and passions to the love and fear of God." If to this we add that which hardens the muscles, adds to the fat, quickens and makes graceful the movements, hardens the bones, softens the skin, enriches the blood, promotes but does not over-stimulate the bodily functions, quickens and makes accurate the observation, increases the sense of real beauty of all kinds, promotes the cheerfulness, and develops a sense of universal well-being, we should have, in my opinion, the principles on which an educational system should be founded.

George Eliot's Romola was in a sense a learned woman, brought up in the midst of books, and in the atmosphere of culture. Yet she took to love-making, marriage, self-denial, charity, and religion, and deserted her books the moment her duty in them was done. She had no innate love of book-learning; most of what she had acquired seemed to do her little good in her after-life. It was no guide to her in her difficulties, it was no solace to her in disappointments, it was no resource to her when everything else had failed. It had not taken hold of her nature, because it was not on the great lines on which her

nature was constituted. She and her father were as much alike as a man and woman can be. Yet to him his books were an occupation and a delight which he loved, to her their study had been a self-denial all through.

We all know what Thackeray's women were, and yet he stands very high as a faithful student and expounder of human nature, as it exists.

When we look at the sort of women again that these great masters of the study of human character made their heroes fall down and worship we certainly do not find that the schoolmaster had had much to do with the creation of their attractiveness. Hamlet and Ophelia, Adam Bede and Hetty, Deronda and Gwendolen, Lydgate and Rosamond, are the common types of men above the common mould taking to women of the unlearned, if not quite uneducated, type. The thoughtful and scientific Lydgate said about pretty shallow Rosamond, "She is grace itself; she is perfectly lovely and accomplished; that is what a woman ought to be: she ought to produce the effect of exquisite music;" while he said about the stately thoughtful Dorothea, "The society of such women was about as relaxing as going from your work to teach the second form, instead of reclining in a paradise, with sweet laughs for bird-notes and blue eyes for a heaven."

But it may be said all this was wrong, the result of yielding to unaided, unlearned nature's lowest affinities, and that it turned out badly for those men. If they had mated suitably the world would have been better, and they themselves would have been happier. But the physiologist will not readily believe that nature's mental affinities can be wrong, any more than he can believe that the appetite is not on the whole the best guide as to the kind and amount of food that is good for us. When he finds in nature a marked masculine and feminine type of being, of body and of mind, marked enough from birth, but diverging widely from the beginning of the physiological era of adolescence, each type tending towards a different ideal, and attaining this at

the end of that period; and, recognising these facts of nature, he finds it most difficult to admit, that the same type of education should prevail in this momentous era, or that the same standard and ideal of a completed education should be striven after for the two sexes. And, when he finds that the great geniuses of literature have created these types of young women as different from the masculine type as the Apollo Belvidere is unlike the Venus de Medici, he cannot but become strongly persuaded that his deductions from physiological facts are true, and that they have been always instinctively recognised by the wisest of mankind. If it can be shown that the present tendency to over-educate the female sex in book-learning during adolescence, and the mental work, confinement, etc., that this implies tends to impair perfect health, to interfere with nature's lines of feminine development, to exhaust energy that is needed for other purposes, and to diminish the chances of the permanence of the race, then it is time that the physiological view in regard to education were put in a plain way to the professional educator and to the parent.

Lecture II.

AS the result of my inquiries among pupils and teachers in the advanced schools for young ladies, I find that about five or six hours of actual school work, and from two to four hours of preparation at home, may be taken as the time that is each day occupied in education. Many of the ambitious, clever girls, in order to take high places and prizes, work far longer than the time I have mentioned in preparing at home, especially if the musical practising is taken into account. At certain times of the year, before examinations, some of these girls will work twelve and fourteen hours a day, and take no exercise to speak of, and but little fresh air. For those who attend the day-schools a somewhat solemn walk to and from school is the chief means the body has of keeping healthy at all. To satisfy the requirements of the brain, and the blood, and the muscles, and the digestion, and the nutrition, and the general growth, we have a girl getting up at seven o'clock in the dark winter morning, dressing, eating a hasty breakfast (as if that was a secondary matter that was too unimportant to waste much time over), having a revise of some special subject learnt the night before, walking to school in perhaps thin-soled boots, and doing the most physiologically profitable thing of the day in the chat and gossip on the way. School and lessons from nine o'clock till two or three, or four often, in questionably aired, overheated, and dull class-rooms, with not a bright bit of paint or colour in them to counteract the sunless gloom of our Scotch winter weather. Who ever saw a class-room in a school where taste had been exercised in the decoration and painting? In my opinion our school-rooms should be made at least as nice as our

drawing-rooms. Then the walk home, a hurried dinner, a little rest, and to work till nine or ten o'clock at night in gaslight. That is the sort of life, and these are the conditions, under which we expect not only prodigies of learning in all the sciences but sweet tempers and sweetly healthful bodies to be developed. That is the actual treatment to which thousands of our girls are subjected during the most momentous period of their lives, physiologically; when the growth of the body is being completed, its symmetry and perfection are being reached, when the latent energies for a life's work are being or should be accumulating, and when a certain amount of joy and fun and play are nature's best aids to health of body and mind.

There is another class of young women who have even a harder lot in many cases, and these are the pupil-teachers in the Board Schools. Their work is, in some cases, simply continuous all day, and part of it is irksome, uninteresting drudgery; their homes are often far from being cheerful, and their food far from being very abundant. I know as a fact that the lives of some of our female pupil-teachers are such that as melancholy a "Song of the School" could be sung of them as Hood's "Song of the Shirt."

In both these cases—the scholars in the higher class of girls' schools and the female pupil-teachers—the range of subjects to be learned at the same time is often enormous. Six, seven, eight, nine, and even ten different subjects, all being learned at once is no uncommon thing! I am glad to say that this is being corrected in the best schools, and only four or five subjects are allowed to be taught at the same time. This is surely enough.

If I had a school to construct on ideal principles, I should have it placed on the north side of a large space of ground. I should have it one storey only, and every class-room lofty, and with roof-lights to let in as much as possible of our scanty Scotch sunlight. I should have the walls of the class-rooms painted in light, cheerful, tasteful colours, to produce a cheering effect on the minds of the pupils. I should have big, open fire-

places to cheer and to ventilate the rooms. I should have, as an essential adjunct, a great room, where gymnastics, romping, dancing, and play should all have full scope, when the weather did not admit of the girls going out. I should not restrain romping and play, even in girls of eighteen, between classes. Girls between thirteen and twenty will romp well, if they are in health, and there is no pressure put on them that it is not the thing for them to do. I should not have more than four hours of good hard work at school, and two of preparation at home. The fact is, that our scholars lose the benefit for their health of the best part of our Scotch winter days, the forenoon, when we sometimes have both sunshine and dryness in the air. By the time school is over, the day is done.

One of the practices most energetically relied on in the higher class of girls' schools is that of the competition of one scholar with another. In some of them this competition is terrific. It extends to every subject; it becomes so keen as to put each girl who is in the foremost rank in a fever heat of emulation before the examinations. In some cases it overmasters every other feeling for the time being. No doubt, from the schoolmaster's point of view, it is the very thing he wants. In his professional enthusiasm he aims at the highest mental result. He is not professionally interested in the health or the special nervous constitution of his girls; he does not regard them as each one a medico-psychological entity and problem. I don't say this by way of reproach. All good men try to attain the highest result in their special departments. The educator has no means of knowing the constitution and hereditary weakness of his girls—that the mother of one died of consumption, that the father of another was insane, that neuralgia is hereditary in the family of a third, that one has been nervous, another had convulsions when a baby, another has been threatened with water in the head, etc. His own education and training have not taught him to notice or know the meaning of narrow chests, or great thinness, or stooping shoulders, or very big heads, or quick jerky

movements, or dilated pupils, or want of appetite, or headaches, or irritability, or backaches, or disinclination to bodily exertion. But all these things exist in abundance in every big school, and the girls handicapped in that way are set into competition with those who are strong and free from risks. It is the most nervous, excitable, and highly-strung girls who throw themselves into the school competition most keenly. And they, of course, are just the most liable to be injured by it. All good observers say the intensity of feeling displayed in girls' competitions is greater than among lads, and that there is far more apt to arise a personal animus. Girls don't take a beating so quietly as boys. Their moral constitution, while in some ways stronger than that of boys, especially at that age, suffers more from any disturbing cause. The whole thing takes greater hold of them—is more real. It is more boys' nature to fight and forget, and take defeat calmly. Girls, I believe, suffer, when the competition in schools is too keen, in their tenderness of feeling and in their charity. They tend to attribute unfairness of motive to their teachers far more than boys, just because their affective nature is and should be stronger than their reasoning power. A man's idea of the perfection of feminine nature is, that it always has some self-denial and much generosity in it. Now these keen school competitions admit in theory of no such notions of self-denial or generosity, though both are common enough in individual cases. An ideal woman should rejoice as much in sympathy with the winner of the first place as if she had won it herself. Men certainly don't, in their hearts, like to see girls competing keenly with each other for anything.

Young women at adolescence are apt to have in large degree the feminine power of taking it out of themselves for a time, more than they are able to bear for long. It is this power which enables a mother to watch a sick child for weeks without almost any sleep, and without feeling much sense of fatigue at the time. Now when this power is called up for months for such a pur-

pose as school competition,—the feelings being stimulated by rivalry with others, and by the enthusiasm of that age, during a period of life when the body is undeveloped, and should be rapidly growing, and all these functions and faculties maturing,—it is perverted from the real use that nature meant it for, and the results cannot fail to be bad. At that age girls are not only enthusiastic in perception and reception, but they are often very conscientious, and apply their ideas of right and wrong to things that have no ethical relationship. They are, in fact, hyper-conscientious, and make themselves unhappy about school deficiencies, for which they are not in the least responsible. I have known girls cry bitterly because an accident or headache prevented them preparing their lessons for the morrow, and blame themselves severely about it. It is not uncommon for our Scotch girls, at least, to think it is some dereliction of duty and sin on their part that prevents them from attaining a high place at school. The whole process of education, as it exists in some schools, with its competition, long hours of work, short hours of recreation, enthusiasm for work, and conscientiousness in the doing of it, takes up all the available energy of the girl. There is little left for joyous feeling and enjoyment of life for its own sake. The sources of vital energy in the brain are not sufficiently replenished by fresh air and the frolic natural to the age. Blood is not formed in sufficient amount, and pale cheeks and flabby muscles are the result. Nature can't get material and force to build up the form towards the fair woman's ideal, and, therefore, personal beauty and grace of movement are not attained to the extent they should be. As for a store of energy being laid up, as it should be at that age, for the future, for woman's work of the future, for motherhood, for the race of the future, how can it be, when every available energy is taken up in this educative process?

The methods of education are now-a-days made far more pleasant for a pupil than they were formerly. Every art and device is now adopted to make it attractive and interesting.

That, no doubt, is in the right direction, and it has resulted from a closer study of the mental nature of pupils. But it is attended with this danger, that, being more attractive, it can be pushed further and more hurtfully to the constitution, by the aid of the pupils, as it were. Its very seductiveness and interest, like the tempting courses of a feast, tend towards dangerous surfeiting.

It must be remembered that, in many respects, the female organism is far more delicate than that of men. This is especially so at adolescence. The machine is less tough, and breaks down at slighter causes. It has more calls on it. It needs more careful management. It is not steady in its action, but irregular. It is not fitted for the regular grind that the man can keep up. Having beauty and harmony as two of its great ideal aims, its strength is not so great. Having to lay up more for the future, it can't expend so much in the present. Sensitiveness always implies delicacy, and in many cases instability in nature. Even suppose it is granted that it was a good thing for a woman that her brain should contain all the book-knowledge that many modern educationalists demand, this good thing might be altogether counterbalanced if the labour of acquiring it stopped one inch of growth, or diminished the joy and organic satisfaction of life one iota. If the men of the future were to suffer and be degenerate through it in the faintest degree, then it would be radically bad.

There is one most unaccountable want in very many girls' schools in our cities. If boys need play, fresh air, games, muscular development, I have no hesitation in saying that girls need them all to the extent applicable to their constitution and strength still more. For boys will have them to some extent. If you don't give a boy a playground he will play on the street, which is better than no play. Now the exigency of public opinion will not allow our young ladies to amuse themselves on the streets; and if not, how are they to get the fresh air and muscular exercise that are absolutely necessary for their health

and proper development? You cannot starve a girl's life of these things without doing her harm, any more than you can with impunity keep her on a short allowance of food. A girls' school without a playground, a gymnasium, or public park near, I look on as a garden without sunshine, or a boat with one oar. It is deficient and one-sided; it is a machine for production without sufficient provision for the renovation of tear and wear. Mind can't grow except by growth of brain; brain can't grow but through good food, fresh air, work, and rest, in proper proportion. The blood will not renew itself properly in youth but by brisk circulation, and this can only be got by exercise in the fresh air. The muscles won't grow and harden but by having plenty of good blood and exercise. The fat, that most essential concomitant of female adolescence, won't form in the proper way, except the blood is rich. Fat is to the body what fun is to the mind, an indication of spare power that is boiling over and available for future use. I don't mean an excessive amount of fat; I mean that amount that gives roundness, plumpness, and beauty. This little estimated substance is, with form, the great source of female beauty. Without it, form cannot make a perfect woman; without it, a young woman cannot be said to be really in health; without it, the body generally has, in most instances, too little spare energy to resist and to recover from disease. Therefore, a proper amount of fat should, in its way, be as much looked to in a young woman as intellectual power or keen feeling. The right sort of fat, firm and smooth, gives the lines of beauty and the idea of softness and health to woman. But to the physiologist its great value and importance is, as an index of good nutrition and a reserve of spare material, not needed for work just now, but called up in any illness. When anything is both a beauty and a strength, it should not be decried or spoken disrespectfully of. I knew a man—not a lunatic—who always said it was his highest ambition to be fat. Certainly there are many more foolish wishes for our growing adolescent girls than that they should all be fat. It is just be-

cause this seems to be incompatible with the work in some of our modern city high-class schools, that I think that work must be conducted to some extent on wrong principles.

I am no educationalist, and may be accused of speaking about what I am ignorant of, if I suggest that too many things are taught at the same time, and too little time is taken for the whole process. Think of an undeveloped brain getting up book-knowledge on ten different subjects all the same day, and this going on day after day for years! It is altogether contrary to the principles of a sound psychology to imagine that any sort of mental process, worthy of the name of thinking, can take place in that brain while that is going on. The natural tendency of a good brain at that age to be inquisitive and receptive is glutted to more than satiety. The natural process of building up a fabric of mental completeness by having each new fact and observation looked at in different ways, and having it suggest other facts and ideas, and then settle down as a part of the regular furniture of the mind, cannot possibly go on where new facts are shovelled in by the hundred day by day. The effect of this is bad on boys, but is worse on girls, because it is more alien to their mental constitution. The effect on them of this unnatural process is to exhaust the nervous power at the time, and to leave the brain afterwards filled with useless things that are soon forgotten and pass away; as Goethe said about professional men, they labour under a great disadvantage in not being allowed to be ignorant of what is to them useless. The vital energies and nervous power that had thus been thrown away should have gone towards a feminine equipment of a healthy well-developed body, a mind built up and stored with knowledge that had a relation to its own nature and to the wants of its future life, affections not attenuated by scholastic routine, and a cheerfulness that is only compatible with good health. The cramming up of the dry facts of those many subjects is in most cases a weariness and pain, while the intelligent study of one-third of them, selected on account of their fitness to the mental

constitution of the learner, or her probable requirements in future life, might be a pleasure and a lasting profit. I would strongly advise parents occasionally to take their daughters' night tasks and do them themselves. It is far more important to extend female education till after twenty years of age than male education.

While education is going on, a regular periodic testing of the bodily growth and condition should also be carried out in the case of every girl. Her rate of growth should be marked by a notch on a stick every quarter. As regularly as the school fees are paid her weight should be taken, the colour of her cheeks and lips should be looked at and noted, her appetite and digestion should be looked to, her habits of activity or otherwise should be observed, her power of sleeping should be noticed, the mode of growth should be observed—*e. g.*, whether her chest is expanding, whether her shoulders are sloping or stooping, whether she is soft or firm in the flesh, etc. Her general mental condition, whether she is frolicsome or irritable, enthusiastic or sluggish, selfish and grudging, or not, is of great moment as an index of the general brain condition. Of course, anything like disorder of health, or pain, or sleeplessness, or want of appetite, or pallor, or thinness, should be at once attended to before they go too far. The great thing is to stop the beginnings of evil. If a girl has grown a couple of inches a year, then depend upon it she should not study hard. Nature has enough to do in such a case to firm up the body in proportion to its bulk. You want not only growth, but activity, grace of movement, alertness, strength. You won't have these if the girl goes on studying hard while she is growing fast.* If growth

* On October 1st I weighed and measured three children of one family, two boys and a girl, on their return to school after the holidays, and on November 30th I again did so. The boys had each gained four pounds in weight and grown half-an-inch, the girl had neither gained nor grown. The boys had had lots of play in the open air between lessons, the girl had been five hours each day continuously in school. The boys' class-rooms had been built for a school, the girl's class-rooms were in a small private house.

and increase in weight stop too soon, a wise parent will send off her daughter to the country to run to grass for a time, to see if mental inactivity will restore the body growth. If she is getting thin, let her live out in the open air, instead of in a school, till her appetite becomes ravenous, and she puts on flesh.

There are three considerations that ought certainly to determine the mode, kind, and amount of the education given to any youth or maiden. These are, 1*st*, the hereditary constitution of the brain, including both its strong and weak points; 2*d*, the actual ascertainable mental and bodily qualities and capacities and special tendencies of the child; and 3*d*, the purposes in life that he or she is destined to accomplish. It is owing to our backward physiological knowledge alone that the two former have not hitherto been taken into account, as they ought to have been, by doctors, parents, and teachers. In regard to heredity, when we know its laws more fully in human beings we shall be able by influences brought to bear on development, and by appropriate conditions of life, greatly to counteract weak points, and to make strong ones available for the purposes of life. We are now able to do so to a considerable extent in the animal kingdom. Man has for his own purposes developed breeds of carrier pigeons, race-horses, pointer dogs, etc. We shall not be able to control the heredity of human beings as we can that of the lower animals, but we can apply conditions of life in a scientific manner for our aims. And even in regard to the mode in which marriages are arranged, a medico-psychologist cannot for a moment admit that young persons of either sex fall in love and assort themselves on no scientific principles. The sympathies and affinities of sex are just as much subject to law as any other part of nature. We doctors have much occasion to know that persons of a nervous heredity and disposition are extremely apt to fall in love with and marry each other. The way in which nervousnesses of all sorts are thus increased is extraordinary. The educators do their best to foster this tendency in the maidens by

brain forcing. The brilliancy of the results at the time are certainly very tempting.

It may be that it will be for the advantage of the world deliberately to develop different kinds of men and women in the future. We may get better general results by having brain specialities fostered. We may thus have some families of special æsthetic power, some of mechanical genius, and some of enduring muscular work, just as we have pointers, greyhounds, and sheep-dogs. But even then it would be more than ever necessary to see that the special strong point did not override and interfere with the general nutritive power and vital energy. In training a greyhound, however anxious the trainer is to get speed, he takes care that the dog is very well nourished while he grows, and he never develops his speed till the growth is nearly done, and the bones are set. He doesn't all the time he is growing run the animal every day. He knows that would spoil the general strength, and shorten the period of greatest activity.

The development of special strong points during the process of the education of children I believe to be of vast importance to the race, but it must be done in accordance with nature's general laws that govern the development of the organism as a whole. The special education must be accompanied by the general development. It must not be pushed to the extent that it absorbs energy needed for other purposes. I can imagine no more interesting or important problem in education than the successful cultivation of specialities. It is quite certain that as yet it has not been solved or even studied to any extent. If you hear of a young lady now who is very musical, you usually find she has so much music added to the grammar and the French and German. It is as important in education to know what things to omit as to know what things to press. It is enough to make one despair of the inherent reasonableness of human nature to think of the amount of time and toil that are given in Edinburgh to the learning of things for which there is no inherent capacity in the learners; things that go against the intellectual grain, that

are learnt poorly and with much difficulty, against nature; and are forgotten at once, in accordance with nature's laws. Think of the girls that toil at music, who have no inherent musical capacity; of the time that is taken in committing to memory rules of grammar, and doing parsing, the real meaning of which the girls' brains could not comprehend, if they lived till they were ninety; of the labour and sorrow given to acquire languages, by girls whom nature meant only to speak their mother tongue; of the futile attempts to take those past the rule of three, whom nature intended to stop at simple division. The sad thing is that we all know each of those girls could do something or other very well and to some purpose in after life, if we could only hit on what it is.

I don't want to frighten any one unduly by the list of bodily and mental diseases and defects that are in some cases attributable to wrong methods of education that I am about to refer to. I would beg everyone who hears me to keep in mind that the worst of such things are the exception. No process of attempted educational stimulation will do much harm to very many brains, fortunately, as I think. Their inherent stability—which, by the way, parents and teachers will ignorantly call stupidity or want of application—sometimes preserves them from being forced into work inconsistent with their bent and capacity. Who does not know dozens of fine girls—capable, practical, intelligent, affectionate, lively—who never could be made scholars of, and yet who know more that will be useful to them than some of the first prizewomen? They never ran any risk of suffering from over-education, their only risk was badly ventilated schoolrooms and want of scope for play. It is very difficult, I know, to treat of the professional aspect of a question popularly without producing misconceptions. If a case of consumption, from ill-ventilated schoolrooms is referred to, many people jump to the conclusion that all girls are in danger of consumption. Nothing could be more absurd. The fact is, that if we and our families were thoroughly healthy in original con-

stitution, the educationalists, and their present over-enthusiastic methods, would not hurt our daughters so very much perhaps, at least permanently. Nature would call a halt with sufficient distinctness before much harm was done, and then the wondrous recuperative power of that time of life would soon put matters right again. It is because few persons now-a-days have faultless constitutions, and few families are altogether free from tendencies to some disease or other, that one needs to be now more careful of the constitutions of the mothers of the next generation.

The first bodily defect to which I shall refer, as the result of over-stimulation of brain, is what we doctors call *anæmia*, or in other words, bloodlessness. The girls look pale about the lips, and have no rosy cheeks. This is manifestly most common in school-girls. Any one can see it.

The next faulty bodily condition that may be caused by wrong methods of education is that of stunted growth. I have seen girls, the daughters of well-grown parents, who simply stopped growing too soon. They are more or less dwarfish specimens of their kind; this being caused, as I believe, by the vital and nervous force being appropriated by the mental part of the brain in learning its tasks; and the conditions of life in the schoolrooms not being good, the air bad, insufficient play-hours, no play-ground, no play-room, no walking in the fresh air and sunshine. I have seen other girls who grew tall enough, but wouldn't fatten. They remained thin and scrawny. Now, this is not what a woman should be at any age if it can be helped.

The next condition sometimes produced is best described by the word *nervousness*. That is a condition of mind and body in which there is want of stability and fixity, undue excitability, bodily restlessness, want of solidity and calmness of constitution, ungrounded fears, deficient power of self-control, over-sensitiveness in all directions, and a very great many other unpleasant things, far too numerous to mention here. This nervousness is commonly hereditary, but may be greatly aggravated or counter-

acted by the conditions of life, especially in youth. Such a constitution is a great curse to a woman, and renders her liable to many diseases. It means a brain wanting in reserve or surplus energy. Such a brain is like a galvanic battery that doesn't work steadily, but gives out too much power at one time, then suddenly is exhausted, and is always needing replenishing. There can be but little doubt that the tendency of our modern life is towards the development of the nervous type of constitution, or *diathesis*. American physicians and socialists are unanimous that this constitution is very common there. I think there can be little doubt that if we wish our descendants to multiply and cover the earth, we should try by all means and counteract this tendency to the nervous constitution in a morbid degree. It is most hereditary in all its forms. There are few families among the educated classes now-a-days free from some taint of it, and it is easily increased. In the families that are now free there is much risk of its being developed in the period of adolescence in the girls, through the present system of education. All our modern ways of looking at life help to develop nerves in a bad sense. The ideal of man and woman has changed from strength to culture, from body to brain. The great brawny-muscled man, who knows nothing of sickness, but has few ideas, is looked down on; the rosy mother of a dozen healthy children, who has no taste for books, is little thought of. It may be that the time will come when such people will be more highly appreciated. Out of the nervous diathesis may arise all the forms of nervous disease, when their exciting causes are put in operation.

Strongly connected with nervousness is the tendency to suffer from pain without any actual disease being present to account for it; that is, to be the subject of headaches and neuralgias. Headache is the most common thing suffered by school-girls, and originated by the conditions of school life. Dr. Truchler found that in Darmstadt, Paris, and Nuremburg, one-third of the pupils in the schools suffered more or less from headaches. I think we should find this proportion in our advanced girls'

schools in Edinburgh. He concludes that it is caused by the intellectual exertion, combined with bad air, with the annoyances and excitements and worries, the wasting and rasping anxieties of school life. Nothing is so terrible as severe neuralgia, and beyond a doubt girls acquire it often enough by the conditions of school life. Headaches in a school-girl usually mean exhausted nerve-power through over-work, over-excitement, over-anxiety, or bad air. Rest, a good laugh, or a country walk will usually cure it readily enough to begin with. But to become subject to headaches is a very serious matter, and all such nervous diseases have a nasty tendency to recur, to become periodic, to be set up by the same causes, to become an organic habit of the body. For any woman to become liable to severe neuralgia is a most terrible thing. It means that while it lasts life is not worth having. It paralyses the power to work, it deprives her of the power to enjoy anything, it tends towards irritability of temper, it tempts to the use of narcotics and stimulants.

There is but little doubt that a tendency to take stimulants to excess, a morbid craving for alcohol, or drugs that have something like the same effect, goes with the nervousness engendered by school life. A healthy brain in a healthy body should have no inordinate craving for stimulants. Some of the worst examples I have seen of a craving for stimulants or opium, having become uncontrollable and a real disease, have been in our highly-educated ladies. Tea sometimes is craved for, and taken to excess in such cases.

The most important effect of all I cannot very well enter on in detail, for it relates to woman's highest function, that of motherhood. But that this is affected, and most seriously, by over-education in bad methods and under bad conditions, no physician will deny. If the end of mind-culture is to be that its victim is to suffer in a more terrible way from mother Eve's primal curse, and is to have fewer offspring, and those she has are to be of a puny kind, the risk will be recognised by all

thoughtful persons as too severe to be deliberately run for our daughters. Perfect health is a priceless blessing to all, but it means even more to women than men. The cheerfulness and vivacity that are their special characteristic seem to exist not for themselves alone, but for their families as well, and those are, generally speaking, wanting if the health is bad. Woman is gifted with the power not only of bearing her own share of ills, but of helping to bear those of others. She can't do so in the same degree if she is not in health. She is a plant more difficult to rear than man in our state of society. More care has to be taken of her to mature and consolidate all her organs and functions. Once fully formed as a woman, she can then stand much, but she is specially liable to the effects of adverse conditions during her development. The full bloom of her perfection as the tender mother, the never-tiring nurse of a large family of children, cannot be attained if she has been stunted in her full development in any way. Whether she is an actual mother or not, she is infinitely the better for having the full capacity of motherhood. Be she teacher, scholar, or lady of fortune, she will be happier and do her work far better, if she has all the qualities of motherhood. They influence body and mind; any process of education that lessens them deprives the world of means of happiness. It stunts the woman and robs the world. No intellectual results, no culture, no mental elevation can make up to the world for the loss of any perceptible degree of motherhood; and, as an actual fact, physicians find that over-education by bad methods and under bad conditions has this effect.

The first appearance of the conditions called *hysteria* is usually coincident with adolescence, and is undoubtedly caused in many instances by subtle disturbances of the health, due to prolonged school hours. This is a most troublesome disease, and most varied in its manifestations. In nothing is the connection between mind and body, between function and feeling, better seen than in certain hysterical conditions. You have a splendidly edu-

cated girl according to the modern standard, with a physique that seems very fairly developed, just showing by certain subtle indications that the mental portion of the brain has been made too dominant. You have this girl prostrated in what seems the most mysterious way by hysteria, in one of its hundred forms. You can't actually say what is wrong, but you know that if she had been brought up in the country, with moderate schooling, and four or five hours a-day in the open air, there would not have occurred anything of the kind. It may result from idleness just as it does from over-brain work, the one being as much contrary to the laws of nature as the other. It is an illustration of the fact that you may have effects produced by wrong methods of education that are not to be detected till they break out in actual disease. If the seeds of disease or the conditions that tend to it are laid by any system of training, it is nearly as bad as actual visible disease. Sometimes it is said about the girls in a school, "Just look at them, are they not fairly healthy for town girls who are working hard?" But one of the dangers is that we may not be able to see the beginnings of evil, and only by sad experience afterwards find that they were there.

The last kinds of disease to which I shall refer as being a direct or indirect result, in some cases, of over-study under bad conditions, are inflammation of the brain and its membranes, and insanity; the former of which all physicians have often enough seen to be the direct result of over-study; while the latter may be regarded, in its essential nature, as the acme of all nervous diseases. In it, that highest portion of the brain that ministers directly to mind is disordered, that very portion that in over-education has been forced and crammed with book-knowledge. Mental disease is not common till towards the end of the period of adolescence, but the conditions that lead up to it are common enough before then. The mere acquiring knowledge seldom causes insanity. Its causes in youth are all the conditions of life that accompany over-education, as well as the

brain forcing itself, the want of fresh air, the poor bodily development, the poverty of blood, the deranged undeveloped bodily functions. Insanity in early youth always arises out of some nervous weakness in ancestry. It may not be mental disease itself—for a tendency to neuralgia or drunkenness, or mere nervousness in ancestors, may become insanity in the offspring, if wrong conditions of life are in operation. But it is often just the children of highly nervous parents—perhaps subject to "nervous depression"—who are quick, precocious, and educable in book-knowledge to a very high degree. They get pushed to their bent, and with all this they have little craving for fresh air and romping. They are often over-conscientious and most receptive. In fact, they are the very young women that delight the heart of the teacher, and sometimes carry off all the prizes at the end of a school session. The treatment of the teacher and the physician would be exactly opposite for such cases. The physician would take such brains to put them to grass for two or three generations—would scarcely educate them at all in the ordinary sense—would send them to grow up almost uninstructed in the country, cultivating blood, bone, muscle, and doing mechanical work alone. That would be the only salvation for such brains. But then we should perhaps miss having a genius once in a century. We should have our Chattertons working as joiners in the country instead of writing poetry and committing suicide in town garrets. I could adduce many lamentable examples, from my own experience, of most brilliant school careers ending in insanity. If I had written down the fierce apostrophe of a young lady of twenty on her entry into the asylum at Morningside, at the end of a school career of unexampled success, the reading of it would do more to frighten the ambitious parents of such children from hastening their daughters forward at school too fast than all the scientific protests we doctors can make. She was well aware of the cause of her illness, and with passionate eloquence enumerated the consequences of her losing her reason.

It is not very long since a pupil-teacher, who had been working all winter about ten hours a-day in teaching and preparation, and had taken no exercise or fresh air at all, after suffering for a while from headaches and confusion of mind, threw herself into a pond. She told me afterwards that the harder she worked the more confused she got, then she got depressed, and then lost her self-control.

There can be no doubt that too hard school-work in young women during the adolescent period tends to bring out hereditary, nervous, and other weaknesses. The great natural protection against these is sound health and general bodily vigour in a frame that has been brought carefully to full maturity, harmonious and healthy in all its functions. This law is found to prevail in regard to nervous hereditary weaknesses, that the stronger and more direct the tendency, the earlier in life such weakness is apt to show itself. If we can postpone it, we can frequently avert it altogether.

Of the chief purely mental results of a brain education higher than the whole organisation can bear, one is unquestionably a certain change in the natural mental type of woman. I shall be asked, of course, what is the natural female psychical type? Is it to be found in the uneducated women of the East, or among the uncultivated classes of the West? Without going into argument, I may say that I should be willing to take the general character of womanliness pervading all the various types of young women created for us by the writers of genius, to whom I referred in my first Lecture. That type is physiologically, as well as psychologically, true to nature. It is absolutely necessary as a complement to the masculine type of mind. Both are incomplete by themselves. The world cannot do without them both; they correspond to the bodily organisation of each sex. Now, if the education process for the female is to be just on the lines of that for the male, if the mould into which the brain of each is to fit is to be the same type—and there is no question of emasculating the male type—then, undoubtedly in the result, we

must expect to find a change in the female type of mind. Very many competent observers say that this is actually very apparent in some of the school-girls of the present day. The unceasing grind at book-knowledge, from thirteen to twenty, has actually warped the woman's nature, and stunted some of her most characteristic qualities. She is, no doubt, cultured, but then she is unsympathetic; learned, but not self-denying. The nameless graces and charms of manner have not been evoked as much as they might have been. Softness is deficient. It takes much to alter the female type of mind, but a few generations of masculine education will go far to make some change. If the main aims and ambitions of many women are other than to be loved, admired, helped, and helpful, to be good wives and mothers with quiverfuls of children, to be self-sacrificing, and to be the centres of home life, then those women will have undergone a change from the present feminine type of mind. But we must comfort ourselves with Lord Bacon's reflection, that "Nature is often hidden, sometimes overcome, seldom extinguished."

American experience in the education of young women has been very instructive. The natural intelligence, the form of government, and the stimulating climate, have all united in making the standard of education very high for women, as well as young men. The national hurry has tended to make them do much in as short a time as possible too. In the Eastern States—especially Massachusetts—the schools for girls have for many years been most highly elaborated. At first the effects were not much noticed, or they were attributed to the climate, or to the hurry of life, or to the national fondness for pastry; but soon the American physicians sounded the alarm about the way the New England girls were being educated. They pointed out that during education a high pressure was kept up in girls that no constitutions could stand without risk. They pointed to the thinness and the nervousness of American young women. Oliver Wendell Holmes directed attention to the "American female constitution, which collapses just in the middle third of

life, and comes out vulcanised india-rubber, if it happens to live through the period when health and strength are most wanted." It was shown how small the families of educated American native-born women were, as compared with those of their German and English sisters, and with the Irish living among themselves. Dr. Clarke, in his most instructive book, "Sex in Education; or, a Fair Chance for Girls," pointed out to the American people the risks of forcing young women's brains, and the actual consequences that American physicians found to have resulted from that process. After pointing out that, as a matter of fact, girls in American schools work seven or eight hours a day, he says, "Experience teaches that a healthy and growing boy may spend six hours of force daily on his studies, and leave sufficient margin for physical growth. A girl cannot spend more than four, or, in occasional instances, five hours of force daily upon her studies, and leave sufficient margin for the general physical growth that she must make in common with a boy, and also for her own development." In Dr. Beard's book on "American Nervousness: its Causes and Consequences," he says that, as the result of a large number of circulars sent to schools, the replies were sufficient to clearly show that "nearly everything about the conduct of the schools was wrong, unphysiological and unpsychological, and that they were conducted so as to make very sad and sorrowing the lives of those who were forced to attend them. It was clear that the teachers and managers of these schools knew nothing and cared nothing of those matters relating to education that are of the highest importance, and that the routine of the schools was such as would have been devised by some evil one who wished to take vengeance on the race and the nation. . . . Everything pushed in an unscientific and distressing manner, nature violated at every step, endless reciting and lecturing and striving to be first —such are the female schools of America at this hour. The first signs of ascension as of declension in nations are seen in women. As the foliage of delicate plants first shows

the early warmth of spring and the earliest frosts of autumn, so the impressible susceptive organisation of woman appreciates and exhibits far sooner than that of man the manifestation of national progress or decay."

It must be distinctly understood that my facts and arguments only apply to the young woman of average type and of average strength. There are plenty of individual examples, where there is naturally so much brain and strength that a very high kind of general masculine education can be given from thirteen to twenty without impairing the development. In such brains there is room for much learning and much affection and many charms. The reasoning power, the muscles, the fat, and the affections may be all equally developed in them.

It may be too, I am not prepared to deny it, that an education may be good for the individual in many cases, opening up sources of intellectual happiness, that is bad for the race. On the other hand, there is some truth in Beard's aphorism, that "Ignorance is power as well as joy" to many men and women.

From a scientific point of view, I am well aware that the weak point of my argument is that it is not founded on any basis of collated statistical facts. I have said to you, "I and many other physicians and physiologists have seen many undoubted instances of girls being hurt by over-education under bad conditions," but we can't say that out of every hundred girls such a percentage do suffer. We have not the facts to enable us to do so. I hope such facts will be recorded in the future, and may be all the more likely to be observed and recorded through attention being directed to the matter. I am well aware, too, that teachers are not most to blame for any bad results that are to be attributed to the present system of over-educating girls. Parents and the spirit of the time are more culpable than teachers. The latter are the public servants, and must do the public's bidding. They are expected to work "The Code" energetically, to earn large grants, to make bricks without much straw in many cases, to turn out omniscient governesses and

teachers in a few short sessions. Parents cry out to them about their children, "they are idle," if the whole evening is not taken up with lesson-learning, or if the animal spirits are too high or the holidays too long. I could tell some sad tales of brain break-down in over-worked teachers, male and female, if that were not beyond the scope of this Lecture.

I went last July to see the examination and distribution of prizes in a very large city school for young ladies. While the young girls there were very many of them fresh in complexion and plump, I must say that the majority of the girls above thirteen seemed to me jaded, and pale, and unduly thin. I did not see a dozen pairs of rosy cheeks in a hundred of them. To my eye, many of them bore very evident signs of over-brain work and deficient physical energy. They didn't look joyous and full of animal glee, as girls at that age should look. Like Dr. John Brown's terrier, "life was too full of seriousness" to them. Two Sundays after I was in a country kirk in the far north, where modern educational systems are as yet unknown, and I contrasted the appearance of the farmers' daughters there with that of the prize-winners in the city school. The difference was absolutely astounding. I only wish I could convey the impression I received in both cases from a critical doctor's survey of both sets of girls. If the one set exemplified health, robustness, organic happiness, strength, resistive power against disease, and potential motherhood, then beyond a doubt the other set did not fully do so. The question of the future is, How can we get, or how much can we get of the intelligence and book-culture of the latter, combined with the health of the former? The health we must have, for it is requisite for the life of the race; the culture we must have in such degree as is consistent with the health.

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