THE USES OF BLEEDING IN INFLAMMATION AND OTHER DISEASES.

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THE admirable paper read by Dr. Markham to the Medico-Chirurgical Society of London, and inserted in two recent numbers of this JOURNAL (April 9th and 16th), appears to me deserving of special notice. I have little doubt that he has correctly stated what ought to constitute one of the indications for bleeding in diseases.

Twenty years ago, it was supposed that the primary cause of inflammations was an increased action of the vessels, but more especially of the arteries, which sent forwards or determined to the parts a greater amount of blood than the veins could carry away. As a result, the smaller vessels became blocked up and distended, while the fluid part or lymph was squeezed through their walls, and infiltrated into the surrounding tissues. The remedy for this was the removal of blood from the part, either by local or general bleeding, by which it was thought this condition could be at once removed. But it is now understood that not only is this theory wrong, but facts have shown that the practice which flows from it is not effective. Instead of the morbid action beginning in the vessels, it truly begins in the tissues outside the vessels. These, in health, are continually attracting and selecting from the blood such of its constituents as are necessary for their own nourishment. Thus the cells of the liver select what is necessary to form bile; the salivary glands what is necessary to form saliva; the muscles what is required to form muscle; and bone what is wanted to form bone. If these parts are injured, healthy nutrition does not take place; but instead of it there is attracted from the blood that lymph, or fluid part of the blood, which is so essential a feature in all inflammation. Instead of being pushed out by a *vis a tergo*, it is drawn out by a *vis a fronte*—the active force causing the disturbance is not in the vessel or in the blood, but in the cells and tissues to which these are distributed.

Again, when the living fluid part of the blood has in this way got outside the vessel, a wonderful new growth of cells takes place in it, whereby what is unnecessary is removed by absorption and excretion, and what is required is developed into new texture. This stage of the process is accompanied by more or less excitement; an increased flow of blood is drawn to the part; more nourishment is required, and nature supplies it. In the same manner that when the leaves bud in spring, more sap exists in and is drawn from the vessels in plants; that during the annual growth of the stag's horn, all the vessels in the neighbourhood are turgid with blood; that when new teeth appear in the infant, the gums are red and tender; that when, in short, all active processes of local growth are proceeding, the pulse is strong, the blood flows with increased velocity, and the neighbouring tissues are congested; so, for the wisest and best purposes, does nature set up a similar action in inflammation, and turns to use that exudation which has been poured out, by transforming it into cells.

According to this theory, we must look upon such excitement in the neighbourhood of an inflamed part as salutary, whereas formerly it was regarded with apprehension. The increased force of the pulse was thought dangerous, and the rapid flow of blood which used to be looked upon as injurious to the individual we now regard as necessary for a cure. Instead, therefore, of diminishing or lessening these useful changes by blood-letting and antiphlogistics, it is clear that theoretically they ought to be left undisturbed, and even supported when necessary. The correctness of this theory has been proved by actual experiment and experience on a large scale, a marked improvement in the recovery from severe inflammations having everywhere resulted from abandoning a lowering treatment in that class of diseases. Inflammations of the lungs, of the pericardium, of the pleura, and so on, have been proved not only to be much less fatal, but to get well in a much shorter time, since bleeding and antiphlogistics were replaced by nutrients and stimulants.

But this is not saying that blood-letting can never be useful in diseases, and may not occasionally be beneficial even in inflammations. Though it has been industriously circulated that I am opposed to bleeding under all circumstances; so far is this from being the case, that I have carefully maintained the contrary. Thus, in my original paper in the *Edinburgh Monthly Journal* for February 1857, pp. 782-3, I observe:—"But whilst large and repeated bleedings, practised with a view of arresting the disease, appear to me opposed to a correct pathology, small and moderate bleedings, directed to palliate certain symptoms, and especially excessive pain and dyspnœa, may reasonably be had recourse to, and unless there be great weakness, without any fear of doing injury. I have often been struck, especially in cases where large thoracic aneurisms cause these symptoms, with the small loss of blood which will occasion marked relief. The same result may be hoped for in other cases where the congestion is passive, even when that is associated with active repletion of blood, followed by exudation. But I need scarcely remark, that this mere palliative object of blood-letting is not the ground on which the practice has hitherto been based, and that in this point of view it requires to be very differently explained." Again, at page 795, I say:—"There are cases, which were formerly mistaken for inflammation, in which blood letting may still be useful. I allude to those where an obstruction to the circulation exists in the heart and lung, *dependent on over-distension of the right side of the former organ*, and cases of venous congestion, engorgement, and perhaps œdema of the latter; also, certain cases of bronchitis preventing aëration, of aneurisms, and of asphyxia. Although even here the true value of the remedy has yet to be positively ascertained, the special cases demanding it more carefully discriminated, and the mechanical principles which justify the practice determined." These same passages are given *verbatim* in the second and third editions of my *Clinical Lectures on the Principles and Practice of Medicine*.

It follows that, in the very class of cases in which Dr. Markham says he has bled with advantage, I have always maintained the utility of employing general blood-letting with moderation. So with topical blood-letting, wherever it can directly operate on the inflamed or congested part, it may be beneficial, as in certain external inflammations, conjunctivitis, or hæmorrhoids; but in deep-seated internal inflammations it can be of little benefit. This is a widely different method of employing the remedy from what was formerly practised; viz., by repeated large bleedings, which lowered the pulse and exhausted the patient, at a time when he required all his strength and vigour to support the new changes in growth required by the economy. I believe that an equally good effect would have resulted in some of Dr. Markham's cases, from the extraction of one-half or even one-fourth of the amount of blood he took away. So far, however, is the proper use of blood-letting as a palliative in inflammation, and as a curative measure in congestion of the heart, asphyxia, and so on, opposed to pathology, that it is quite in harmony with it; and, in all these cases, its good effects fully explain the benefits, temporary and permanent, which have been recorded in its favour by practitioners both ancient and modern.

ON THE CAUSES OF PULMONARY CONSUMPTION.

By JAMES TURNBULL, M.D., Physician to the Liverpool Royal Infirmary.

[*Concluded from page* 367.]

Occupations producing Inhalation of Irritating Particles. There are many occupations, which, it can be shown, have a direct tendency to cause chronic pulmonary disease by the local irritation they produce on the lungs, in addition to the injurious effect which is often, at the same time, caused by the sedentary nature of the employment itself. It has long been known that stone masons, who are engaged in cutting stones, suffer from inhalation of the silicious particles, and become affected with pulmonary disease; and also that the grinders employed in manufacturing cutlery suffer in a similar way, especially when the processes are carried on in confined workshops, and without the aid of water, which prevents the diffusion of the silicious and metallic particles in the atmosphere. Under the head of metal manufacture, Dr. Greenhow has given some statistics which prove very clearly the injurious influence of such employments; and, in respect to the operatives of Sheffield and Birmingham, it is made apparent by the great divergence of the pulmonary death-rates in the male and female population. The men, being almost exclusively engaged in such employments, suffer most; and in Sheffield we find that the male pulmonary death-rate is 839, whilst the female is only 670; and in

Birmingham the male rate 838, and the female 699. The coarser kinds of metal manufacture, such as ironfounding and nail making, seem to be much less injurious.

Dr. J. C. Hall, of Sheffield, has given a very good account, in the volume of this JOURNAL for 1857, of a peculiar form of chronic inflammation of the lungs, to which the grinders are subject.

It has been found that the linen and flax manufacture produces an injurious effect on the operatives, by causing them to inhale an atmosphere charged with dust. I have myself observed the tendency of dust to cause consumption in the cornporters and warehousemen of Liverpool, whose employments are of a dusty nature. It can be shewn by a comparison of the male and female pulmonary death-rates of Hendon, an agricultural district between London and Harrow, where the men are chiefly employed in binding and cutting hay for the London market, that the inhalation of the dusty particles must have a pernicious influence on the lungs; for whilst in most of the purely agricultural districts the female is at least as high as the male death-rate, in Hendon we find that the male exceeds the female rate in the proportion of 434 to 372.

Mining. Lead-mining is a kind of employment which appears to have a very distinct and decided effect in the production of pulmonary disease. Tin and copper-mining produce a similar though less pernicious influence. The injurious effects of these employments fall chiefly, or almost exclusively, on the men; so that a comparison of the male and female death-rates of some of the districts gives us an accurate mode of estimating their respective influences. In all the lead-mining districts, the male death-rate from pulmonary diseases greatly exceeds the female; and in Alston, which is the most exclusively lead-mining district in the kingdom, the male death-rate is 877, whilst the female is 494. The injurious effect of the occupation on the men is such, that a larger annual proportion of the grown-up men die of disorders of the chest than in the most unhealthy towns in the kingdom; and in consequence, Alston has been found to be the place in which there is a larger proportion of widows than in any other in the kingdom.

The injurious effect of copper-mining is shewn in the fact of the male pulmonary death-rate of Redruth being 670, whilst the female is 450; and the injurious influence of tin-mining in the male rate of Penzance being 560, whilst the female rate is 456. It would appear that whilst lead, copper, and tin-mining, are certainly dangerous to health, coal-mining is at least not unhealthy, so that we have reason to suppose that there must be metallic particles inhaled during the working of the ores, which injure the lungs.

M. Lombard (*Report on the Laws and Ordonnances in force in France for the Regulation of Noxious Trades and Occupations*) found that in 1000 deaths from consumption, the occupations were as follows:—

With vegetable and mineral emanations	176
With various dusts	145
With sedentary life	140
With workshop life	138
With hot and dry air	127
With stooping posture	122
With sudden movements of arms	116
With muscular exercise and active life	89
With exercise of the voice	75
Living in the open air	73
With animal emanations	60
With watery vapour	53

Soldier's Life in Barracks. There is no occupation which can be shown to have so direct and powerful an influence in producing consumption as the life of a soldier. Though they are men picked out as the soundest and healthiest, it has been found that the mortality among soldiers is extremely high, being in the infantry of the line 18·7 per 1000 from all causes, or double that of the general population of the whole country, which is only 9·2. This applies to the army at home, and does not include the officers, who are not affected in a corresponding ratio. In the foot guards, the mortality is even higher, being 20·4 per 1000. Not only, however, do we find that the mortality among soldiers is far greater than in any other class of the community, but we also discover on further examination that there is scarcely any fact in reference to pulmonary diseases, more striking, more important, or more clearly proved, than this, that the excessive mortality is caused more by the development of pulmonary than any other class of diseases. The form of disease to which an impulse is thus given is almost entirely chronic, and of tubercular nature. Dr. Farr has pointed out, with the aid of a diagram, that whilst in the male population of England of the soldier's age, only 4·5 die of chest and tubercular diseases; in the infantry of the line, there are no fewer than 10·1. The deaths in the general population from all diseases being only 9·7. We see, therefore, that in the army, a greater number perish from pulmonary diseases alone. In the guards, the proportion is even higher, being 12·5 from consumption and allied chronic affections, exclusive of the acute.

The facts and statistics brought to light by the commissioners have further proved that the higher the mortality of each particular branch of the service, the greater is the proportion of pulmonary disease; and also, that the ratio of deaths from consumption to the deaths from other pulmonary diseases, increases in proportion as this class of diseases is more prevalent; so that if it were wished to make a great experiment to discover the causes of consumption by its actual production, it would be difficult to devise a more complete one than has been made by the neglect of the health of soldiers in barracks. For it is not in the field that the great mortality from pulmonary disease occurs, but while the soldier is at home; and it is therefore in his mode of life that we must look for a solution of the causes of his great liability to consumption.

The soldier's life is monotonous, and he is under restraint, to which circumstance we may attribute some influence; but in these respects he is not materially different from the sailor in the navy on the home station, in whom the mortality is only at the rate of 6·8 per 1000, or considerably less than that of the general population. Neither can night duty, which has been assigned as one of the causes, have any great effect; for the mortality in the police force, who have a larger amount of night duty, does not exceed that of the population of the country.

The intemperate and debauched habits of soldiers undoubtedly have a very considerable influence; but we must look beyond all these; and there is reason to believe that want of proper exercise and suitable employment are quite as efficient causes; but that crowding and insufficient ventilation of the barracks, and defective sewerage, are the most important.

The mortality is least in the cavalry and dragoon guards, who have varied exercise in the stable, as well as the sword exercise, which calls into action the muscles of the chest in a manner unknown to the foot soldier, whose attitudes are monotonous and restrained; so that when on duty and drill, he is often loaded with knapsack and other accoutrements, which constrain and hinder the free action of the muscles of the chest, and seem to act injuriously on the respiratory organs.

The commissioners appear, however, to think that of all the causes the most important in the production of the excessive amount of consumption in the army, has been the confined ill ventilated condition of the barracks. They seem to think that the breathing of the unwholesome air of the crowded dormitories has laid the seeds of consumption—the minimum cubic space allowed to each soldier having been only 450 cubic feet. We have reason, therefore, from this and other facts to believe, that when impure air is habitually respired, it acts like a blight upon the lungs. Some influence may also be attributed to the monotonous and unvaried nature of the soldiers' diet, and to the meat being always cooked by boiling.

It is sad to think that such an amount of disease and mortality should in time past have been allowed to occur amongst our soldiers from neglect of ordinary sanitary laws. But the attention of the country has been fully roused by the facts published in the Report of the Army Commissioners: and we may now hope that what was done towards the end of last century for our sailors, by sanitary improvements in respect to diet, the use of lemon juice, ventilation, cleanliness, and the preservation of the water in iron tanks—measures by which scurvy, fever, and dysentery, were almost extinguished, and the mortality reduced below the level of that of the general population—will be shortly effected for our soldiers, by the introduction of such changes as may reduce the disgraceful pulmonary mortality to a level with that of the general population of the country.

Confinement. It is a well-known fact that many of the lower animals, when confined in menageries and deprived of proper exercise, light, and fresh air, become subject to consumption and frequently die of tubercular disease. Dr. Baly has demonstrated that the same influences operate on man; and that, in prisons, though the food, ventilation, and other hygienic conditions are unexceptionable, the proportion of scrofula and consumption in criminals is remarkably increased, and that the

rate of mortality from these diseases augments with the extension of the period of confinement. In the Millbank Prison he has shown that the mortality is double that of the metropolis, and that the deaths from consumption are three times as numerous. We have seen that soldiers suffer from the constrained life they lead in barracks, and there can be no doubt that various other constrained modes of living, as, for example, in workhouses, have a similar effect. I have seen the same injurious effect exemplified in the development of consumption in pupils subjected to the confinement and restraint practised in some boarding schools. A constrained monotonous mode of life is unquestionably a fertile cause of consumption, and especially when to this is added privation of the stimuli of exercise, light, and fresh air; and their influence is aggravated by insufficient or unwholesome diet and exposure to damp and cold.

Mental Influences. The mind and the imagination have a wonderful action on the body; but it is extremely difficult to appreciate accurately their effects on diseases. I believe that the depressing mental emotions and affections have a directly sedative effect on the lungs, and as certainly reduce the intensity of the respiratory function, as exercise and muscular action increase it; and, whilst I think that cheerful mental occupation and a hopeful condition of mind have both a prophylactic and curative tendency, which it is most important not to overlook in treating the disease, I feel convinced, from my own observation as well as from some of the facts already adduced, more especially those in reference to criminals, that the depressing mental influences, such as grief, disappointment, anxiety, and the loss of fortune, and especially of friends, have an influence greatly beyond what is commonly attributed to them. I have never seen anything that would lead me to believe that consumption is at all a contagious disease, though I think it is injurious for a healthy person to sleep with one who has active pulmonary disease; but we not unfrequently find a husband, and more frequently a wife, attacked soon after nursing the other. In all such cases, where I have seen one relative attacked after another, I have attributed it to mental depression, and the trial of the feelings which must necessarily be experienced in watching, often for months, the fatal progress of this wasting and distressing disease in a near relative. In the case of a brother or sister, we have also to take into account that these influences act with double force on a constitution hereditarily predisposed.

Defective Diet: Insufficient Clothing: Cold and Damp. These are well known causes, the influence of which has never been underrated. It is difficult, however, to bring forward facts proving clearly the operation of these causes separately, as they generally act in combination with each other, or with some of those already mentioned. I look, however, on them as minor causes; and I may state that, whilst soldiers in barracks are more subject than any other class of persons to consumption, this is not the disease from which they suffer in the field, where they are exposed to all these causes. The Crimean experience proved this, and showed that exposure to cold, wet, fatigue, and insufficient food, caused the development of scurvy and the zymotic class of diseases, fever, cholera, and dysentery; but not consumption. It is also known that the extreme cold of very northern latitudes does not render consumption a more prevalent disease, but has the opposite tendency. This class of causes acts powerfully, however, in conjunction with others.

Intemperance and Irregularities of Living. Though consumption is not the disease to which the habitual drunkard is most liable,—those of the nervous system and of the digestive organs being more common in intemperate persons—yet I have so frequently seen tubercular disease of the lungs in persons of dissolute habits, that I believe it has a powerful influence in conjunction with other causes and irregularities of living, in producing this disease.

On this subject a writer, from whom I have already quoted, observes very justly, that of all vices none are so apt to lead on to consumption as the unnatural or unrestrained indulgence of the sensual passions. To this cause, indeed, the germ of tubercules are very frequently traceable; and I am convinced that the many bearings of this subject upon the physical and mental energies have a much closer and more frequent relationship to phthisical affections than we can ever expect, from their peculiar nature, to see fully demonstrated. It is probably in this way that so much evil appears in the sequel to marriage contracted at too early an age either for the due estimation of its responsibilities or the perfecting of the constitution, the penalty for the violation of such a natural law being exacted in the subsequent establishment of phthisis in the parent or in the offspring, or, perhaps, in both.

Effect of other Diseases. Tubercular deposits are most apt to be formed in the lungs during debilitated states of the constitution, and we know from experience that consumption is not unfrequently developed during convalescence from fevers and other diseases. Scarlet fever and measles are especially liable to stir up the tendency to the disease in children of delicate constitution; and, therefore, in such cases the greatest care should be taken to remove completely the attacks of bronchitis and inflammation of the lungs, which are so frequently induced by these diseases, and to restore the health by suitable tonic treatment, and those means best adapted to prevent the tubercular tendency.

Influenza, bronchitis, and pneumonia, and chronic pleurisy have also, I believe, in many cases, a direct influence in exciting the deposit of tubercular matter in the lungs. Their influence is most frequently observed in those predisposed, hereditarily, or by the action of the causes which have been already mentioned, and I believe that it has been rather underrated by many medical men, who have appeared to think that these diseases act merely by exciting into activity preexisting or latent tubercles, or are themselves produced by the irritation of the tubercular deposits. In a practical point of view, we must not, however, overlook the fact that tubercle is nearly allied to the lymph effused by healthy inflammatory action, and though ordinary tubercle is usually deposited independent of an inflammation, we know that the products of chronic pneumonia are so nearly allied to tubercle, that they often run precisely the same course; and I believe that when the blood is in a fit condition to cause tubercular deposition, inflammatory irritation will readily determine it in the part so affected.

CASE OF DIPHTHERIA.

By JOHN M. BRYAN, M.D., F.R.C.S.Eng., Northampton.

MASTER B., aged 6, the son of respectable parents residing at a farmhouse in a healthy situation, one mile out of Northampton, was seized with sore-throat on July 9th, 1857. I prescribed an aperient powder of jalap and calomel to be taken every night, without seeing him.

July 12th. I was hastily summoned to the patient, and found the whole fauces intensely swollen and transparently red. Deglutition was painful and difficult; there was high fever; and the pulse was rapid. His bowels had been opened by the powders; and I now ordered eight grains of chlorate of potass to be taken in water every three hours, and the following liniment to be applied to the throat on spongio-piline:

℞ Aceti cantharidis ʒi; spiritûs camphorati ʒss; olei olivæ ʒi. M.

This soon blistered severely. He was extremely intractable in taking medicines, or in allowing an examination to be made of his throat: the attempt to do so threw him into violent paroxysms, almost amounting to convulsions.

July 12th. The symptoms were much more severe; there was a pale appearance of the whole internal fauces, and a false membrane was forming. I applied freely, twice a day, a solution of nitrate of silver (ten grains to the drachm); and continued the chlorate of potass.

July 14th, 6 A.M. He was much worse, the fauces being quite coated with ash-coloured false membrane. I applied the solution of nitrate of silver, and gave four grains of jalap and a grain of calomel—to be repeated in four hours. The following mixture was also prescribed:

℞ Infusi rosæ compositi ʒij; acidi sulphurici diluti mxv spiritûs ætheris nitrici ʒi; syrupi ʒss. M. Fiat mistura cujus sumatur cochleare i medium 3tiis horis.

1 P.M. I again visited him, and applied the caustic solution freely. Some considerable portions of false membrane, of fœtid odour, came away, with some relief. Beef-tea and small quantities of port wine were ordered.

8 P.M. I again applied the solution of nitrate of silver to the fauces.

July 15th, 5 A.M. The symptoms were very extreme, having also become those of decided croup. I applied the caustic solution very freely, by means of a piece of sponge fastened to the end of a pencil, and detached a good deal of very fœtid membrane. Breathing and deglutition were very difficult; and, as there was apparently no chance of recovery, I gave him a grain of sulphate of copper in a teaspoonful of syrup every hour. After he had taken one or two doses, retching and vomiting came on, attended with detachment of quantities of false membrane and tenacious mucus; and a clearing of the throat took place, with