A demonstration of the origin of tubercular consumption / by Henry M'Cormac.

William Gourlie Esq.
with the author's respects.

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OF

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TUBERCULAR CONSUMPTION.

BY

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PHYSIOLOGY illustrates the law of health, pathology the law of disease. In a word pathology may be considered the physiology of disease. In both cases the vital phenomena immediately subservient to the continuance of life take place, but in the physiological state these phenomena are normal, whereas in the pathological state they are more or less abnormal. In nature there is a conservative principle continually at work to maintain in integrity the acts of the organisation, as well as to restore that integrity when it has been invaded. This principle is opposed by the various causes of disease. It is assailed by casualties, as well as by the wearing out of the organisation, in other words by death.

As the rule of health is subject to fixed conditions, so also is the rule of disease. It is thus in one case as in the other, that the human intelligence learns to profit by the past, to preserve existence, and to retrieve disease.

Certain morbid states are common to the whole animal kingdom, while other such states are confined to particular races or even families of being. This shows the importance, at any rate the desirability of a comparative pathology, not less than of a comparative anatomy and comparative physiology. A comparative pathology however, has as yet hardly existence or name.

Among the diseased conditions common to the whole animal kingdom, is tubercle, tubercle of the blood and tubercle of the solids. First we have the diseased condition or tuberculosis of the blood, then as a consequence thereof, the amorphous, non-organised morbid deposition termed tubercle. This morbid deposition is common to the whole family of warm-blooded animals when domesticated, and even to lower tribes of being.

The black races and the white races of mankind, the inhabitants of warm climates and of cold climates alike, of dry regions and of damp, the rich and the poor, young and old, male and female, the temperate and the intemperate, the laborious and the indolent, birds, beasts, and man are liable, one and all, to tubercle.

Amorphous tubercular deposits may take place in any part of the body, in virtue of the law or rule of diseased action to which tubercles owe their birth. This law of diseased action is the same in one place as in all, in man as in brutes, taking it for granted that the conditions of its existence subsist otherwise. When tubercles however are deposited in the lungs, they constitute the well-known and devastating malady, variously termed consumption, phthisis, decline.

The mortality from phthisis is excessive. By a very rough estimate I have arrived at the conclusion that the mortality in the Three Kingdoms only, amounts to not less than 100,000 annually! Many diseases however, exclusive of pulmonary consumption, owe their fatal character and close to the presence of tubercles. Among these are the various forms of scrofula, many affections so named of the joints and spine, white swellings, certain diseases of the bones, the brain, and its membranes.

Tubercle in appearance has much the semblance of decayed cheese, or the substance termed adipocere otherwise animal matter in a certain state of decay. It is completely unorganised, and without a trace of vitality. It may occur in the encysted form, also in a diffused state. In either of these states or forms, or both of them, it may be manifested in the lungs. In the liver the tuberculous matter is commonly diffused or non-encysted,

and was long supposed to be merely a fatty, although in reality a tubercular degeneration.

Recent tubercle is mainly a hydrocarbon, composed of a certain proportion of oxygen, nitrogen, and earthy salts. According to Scherer in 100 parts recent tubercle, deprived he says of fat, which however as combined with tubercle is as much a morbid degeneration as tubercle itself, there were, fractions omitted, of carbon 53 parts, of hydrogen 7, and of nitrogen 17. The earthy salts do not amount to more than some 2 or 3 or 4 per cent. except in those cases in which there has been partial and successive tubercular deposition and absorption, the inorganic portion however, remaining behind. This process may go on till the greater portion of the tuberculous mass shall be nearly or wholly composed of earthy matter, assuming then the designation of cretaceous tubercle. Else in all tubercle, recent tubercle in particular, carbon very especially predominates.

Tubercle is never developed, never deposited, except when the system in general, the blood in particular, becomes tuberculous. But the blood never becomes tuberculous, except through a vice or defect in the process of respiration in consequence of which the vital fluid becomes unable to throw off its carbonaceous and other impurities, whereupon in virtue of a law of morbid action more fully developed in my treatise on the Nature, Treatment, and Prevention of Pulmonary Consumption, this dead tubercle-matter is forthwith deposited in the tissues of man and brute, and very notably in the lungs and liver, in virtue we may presume of their leading function as carbon excretories from the blood.

From ample experience, in short the most varied and multiplied observation, we find that consumption is the result of the continued respiration of a foul, unrenewed atmosphere. Where human beings, or the inferior animals then, are pent up in narrow spaces and debarred day and night from pure unfouled air, tubercle deposits, after no very lengthened period, prove the invariable result. If the atmosphere be sweet and unadulterated, at once by day and by night, there will be no tubercle, in short

no scrofula, no consumption, all supposed direct hereditary or other influences to the contrary notwithstanding. When the office of respiration is attempted in a stagnant or otherwise unrenewed atmosphere, whether it be in a dirty hovel or in a chamber stuck out with gilded mouldings and silken hangings, the respiration is not adequately performed, the necessary vital depuration of the blood is not effected. We are so much the slaves of outward impressions, that we fail to perceive that air of the utmost impurity, at any rate not healthily respirable, may subsist in dwellings in all other respects very models of purity and correctness. No natural stamina however vigorous, no exactitude of regimen else however unwavering, can long resist the deteriorating influence of a perverted atmosphere. There must be air, the entire air, and nothing but air, else tubercle in some form or other will be sure to result. No perfumed or stagnant substitute will at all suffice instead of the exquisite purity which nature enforces under the dread penalty of disease and death. This I have oftentimes pointed out, and very especially in my paper on The Connexion of Atmospheric Impurity with Disease, read before the Statistical Section of the British Association, Belfast, Sept. 7, 1852. I had not then however, ascertained by means of the investigations and inquiries I have since followed up, the exact manner in which the prolonged respiration of foul air is productive of tubercular degeneration.

When respiration is performed in foul air, it is not healthily performed, inasmuch as the healthy vital depuration of the blood is not effected. To borrow from my essay on consumption, the carbon and other impurities being inadequately discharged, finding no sufficient outlet by the lungs, the liver, or the skin, being neither burnt off in the lungs nor expended on the tissues, are deposited mainly as a hydrocarbon in the thoracic and other organs. Comparative pathology throws further light on this matter. I have stated that tubercle under such circumstances, was deposited in the tissues of all warm-blooded animals, but insects even are not exempt. Silk-worms when housed, as I learn they are housed, in close, heated, ill-ventilated rooms in Italy and the

South of France, are attacked by a disease, probably tuberculous, which under the designation of muscardine, causes great ravages among these useful insects. The excretion of respiratory impurities being checked in foul air, disease in short, in man and brute, is sure to result.

A certain amount of carbonic acid is every minute exhaled during the respiration of pure air, but this amount is instantly diminished when respiration is attempted to be carried on in an irrespirable atmosphere, and every atmosphere is irrespirable that has been respired once or oftener previously. The air which has once passed through a human being's lungs, is no longer fit for that human being's further respiration or the respiration of any one else, not at least until having undergone nature's alchemy, it shall be restored to its pristine freshness and purity.

In an experiment by Allen and Pepys, in which fresh air was taken in at each inspiration, the amount of carbonic acid exhaled was 32 cubic inches in the minute. Whereas in a second experiment, in which the same air was repeatedly respired, the amount of carbonic acid emitted was only 9·5 cubic inches! And further, no matter how long the same air might be respired, even if until it proved no longer fit to sustain life, the amount of carbonic acid with which it was charged, never exceeded 10 per cent. So that when air is fouled to a certain extent, the lungs cease to excrete the impurities which the blood is ever ready to pour out. Hence, the carbon to the amount of say half an ounce per hour, more or less, is retained in the circulation, becoming at once the occasion and the material of tubercle.

It is quite obvious without entering into the details which my treatise on consumption otherwise renders unnecessary, that any attempt at the removal or prevention of consumption must bear a constant reference to the condition and purity of the respired atmosphere, when pure, the veritable and only elixir of life, as in my Sanatory Economy I have already termed it. In the essay on consumption I have shewn, I conceive to demonstration, that consumption does not, cannot ensue short of the continued respiration of impure air. I have further proved that during the

respiration of foul air, the blood is not adequately purified. I have given as close observation to the order of cause and effect, as seems possible in the case of any organic law or any law of disease whatever, and therefore, again repeat that tubercle is not only in every case the result of the continued respiration of foul, unrenewed air, but that the impurities retained in the blood in consequence of the continued respiration of such foul air, is the very material, in short the matter of tubercle itself.

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