

Disease
from
A Public Health
Point of View.

Thesis

by

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Disease from a Public Health point of View.

As an indispensable preliminary to the answers I propose to give to this question, it will be necessary to advert to some elementary physical and physiological properties of the bodily organism to which disease applies. The body of man, being formed out of, and therefore in reality a part of, the material universe, is subject to the same general laws which obtain in the physical world around him, and if people could only be persuaded to apply the ordinary rules of everyday life to the preservation of their bodies, the health of communities would be vastly improved.

Built out that fundamental morphological plan which is best adapted for life on this planet, the human frame is so strangely and inscrutably designed that, out of a mere protoplasmic jelly-like speck, there is evolved a mechanism so complex that we are unable with any degree of completeness to decipher its intricate structure, exhibiting throughout the process a series of developmental changes, the most marvellous, mysterious and interesting to be found within the entire range of biological research. We know that every movement of this inimitable masterpiece of machinery, from the contraction of a muscular fibre to the evolution of an idea, implies a certain amount of

Next on review p. 53

On the whole well written
but a more of a
Magazine article than
a scientific paper
I should like another
opinion as to it, but on
the whole I think that
it may pass

A. D. W.

expenditure of energy, for the renewal and supply of which, a regular quantity of nutritive matter is necessary. In respect of the feeding materials, the steps of the process, the production of energy, and the accomplishment of work, there exists a wonderful similarity between what appertains to the maintenance and operation of other mechanical appliances and the corporeal machine. The three essential requisites - food, air and water - for the nutrition of the human body, bear a striking resemblance to the three essential requisites - fuel, air and water - for the feeding of a steam or other sort of engine. Nutrition itself is just the bringing of fresh material to the body, its metabolism in the body, and the removal of its effete or waste products from the body. The food partaken of is subjected to the chemical action of the digestive juices, reduced to a condition suitable for absorption and assimilation, taken up by the lacteals, poured into the blood stream and carried to every part of the system for its nourishment. Respiration is, to all intents and purposes, merely the interchange, between oxygen and carbonic acid. The oxygen, taken in at every inspiration, diffuses through an animal membrane according to the law of diffusion of gases, combines with the hemoglobin of the blood and is conveyed by the arterial system to the different parts of the body, where it unites with the carbon

of the tissues to form Carbonic acid, which in turn is carried back by the venous system to the right side of the heart, thence to the lungs and is breathed out at every expiration. This in every respect is analogous to the process of Combustion, while the depurative apparatus is simply nature's method of removing the ashes to prevent their choking or otherwise interfering with the fires. Then the ultimate object of the alimentary and respiratory arrangements is the furnishing of the required energy to enable the economy to do its duty and discharge its functions, the principal agent in the production of which, by converting the latent power of the nutrient particles into active force, is undoubtedly oxidation.

The three great working systems of the body are the muscular, the glandular and the nervous, and work is as really done and force as really expended when a muscle contracts, a gland secretes and an idea is evolved as when a weight is lifted, a solid melted or a gas compressed. Muscular work is mainly mechanical, glandular chiefly chemical, and mental psychical; but all the kinds involve more or less an uninterrupted drain on the bodily energies calculated to induce a gradual depreciation in the aggregate efficiency of the organism as a whole, and to diminish its capacity for resistance. The law of wear and tear, is as true of the human body as of aught else. It is only capable,

of performing a certain amount of work, can survive but a measured degree of endurance, and is warranted to stand no more than a given strain. Consequently the period of its effective strength and utility, as well as longevity depends largely on the usage it receives at the hands of its owner. However much it may be ignored, practically, the action of this principle affecting men's bodies is tacitly admitted, for it occasionally slips out in certain familiar expressions of every day life. For instance, "shattered his Constitution," "aging rapidly," "getting prematurely old" &c mean that some one has shortened his days, that there has been excessive working, neglect or maltreatment of the machine, and that a different line of conduct might have prevented it.

These introductory observations having cleared the ground for what I am anxious to establish, in order the more distinctly to convey my ideas and render myself intelligible, it is my intention in pursuing this subject to take up, seriatim, the four following points. Firstly, I shall endeavour to answer the question "What is disease?" from a Public Health point of view; secondly, try to fix the health standard which, in the present condition of man, ought to be aimed at; thirdly, seek to apply that standard so as to form a correct estimate of some of the principal deviations therefrom; and lastly, discuss the importance of public enlightenment as a factor in the advancement of Public Health.

I What is Disease?

Looked at from the Public Health standpoint, which alone concerns me for the present, I venture to define disease as the displacement through some disturbing agent of the same forces which are operative in health. This will appear very evident, if we consider the two fold way in which disease affects the human frame. There is first the effect of the direct action of the disturbing element, whatever it may be, upon the system and then the indirect effect of the reaction of the system to repel the intruder. A simple reference to the disarranging influence of a common cold will make my meaning plain. Suppose one has too freely exposed himself, and ere long feels a cold shiver pass over his body, followed soon after by a burning heat with the supervention of an elevated temperature and a quickened pulse. What has happened? The disturbing agent cold has caused vascular contraction externally, and vascular dilatation internally, succeeded by an interference with the delicate mechanism which regulates the heat withdrawing, and the heat-producing apparatus in the body. We know that the skin is the great heat-withdrawer, and that seventy-seven per cent of the totality of the heat abstracted from the body finds an outlet by way of the integumentary system. Contraction of vessels, therefore, at the periphery, driving the blood inwards and away from

the seat of common sensation satisfactorily explains
 the shivering. The liver on the other hand is the great
heat producer and the dilatation of its vessels and the increased
 molecular metamorphosis within that organ would necessarily
 mean a greater production of heat. With constant increase
 of heat, therefore, throughout the heat producing area and its
 non-escape, from the closure of the ordinary avenues of
 exit at the cutaneous surface, per the heat withdrawing area,
 the temperature under the circumstances is bound to rise.
 But the disturbance by no means ends here. Increased combustion
 and activity involve the multiplication and accumulation
 of waste products, leading to rapid deterioration of the blood.
 This vitiated blood affects the nutrition of the tissues which
 it supplies. The whole glandular system is virtually obliged
 to suspend operations. The functions of the cutaneous, lingual,
 gastric, and intestinal glands as well as of the kidneys are
 in abeyance with consequent dry skin, coated tongue, en-
 feebled digestion, constipated bowels and scanty urines.
 The impure blood ultimately poisons the nerve centres, and
 there ensue those well known disagreeable sensations of pain,
 headache and the like, culminating perchance in delirium.
 In the event of any other kind of machinery getting out of
 gear, there is complete stoppage of work till the repairs are
 executed. Not so with the human body. To stop its
 working would be death. So far from cessation

all the forces which come into play in health are there, and operating with redoubled energy, only they are disarranged and misplaced.

But what are the lungs and heart doing?

There is greater rapidity of breathing and acceleration of the heart's action. Though reacting injuriously on the system as such, yet in reality these are striving to effect a crise and doing their utmost to drive out the enemy. This reaction of the system is nature's effort to exclude the leaven - nature's endeavour to counteract the evil. The lungs in health normally dispose of about one fifth of the whole heat withdrawn and, the proper channel of elimination not being meanwhile available, they try to do not only their own work, but that of the skin, besides. The cardiac and respiratory nervous ganglia can do more and hold out longer than the rest, so that when the others fail, they, as the reserve power, attempt to make up the deficiency and give opportunity for the organism to readjust its balance, the sensitive delicacy of which has not a parallel elsewhere.

Such being the rationale of the phenomena incidental to so simple a disturbing cause as cold, and the essential difference between one disease and another consisting in the degree of disturbance each is capable of producing, the justice of the definition I have taken the

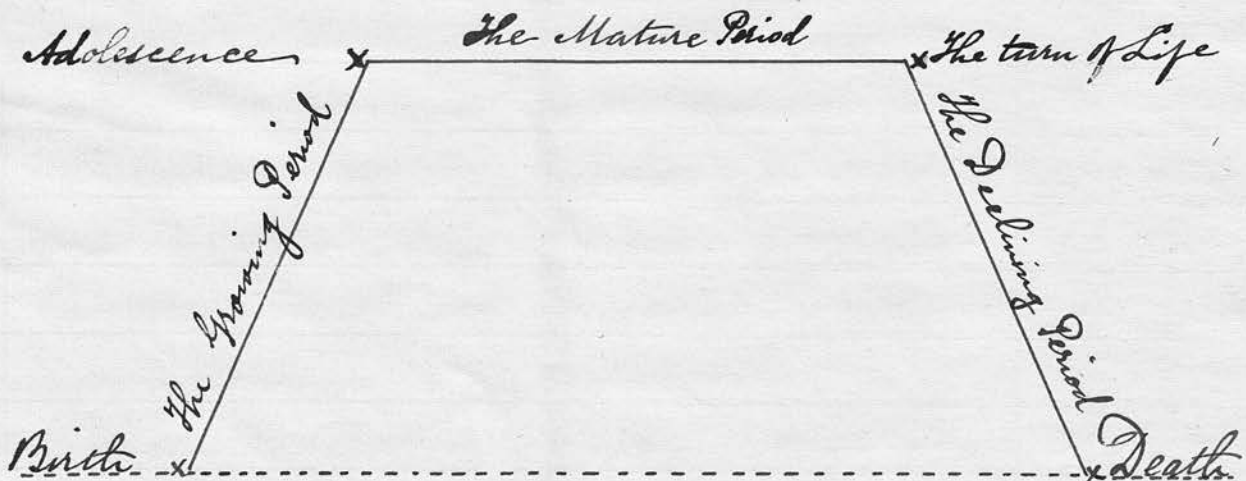
liberty of propounding will, I trust, be sufficiently apparent. Disease being thus a misplacement of health energies, a deviation from the healthy standard, and a disturbance of the normal state, if we come as to inquire what is the health condition to which we should aspire, constituted as we are?

II The Standard of Health to be aimed at.

Public Health has to do neither with man as he was, nor man as he will be; but with man as he is. It is concerned not with humanity innocent; but with humanity fallen, a state in which absolutely perfect health is unattainable. It is of interest, therefore, to consider what should be aimed at in the present actual circumstances and condition of the race. It would be useless to fix too high a standard and unwise to fix too low an one. But the proper standard is, I believe, formulated for us in one of those felicitous utterances which you may casually hear dropped in the course of ordinary conversation. For example I have heard a man, hale, hearty and robust, in advanced years exclaim "I have arrived at such and such an age and I have not known a day's illness" This is no airy transcendental flight. It is neither impossible nor impracticable; but something the gentleman referred to had reached and was enjoying. He had attained, the crown of physical glory - healthy old age.

and, if spared, the remainder of his life will be but the working out of a gradual process of decay as natural, in the present condition of man, as the process of development had been. His decrease will come - the terminus - death will end existence here; but it will be physiological not pathological death - the several parts of the machine will no longer act in unison or answer one another's call - the wheels will rather stop than be stopped.

Let me, however, give a diagrammatic representation of what I conceive the requisite standard of health ought to be. The figure consists of an ascending, a horizontal and a descending portion, presenting something of the outline of an oriel window, with birth at the beginning, adolescence at the one angle, the turn of life at the other, and death at the end; thus,



The ascending division, from birth or strictly speaking from conception to adolescence, represents the period

of growth, the horizontal or level division, from adolescence to the turn of life, represents the period of maturity, and the descending division, from the turn of life down to death, represents the period of decay. Addition exceeds subtraction in the growing period, addition and subtraction are approximately equalised in the mature period, and subtraction exceeds addition in the declining period. Increased and increasing substance, activity and strength characterize the period from birth to adolescence, attained and maintained substance, activity and strength characterize the period from adolescence to the turn of life, and diminished and diminishing substance, activity and strength characterize the period from the turn of life to death. What is sought to be expressed by the foregoing unpretending sketch is simply this, that the proper standard of health which in my judgment ought to be fixed is the passage through the periods of growth, maturity and decay with practically speaking an immunity from illness.

The standard thus determined, we can now proceed to its application, like a mason with his plumbline, for the due estimation of certain departures therefrom, which seriously affect Public Health.

III. Some of the principal deviations from the Health Standard.

As to the time of their occurrence, they may

take place at any time from life's earliest dawn to its close and even during the period of utero-gestation. Deviations may show themselves anywhere along the entire line whether we look at the ascending, the level or the descending portion. Indeed where may not disease exert its blighting influence? Departures and deaths may appear at any point in the growing period, at any point in the mature period and at any point in the declining period. What can be sadder to contemplate than the sorrowful consideration that so many fair flowers of promise should be nipped in the bud, so many little lives be terminated at their very start and so many tiny lamps extinguished almost ere they had well begun to burn, running no race, telling no history, filling no niche and performing no duty? So accustomed have we got to behold the prevalence of early mortality that it has somehow come to be accepted as a matter of course instead of, as it should be, deemed a reproach to Public Health. Children under five are actually expected to die in what may be termed a definite proportion and the anomaly seems no more to arrest attention than if it were natural. Did these living sparks burst forth into flame, play their mortal part, finish their course and like ripe, mature grains fall fairly under the fell stroke of the dread reaper's sickle that were natural, honourable and normal;

but this is unnatural, dishonourable and abnormal and, moreover, unless it is distinctly recognized to be so there is little hope of improvement.

With respect to the deviations themselves, they are so numerous that I am compelled to make a specimen selection, and will confine myself to those, which, for convenience and distinctness, I shall classify as the transmissible, the Communicable and the acquirable.

1. The transmissible. What I mean by transmissible deviations from our standard are those forms of disease, which are transmitted from sire to son, from parent to child - disease with which the unfortunate victims are tainted from birth or before it. The most painful and unpleasant reflection associated with all these cases is the fact, that the individual sufferers themselves are in no way personally to blame. Take specific disease, the most prolific and the most mischievous source of all the morbid disturbances to which the human frame is liable, what is it from the Public Health point of view? We may stand by a syphilitic child and indulge in the usual technicalities, which perhaps conceal in measure from ourselves, and certainly from others, the naked truth; but the interpretation of the technical phraseology amounts to this, "that child is suffering from the error of its parents". In other words specific disease is neither more nor less than the result of an error of conduct. How deeply does that

error penetrate? The profession knows that the system of one individual once impressed with the poison of that error can transmit it to the offspring and that, when transmitted, can so modify the constitution of that other organism as to cause false nutrition of its internal organs and of its very bones. Young lives thus poisoned at the commencement have little chance of developing and going through the periods of our health standard, and, so powerless are we to help them, that for many our kindest wish is the release from suffering, which an early death alone can bring. I may be told it was a pity that a Merciful Providence allowed these children to be born and breathe. They had done no wrong that they should suffer. But is such the honest way to view the matter? Will this state of things ever be remedied if we refuse to face the reality and continually endeavour to shift the responsibility onto the wrong shoulders? We know that all this is due to the poison of an error on the part of the ancestors, the poison doing nothing more than manifesting itself according to its nature - the fruit according to the seed. These inherited poisons differ in virulence corresponding to their character but produce effects precisely commensurate with the intrinsic strength of the virus proper to each particular poison after its kind. The evil, however, is not by any means confined to hereditary specific disease. What is hereditary insanity? What is hereditary phthisis? What is hereditary struma?

What is hereditary Carcinoma? What are all these from a Public Health standpoint but the results of an error of marriage. Then hereditary gout is but the result of an error of eating and hereditary alcoholism the result of an error in drinking.

That ~~these~~ transmissible diseases, which work such frightful havoc among the human family, and of which the most appalling perils to the life of mankind are begotten; should every one of them be the result of comparatively trifling errors in themselves, often thoughtlessly committed, avoidable and preventible errors all amenable to correction, breaks upon one, when realized for the first time, like a new revelation. The fact is, these maladies constitute the foundation of so many diseases classed under different denominations, and exert such a modifying influence on the character and course of morbid states otherwise distinct, that to succeed even in diminishing them would be to reduce the existing risks to life and health to an incalculable extent. It may be said this is all very well theoretically; but what is the remedy? My reply is a little self denial. This will do more to lessen the sum of human mortality, misery and sickness than all the drugs in the Pharmacopoeia, potent for the cure of disease and the alleviation of suffering, as I believe them to be.

2. The Communicable. This class is intended to include all those diseases which are propagated by Contagion and

infection. It would be tedious to enumerate the long black list - something in numbers - with their varying periods of incubation and their characteristic courses of symptoms. Nor is it necessary, as my present purpose will be amply served by restricting the sequel to one or two considerations of practical importance from the Public Health aspect, arising out of the now almost universally accepted theory of their origin.

Being living things or microorganisms, the first practical deduction is that they may be killed. Hence the indication for the employment of antiseptic substances or germ killers for the destruction of the morbid poisons as soon as they are given off from the bodies of patients suffering from the diseases which generate them. Deodorants, which merely neutralise offensive odours without reaching the contagia are insufficient, and those disinfectants, which only affect molecular decomposing chemical changes and do not destroy the vital particulate organisms. This establishes the immense value of thorough disinfection by means of proper efficient substances possessing germ-destroying qualities, and the place it holds in the promotion of Public Health if scientifically carried out.

The next point is that since they are living things they require appropriate conditions for their growth and development by the removal of which they can be rendered

virtually, harmless. They are the descendants of parents. They can only come from preexisting germs. Certain external circumstances are essential to their generation, cultivation and dissemination. Make the conditions such that they cannot propagate themselves, or render the soil so unsuitable that they cannot multiply, and they become practically inert. If it be demanded how this is to be accomplished, I answer by making model sanatoriums of all our homes, nurseries and schoolrooms; by the establishment of a copious water supply, a proper system of drainage and an efficient disposal of sewage in all our towns and cities; and by the ingress of sufficient light and air, the exclusion of damp and the cultivation of cleanliness throughout all the dwellings in the land. Given attention to these matters and the micro-organic poisons of the contagious and infectious type would be robbed of their terrors.

The third consideration is that the vital condition of the victims selected as their prey materially affects their power for mischiefs. Provided the body is kept up to the proper standard of health the poisonous materies morbi play as innocuously about its receptive media as the wind round the ramparts of Edinburgh's majestic Arthur Seat or its immovable Castle Rock. But let the health be impaired, the Constitution weakened and the vitality lowered,

and the opportunity is thereby afforded for them to gain an entrance and do their deadly work. The vigorous vital force, inherent in all individuals above a certain health level, constitutes a bulwark of resistance against these disease-generators, whereas all below that level are specially vulnerable whenever within the sphere of their influence. Herein lies the benefit of aiming at the standard we have fixed and of bringing as many up to it as possible.

Three methods are thus suggested in the interests of Public Health for fortifying the population against the ravages of the communicable diseases under consideration, and though our knowledge is meagre as to the exact natural history of the organisms or how to arrest the process, once the poison is introduced into the system; yet, if we know that the poisons themselves may be destroyed, removed and rendered unproductive or unhurtful, this is the point of practical moment connected with our subject.

3. The Acquirable. Of course every disease may be said to be acquirable in the first instance; but, as distinguished from the hereditary and the spreading varieties, this designation is meant to comprise the deviations from health acquired by slighter and still more preventible causes, such as, Careless exposure, improper clothing, unsuitable articles of diet, irregularity of meals, late hours, foolish indulgences, intemperate habits and the other many apparently insignificant indiscretions

which might be named. On these, however, I refrain from enlarging as it would make the manuscript too voluminous; but I may remark that ordinary care and precaution, self-discipline and the exercise of that common sense which none should be above cultivating, would work wonders towards the reduction, if not the possible obliteration, of this class of ailments. There remains our last topic now to be discussed.

IV The importance of public enlightenment as a factor in the advancement of Public Health

Since the only real remedy for the most subtle, virulent and lethal diseases which desolate homes, cities and countries is prevention, the proposition that those who alone can be preventers in any true sense, should be made alive to the enormous possibilities for good or evil depending on their exertions in the right or wrong direction; will commend itself to every philanthropic as well as to every medical mind.

Legislation has effected much and may yet do more with respect to the Communicable diseases; but no legislative enactment which would not be resented as an interference with the liberty of the subject could, in the present state of public opinion, be introduced to deal with the transmissible. Accordingly the diffusion of light, even in this aspect, is desirable and needful for the question

ever to come within the range or scope of practical politics, or be ripe for parliamentary regulation were it advisable.

Not can medical treatment or skill touch these diseases with anything that deserves the name of cure. Temporary relief of symptoms and repression of certain manifestations there maybe; but cure is not to be expected. How can cure be strictly applicable to that which is nature pursuing her relentless and merciless course in correction of those who have outraged her? Let us not be deceived, nature will not help us against ourselves, nor can her laws be set at naught or trampled on with impunity. An error of conduct seems a very simple matter and really is what it seems while within the limits of prevention and subject to the governing power of the responsible agent's will; but no sooner does it become poison-generating than it goes immediately, and entirely beyond his control. The resulting virus runs its poison-innoculating career and opens into an ever widening sea of evil, till the dread consequences of that thoughtless yet fatal mistake may in one phase or another extend even to the third and fourth generation. To successfully cope with such diseases, therefore, they must be dealt with in the sphere where they are capable of correction and before they pass beyond recall, in other words the public themselves must first see the necessity for and then use the remedy-

a kind of remedy that therapeutics will never be able to administer. The prime indication in all effectual or absolutely curative treatment is removal of the cause which in this case can only be accomplished by prevention. But Medicine, when appealed to here, comes in too late for that and in the nature of things necessarily so. It consequently becomes the part of wisdom for it frankly to acknowledge its helplessness and while relieving symptoms wherever it can, seek by appropriate means to induce those who are in a position to remove the cause to bestir themselves and act.

I am aware the spot is sore and sensitive. I know the subject is delicate and the task a trying one. But the difficulties are not insurmountable, the obstacles are not insuperable, nor is the problem insoluble. Let it be known that certain marriages must inevitably lead to disease, both of mind and body, such as hereditary insanity, tuberculosis, phthisis, struma, syphilis, gout, rheumatism and the like, and wise sensible men and women will assuredly hesitate ere they of a certainty inflict these tremendous evils on the communities in which they live. Once convinced that as surely as healthy unions and healthy combinations are productive of health and strength and long life so surely are unhealthy unions and unhealthy combinations productive of sickness and premature death and they will pause before knowingly

making themselves instruments of torture to those they love better than life. Let people realize that by unwholesome and questionable alliances they may be the unwitting means of bringing untold misery and suffering to their nearest and dearest and the contracting parties to every matrimonial engagement will ere long make health an indispensable condition to the ratification of the compact. Knowledge of the facts, acquaintance with the consequences and reflection on the results would mean the beginning of the dawn of brighter, healthier, happier days. Why should hereditary soundness not be considered as essential an element of every marriage contract as money settlements? Though money has its place it is not everything. The riches of the millionaire are hereof their charms if he lacks the health to enjoy them. No more melancholy spectacle exists than of the man who would willingly part with every farthing of his hard earned fortune to regain the health he inconsiderately lost in acquiring it. The magnitude of the boon to Public Health in the event of this marriage question being dealt with on its merits by rich and poor it would be impossible to overestimate, coupled with a judicious counteraction of the tendency to overrate wealth and undervalue health.

The public must be shown and come,

to recognize that the only effectual and permanent remedy is in their own hands, that they are practically masters and mistresses of the situation and that nothing more elaborate than to breathe pure air, eat pure food, drink pure drink, wear pure clothing and do pure deeds, is required for the introduction of a sanitary millennium.

I yield to no one in admiration for and appreciation of the mighty advances and benefits of modern science; but in conclusion I make bold to submit that the discovery and application by people themselves of the appalling fact that the most fatal types of all the fatalities which afflict the human family are due to nothing other than the gratification of a desire or the satisfaction of a morbid craving that an effort of the will might correct, would do more for the removal and amelioration of the principal ills to which flesh is heir than all the grand discoveries and triumphs in medicine and surgery that have been the glory and boast of our noble profession in recent years. Granted the carrying out of the simple points I have referred to, and I predict the realized anticipation of that master picture of consummate health embodied in the prophetic announcement "There shall yet old men and old women dwell in (Edinburgh, Glasgow or any other place) and every man with his staff in his hand for very age and the city shall be full of boys and girls playing in the streets thereof."

William Simpson Flett