

of a grain of dust between the eyelid and bulb. In many inflammations, this preliminary rush of blood along the dilated vessels is absent: witness the cases dwelt on in my first lecture, in which the inflammatory state comes into existence *d'emblée*, in consequence of exposure to heat or cold; or the case of mycotic inflammation of the cornea, in which the episcleral vessels do not become affected until the infective material has slowly found its way from the ulcerated surface to the limbus; or in the case of erysipelas, where redness and swelling invade the skin in company, without any antecedent active congestion; whence we conclude that, although determination of blood is a frequent precursor of inflammation, it is not a part of it; and we are confirmed in that opinion by the observation that the "inflammatory blush", as Hunter called it, presents itself as the sole response of the vessels to local irritation; of which fact no better illustration can be given than the famous instance in which he observed it day after day in a patient whose toe he had occasion to cauterise regularly. "After each application", he relates (*Treatise on the Blood and on Inflammation*, 1794, p. 158) "the surrounding parts put on a blush; and all the veins on the top of the foot, as well as up the leg, immediately began to swell, and became large and full."

No experiment can be better adapted to show the complete distinction between determination of blood and inflammatory hyperæmia than that described by Dr. Williams in the Gulstonian Lectures to which I have already referred. Hunter had shown by his experiment that it is possible for the inflammatory blush to subside, leaving no trace, or the injured part to be flooded with blood and then return to its original condition. But Hunter's attention was entirely fixed on the blood-vessels, to the action of which he attributed the whole process. For the purpose of separating Hunter's "incipient enlargement of the vessels upon the first excitement of inflammation", (*Treatise on the Blood, etc.*, p. 279) from the definitive changes which followed it, Dr. Williams most judiciously adopted this method of graduated irritation of the web of the frog's foot, which was at that time the only field of experimental observation. He found that a weak solution of capsicum applied to the web causes dilatation with acceleration of the movement of blood (hyperæmia with increase of motion) in arteries and capillaries; but if the solution were strengthened, or the application several times repeated, the quickening soon gave way to slowing and commencing stagnation. (See *Principles of Medicine*, third edition, pp. 241 and 263.) The effect of the weak excitation was transitory, and the observation could be repeated any number of times on the same web. The stronger solution produced permanent damage of the tissue, resulting in inflammatory congestion, exudation, and stasis. In the mammalian mesentery, the same effect may be produced in a similar way. The substitution of 1.5 per cent. solution of salt for the ordinary .75 per cent. solution which is used as an irrigating fluid, has the effect, as Dr. Thomas has shown,* of fluid at once hurrying on the blood-stream; and if this is done at a time when the mesentery has already undergone inflammatory slowing, and the colourless corpuscles are hugging the walls of the veins, these corpuscles at once resume their place in the axial current; so that, so far from the initial affluxus being itself an inflammatory phenomenon, we can, by inducing it, arrest an inflammatory process when it is in progress.

(To be continued.)

* Thomas, "Ueber Entzündliche Störung des Capillarkreislaufes bei Warmblütern." *Virchow's Archiv*, vol. 74, Sep. abdr., p. 27.

REMOVAL OF PLACENTA IN MISCARRIAGE.—Dr. Crummer gives the following instructions in the *Transactions of the Illinois State Medical Society*, 1881. 1. One index finger introduced into the womb while the organ is depressed well into the pelvis, and steadied by the other hand applied externally. In this way a moderately contracted os may be dilated, a sharp ante-flexion of the uterus straightened, and, using the finger as a hook, the uterus may commonly be thoroughly emptied. 2. With one or two fingers in the vagina for counter-pressure against the anterior surface of the womb, and the other hand making firm pressure over the fundus and posterior surface of the uterus, the contents of the womb may sometimes be pressed out. These procedures, though somewhat painful, do not require an anæsthetic. But, in a certain proportion of our cases, they do not succeed. Very often the detached after-birth can be just felt: at the tip of the finger, or glides from it in any effort at extraction. We may then resort to: 3. The introduction of the hand into the vagina and one or more fingers into the uterus, and this requires an anæsthetic. 4. In some cases where the vagina is small, or an anæsthetic not desirable, I have succeeded admirably with Loomis' placenta-forceps in grasping and removing the offending substance.

CROONIAN LECTURES ON THE CLIMATE AND FEVERS OF INDIA.

Delivered before the Royal College of Physicians of London.

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LECTURE II.—(Concluded.)

Pernicious Forms.—The conditions to which the term "pernicious" is applied occur as intensifications of any of the stages. The cold stage may be unduly prolonged and occupy the whole paroxysm, the patient either sinking, as in the collapse of cholera, or reaction taking place slowly. The hot stage may be intensified and prolonged, the patient becoming delirious, comatose, convulsed; stupor begins with the commencement of the paroxysm, and gradually deepens into complete coma and death, or the symptoms may gradually disappear as the period of the paroxysm passes away. The sweating stage may be very profuse and prolonged, the pulse sinks, and death may take place from exhaustion, or extreme depression, during which the patient is intelligent but hardly sensible of his own weakness, when any exertion or even the erect posture is attended with danger. These are the principal dangers with which I am acquainted. There are other conditions pointing to the cerebro-spinal centres and abdominal viscera, arising out of the general disturbance produced by the malaria rather than by its direct action. Pernicious symptoms sometimes come on suddenly with little warning, after one or two ordinary paroxysms, probably from the intensity of the poison in those who have been unusually debilitated. In the damp hot months in certain parts of India, the symptoms which indicate cerebral disturbance are most likely to occur.

Masked Malarial Fevers.—To certain conditions the term masked has been given: neuralgia with imperfectly developed fever, hot hands, aching pain extending along the course of the great nerve trunks in the limbs; gastralgia often intense, and various forms of disturbed innervation, functional derangement of the liver and other abdominal viscera, nervous irritability, dyspepsia, asthma, hæmaturia, bronchial irritation, insomnia, and symptoms pointing to the effects of malarial poison on the nervous system. The symptoms may be those of collapse, as in cholera, or apoplexy, epilepsy, cerebral effusion, hæmorrhage from stomach, bladder, bowel, or kidney; but the history and the circumstances under which the symptoms occur, indicate their true nature, and malarial origin. Malarial symptoms, are influenced by the state of the weather, and the natives think by the full or new moon. This subject has been discussed in the *Medical and Physical Transactions of Bombay*, by Mr. Murray and Dr. Peet. Morehead says a familiar fact for the hospital physician in India is to find several of the inmates in his wards affected by febrile disease on the same day, though all were free previously; that these days are coincident with the lunar changes; and that those who have suffered from malarious fever had recurrences on those days. But, as it was generally observed that there were atmospheric changes on those days, the fever was due to them, not to the moon. Such is probably the real explanation of the so-called solilunar influence, advocated by Dr. Balfour, who declared that the meridional periods, diurnal and nocturnal, were distinguished by remarkable changes of the weather, which were most remarkable at the lunar periods.

Malarial Cachexia.—A frequent result of exposure to malarial influences and of repeated attacks of periodic fever is anæmia, or even though there may have been no fever, often a profound state of cachexia, with which is associated structural changes in the abdominal viscera, and notably in the spleen. The sufferer has a puffy blanched face, pearly conjunctivæ and lips, short and hurried respiration, weak cardiac action, hæmic murmurs, and a feeble pulse, a tumid abdomen, not unfrequently dropsy, œdematous lungs and areolar tissue generally, wasted muscles, and a bronzed discoloured skin, with a large spleen extending sometimes as far as the iliac fossa (ague cake). Such is common enough in the notoriously malarial regions of India, where the whole population present more or less of this appearance, and where the physical degeneration is accompanied by an almost equally well-marked mental and physical torpor; depression of energy being characteristic signs of this state. I have known individuals return to this country too late to profit by the change. I have also seen a

profound state of malarial anæmia in persons who, having resided for some years in malarial districts, were found to be free from splenic or hepatic enlargement, but in whom the kidneys had suffered, the urine being of a low specific gravity, loaded with albumen, and containing renal casts. The presence of albuminuria is, however, not frequent, nor is it, when in small quantity, of such serious import as might at first sight be supposed. There are other sequelæ of malarial poisoning which are very distressing, such as neuralgia, which may affect any area of nerve-distribution. The fifth nerve, the brachial plexus, and the sciatic are especially prone to suffer; and I have seen many cases in which the suffering was very great. These attacks of malarial neuralgia have their periods of remission and exacerbation, in some assuming the quotidian, tertian, or quartan type; in others being altogether irregular, and though often very obstinate, frequently also yielding to quinine. Asthma is also a frequent mode in which malarial poisoning expresses itself, and though often purely functional, is liable to produce emphysema and chronic bronchial changes.

Treatment of Malarial Fevers.—The days of bleeding and mercurialism had passed, or nearly so, when I went to India in 1850; so that I have had no experience of a mode of treatment which fifty years ago was believed to be absolutely essential. Twining says: "The practice of bleeding in the commencement of the cold stage has always proved safe and generally more successful than any other remedy." He is careful to say that he did not bleed his patients to relieve inflammation, but congested abdominal vessels. But it was a spoliative and needless proceeding, as the practice of later times has shown, though not abandoned altogether, I believe, in some countries. How far the mortality in former years may have been attributable to depletion I cannot say, but it certainly has diminished of late years, and death from uncomplicated malarial fever in a European is not frequent now. During an experience of more than twenty-two years I can remember few fatal cases, and I think this is the experience of most medical officers who have served in India during the last thirty or forty years. The general plan of treatment of intermittent fever in India is as follows. An aperient, to relieve constipation and congestion of the portal system, is generally the first step. This may be followed by a saline aperient, which it may be expedient to repeat. If there be signs of gastric irritation, or of a tendency to dysentery or diarrhoea, one or two full doses of ipecacuanha, fifteen grains or twenty grains, may be desirable. During the cold stage, warm drinks, warm clothing, hot bottles or bricks are useful, and during the pyrexia diaphoretics, cooling drinks, and ice to the head if there be much pain. One-eighth part of the following may be taken every two or three hours. *R.* Liquoris ammon. acet. ℥ij; ætheris nitrosi ℥ij; potassæ acetat. ℥ij; misturæ camphor ℥vj.—*M.* In the sweating stage rest and quiet are required, care being taken to avoid chills. Quinine should now be given and repeated every three or four hours. I have generally given it in the following form:—*R.* Quinæ sulph. gr. xl.; acidii sulphur. dil. ℥j; tincturæ aurantii ℥ij; aquæ ℥vij.—*M.* One-eighth part for a dose. The diet should be light; stimulants, unless there be some special necessity, are not required. The patient should avoid fatigue, excitement, or exposure to vicissitudes of weather, and he should continue to take quinine, after the first three or four doses, at longer intervals—say of six hours—until cinchonism begins to appear, when it may be gradually relinquished. Should a second or third attack have occurred, it is well to take a dose about an hour before the onset is expected, and if the first dose of five grains have not made a decided impression, ten grains may be given. Many give ten grains at first. I have generally found five grains sufficient in ordinary cases, and when the time comes for diminishing the quantity, three grains, and at longer intervals. The bowels must be kept open, not merely with the object of removing accumulation, but of relieving the portal system, liver and spleen. Quinine will have little effect without this; with it, it is most efficacious in diminishing the intensity, and in preventing return of fever. In uncomplicated cases of intermittent, with no visceral engorgement, this mode of treatment will generally be efficacious. Persistent return of fever will need larger doses of quinine, or arsenic.

Treatment of Remittent Fever.—In this form the high fever, racking headache, muscular and epigastric pain, nausea, vomiting, and other painful symptoms, call urgently for relief, but not by bleeding, unless, indeed, a few leeches be applied, and that very seldom. The bowels should be freely acted on by colocynth or jalap, with a moderate dose of calomel, acet. of ammonia, with ether, to induce diaphoresis; cooling drinks and iced water should be given, whilst ice is applied to the head, which should be shaved if the heat and pain be great; cold affusions, sponging, or even the wet sheet may be used if the temperature is very high, care being taken not to apply cold long enough to cause depression. Draughts of tepid water will soothe the stomach and relieve it of bile and other matters; if the retching be obstinate,

swallowing small pieces of ice is grateful. Effervescing draughts of citrate of potash and iced soda-water, the application of a sinapism or chloroform on a piece of lint over the stomach, will sometimes give relief. Pain over the liver and spleen may be met by hot fomentations; or it may be expedient, if very severe, to apply few leeches, though this is seldom necessary. The most important indication is to watch for any sign of remission, which generally occurs in the morning, when a full dose of quinine, ten to fifteen grains in solution, should be administered; twenty or even thirty grains are sometimes given; I doubt if they do more good than ten grains, though fifteen to twenty grains may occasionally be necessary. It sometimes happens that the stomach will not retain quinine. If so, it may be given by hypodermic injection or by enema; the former is best, and if the needle be made to enter the subcutaneous areolar tissue, turning the aperture away from the under surface of the skin,* there is little danger of local mischief, though abscess, sloughing, erysipelas, and even tetanus, have followed the operation. In cases combined with splenic cachexia, it should be avoided if possible; a solution of the neutral sulphate, or of borate of quinoidine (of Dr. De Vry), which is very soluble and has an alkaline reaction, dissolving in three-parts of cold water, may be used. Mr. Ravier dissolves the sulphate in tartaric acid, and has used it with efficacy and safety. He has not found it produce abscess, ulceration, sloughing, or tetanus, if the precautions he suggested were observed. It is preferable to the solution of the neutral sulphate on account of its higher concentration, the tartaric solution containing one in three, whilst the neutral sulphate is only one in twelve. Quinine must be continued until the symptoms abate, the remission becomes more perfect, the tongue cleans, and the condition of prostration improves. It is not necessary to continue large doses, but enough to keep up a moderate degree of cinchonism. Where the fever tends to assume the adynamic form or become continued; when there is delirium, sordes of teeth, muttering, tremor of muscles, dry hot skin, abdominal, hepatic, and splenic tenderness with delirium, depressed cardiac action, and feeble pulse, and no signs of remission appear, or only in the most transient form, quinine should be given irrespective of remission, and I never hesitate to give it during the pyrexia of malarial remittent; a coated tongue and confined bowels need not deter, in a bad case, from giving it. Nourishment and stimulants are to be carefully administered. Pulmonary and bronchial congestion and inflammation are often dangerous and frequent complications. Hepatic and bowel complications may also occur, and will require appropriate management. In the adynamic state, wine, brandy, and other stimulants are necessary. The amount will depend on the state of the pulse; animal broths, milk, or other nutrients will be required. Change of climate should be enjoined as soon as the strength is sufficiently re-established to enable the patient to undertake a voyage. Quinine seldom fails if judiciously used. Experience has taught me that large doses of twenty to thirty grains sometimes given are not generally necessary, though there may be exceptions to this rule. However carefully administered, it will sometimes neither arrest the paroxysms nor alter the character of the fever; indeed, in certain cases it seems rather to do harm than good; though, as far as my experience goes, such cases are rare. I have heard intelligent natives ask not to have quinine given to them, as "they did not wish to make the fever worse." Had a dose of calomel and colocynth, or of compound jalap powder, or some neutral salt been given before the quinine, the effect might have been more satisfactory. In former days calomel was regarded as an essential part of the treatment, and large and frequent doses were given; an occasional dose of a few grains combined with colocynth may be useful, especially when there are hepatic complications, but beyond this it is not required. The essential principle of treatment is to keep the bowels open (not purged), relieve visceral engorgement, bring down the temperature, and neutralise the action of the poison. I know of nothing better than the cinchona alkaloids; they neutralise the poison, diminish blood-pressure, decrease temperature, and prevent, or modify, periodicity. Their most marked effects are shown in their influence on malarial fevers; but quinine is useful in other pyrexial conditions, and I cannot regard it as a crucial test of the nature of a fever; in the most fervent of all fevers—the ardent or thermic—when the temperature rises so high as to imperil life, hypodermic injection of quinine has been thought to have a powerful effect in reducing the temperature; and I believe it is now given in enteric fever in this country with this object. In pernicious attacks with collapse, either in the cold or sweating stages, quinine must be combined with stimulants and warmth. In the cold stage it may sometimes be advantageously combined with opium, whilst warmth is applied to the body generally. When coma super-

* Scriven uses a syringe devised by Dr. Buzzard.

venes, ice to the head, revulsives, sinapisms or turpentine stupes to the legs and trunk, and stimulating enemata, in which thirty grains of quinine may be combined, or a few leeches to the mastoid processes, may be useful. Blisters are sometimes applied. Under the influence of quinine the fit may terminate like ordinary ague. Stertor, congestion, coma with high temperature, suggest active measures, but not of a depleting character. When there are gastralgia and vomiting, I have found opium afford great relief. Time does not admit of dwelling on numerous other antiperiodics; none are comparable to cinchona and its alkaloids. The mixed alkaloids now prepared in India from cinchona grown in the plantations at Darjeeling and other hill stations, have been submitted to trial and found very efficacious, though certain objections were made that they caused nausea; it seems as though this and other objections are not so serious as at first imagined, and that the drug will come into general use. Though economically it may have advantages, it will not supersede the sulphate. Dr. De Vry brought this preparation to notice. Dr. Verckhuysen says quinetum is of great value as a febrifuge, but takes longer to act, and will not replace quinine in pernicious fever. It has the same apyretic effect as quinine, but is less powerful; larger doses are, therefore, required at longer intervals before the paroxysm than quinine. It produces no unpleasant effects, no noises in the ear, and can be taken by those who cannot take quinine. It is more efficacious in chronic cases as a tonic, whilst in masked malaria it is incomparably superior to quinine. Arsenic is a valuable febrifuge and antiperiodic. When quinine does not succeed, arsenic sometimes will do so, given in doses of five drops of the liquor arsenicalis. Care must be taken not to continue its use until symptoms of gastric irritation are set up. In the treatment of the early conditions of malarial fever I have never found it equal to quinine; but in cases of chronic malarial poisoning, with frequent returns of fever, neuralgia, or other indications of the chronic action of malaria, I have seen benefit arise from the continued use of arsenic in small doses—three or four drops of the liquor potassæ arsenitis twice a day, after food. The antiperiodic powers of opium are probably the chief reason why opium-eating and smoking has become so widely-spread a habit in China and India. There is little doubt that it does possess such a power, and that in the earlier stages it gives great relief; it relieves pain, soothes and breaks or stops the periodic return of fever; and it seems to assist those exposed to malarial influences in resisting them; it has been used for this purpose since the time of Galen. Trotter, Lind, and others, in the last century, prescribed it, and there may be cases where it might be expedient to use it now; it would probably be hurtful during the hot stage, yet in the cold and sweating stages it might be beneficial. Waring says he has seen it cut short the cold stage like a charm, and mitigate the severity of the following hot stage. I have had no experience of it as a febrifuge, and as there are so many others that would better fulfil the purposes required, except in intercurrent conditions, which might complicate malarial fever, I should not resort to it. Many other drugs are spoken of both in the officinal and native pharmacopœia, but they are inferior to the cinchona alkaloids; arsenic, gelsiminum, biberine, salycine, strychnine, atees (aconitum heterophyllum), piperine, ilicin, bonduc nut (fruit of *Casalpina Bonduchi*), salts of iron, zinc, picric acid, the mineral acids, and a variety of native drugs—the hyposulphites and alcohol. These, or some of them, especially iron, may be of service in certain stages of the fever, or in the cachexia following it. Atees is much used in native practice, and is a valuable drug, as an antiperiodic, tonic, or as combined with gentian, chiretta, or other vegetable bitters, but it can in no way take the place of quinine, quinetum, or arsenic. I may not omit to mention the tincture of Warburg. I have never found it better than quinine, though it certainly possesses febrifuge and diaphoretic properties. Dr. Maclean and others speak highly of it, and as its composition has been declared, the objections to its use have been removed; but I must leave it with this brief notice. In the treatment of malarial cachexia, with enlarged liver and spleen, the most important step is change of climate, the judicious use of preparations of iron and quinine (sulphate is best), and attention to the state of the portal system. I do not mean excessive purgation, but gentle action by salines combined with quinine and vegetable bitters. Carefully regulated and nourishing diet, and protection from all vicissitudes of climate must be enjoined. In such cases benefit may be derived from the saline and ferruginous waters of Germany, and from measures that tend to improve the general health. I may add that a prolonged absence from the country in which the mischief originated is necessary. In conclusion, I would remark that though mercury is especially to be deprecated in the treatment of disease connected with malariously enlarged spleen, local application of the ointment of red iodide of mercury, applied as it is done in India for goitre, is often successful in reducing the spleen; and that it does not appear to incur much if any

risk of mercurialism being induced. Professor Maclean speaks favourably of it, and I can endorse the opinion he has expressed. One word in regard to a matter I have omitted. In advanced splenic cachexia the patient should be very careful not to make any exertion; the result may be rapid dissolution with all the symptoms of pulmonary obstruction. The last instance in which this was impressed on my attention was in the case of a young Englishman of eighteen or twenty who had returned from India in a profound state of cachexia—the spleen descending nearly to the ilium, and with all the symptoms of anæmia in the most advanced condition. Under the influence of quinine, iron, and nourishment, he was improving, and there was hope of further progress. One day, in spite of warnings, he rose, walked to the window, and tried to raise it. He went back to bed exhausted and breathless, and died in a few hours.

In my next lecture, I hope to describe some forms of continued fever in India.

THE GULSTONIAN LECTURES ON PULMONARY CAVITIES: THEIR ORIGIN, GROWTH, AND REPAIR.

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LECTURE III. PART III.—*Concluded.*

OF the alterations in shape suffered by cavities, I have already spoken at sufficient length. The relations of cavities to surrounding parts are also subject to variations. When superficial, and when at the same time closely adherent to the chest-wall, cavities are only susceptible of very limited alterations in their position; but the intervention between them and the pleura of a moderate thickness of spongy tissue enables them to undergo a gradual but decided displacement. This shifting of cavities, as the result of age, takes place in a determinate direction. In all cavities the natural tendency is to a recession towards the root of the lung; and the compensatory development of the healthy portions of the lung usually assists by substitution the normal retraction. Thus, I have sometimes found in the mid-dorsal region, connected with a thickened and shortened bronchus, the remains of a cavity which had obviously retreated from the surface, under the influence of the super-inflation of the lung-tissue which had grown up, as it were, around it. The retraction upwards of cavities at the base is often very striking, but greater practical interest belongs to the history of cavities at the apex.

The direction of the *shifting* of the apex-cavities is remarkably constant. Unless rigidly fixed by adhesions, they invariably tend to retreat from the front of the chest towards the back, and from the sub-clavicular into the axillary region. Consequently, the chronic cavities, frequently detected after death at the outer apex, should not be taken to have necessarily originated there. The remarkable shifting to which I have alluded was pointed out by Dr. C. T. Williams, in his lectures on the Various Modes of Contraction of Cavities in Phthisis Pulmonalis (*Lancet*, 1873, vol. i, pp. 298 and 369). I fully agree with the view which he expresses concerning the special mechanism at work. It cannot be doubted that, on the right side, the retraction is mainly favoured by the great expansion of which the middle lobe is capable. I would not, however, restrict this action to the right middle lobe. Every portion of spongy tissue in the sternal region is possessed of similar capabilities for expansion; and, on the left side, the ultimate results are not far behind those observed on the right.

The recognition of the changes to which I have alluded has a direct bearing, not only upon our diagnosis, but upon the prognosis which we may form in individual cases. Unless we have carefully examined the upper axillary region, we cannot pronounce a chest to be free from excavation. The signs of disease have sometimes entirely disappeared from the anterior aspect of the chest, when cavernous sounds are still plainly perceptible in the axilla. The discovery of a vomica in this situation frequently throws upon the history of the case a clearer light than is derivable from the patient's own statements. On the other hand, in the early stages of subclavicular disease, the rapidity with which the signs are observed to recede may be accepted as a measure of the favourable chances. From this rapid shifting, we derive an