

with that of the sound limb. If we find a marked and persistent increase of heat, say of 2 or 3 degrees, in the affected joint we may feel sure that changes are going on in the part, which, if not sufficient to excite suppuration, border closely on that stage of the disease. Absolute rest, belladonna, pressure and ice applied outside an elastic bandage may arrest further mischief in conjunction with good hygienic arrangements, but my opinion is, that sooner or later a joint affected with granular disease which has indicated a persistent high temperature, although it may improve for a time, will hardly recover its normal condition. If no persistent high temperature has been observed, there is a hope of recovery; but, unfortunately, it is frequently impossible for us to know if the temperature of a diseased joint has not been persistently high at some time or other previously to the case coming under our care. A high temperature therefore such as I have referred to, accompanied by other symptoms of granular disease, is a distinct warning to us of serious mischief, but its absence is no proof that changes such as I have indicated may not have occurred, the parts having perhaps been comparatively quiet when the patient happens to come under our observation; our prognosis must therefore always be guarded.

I have already described the plan of treatment to be adopted in the more favourable class of cases.

If the patient, in spite of these measures, continues to get worse, the actual cautery should be employed, the skin and connective tissue beneath it being singed in lines along which the cautery extends, being some four or five inches in length on either side of the patella; not only is the counter-irritation useful in cases of this kind, but the cicatrices which form as they contract, exercise a certain amount of pressure on the pulpy tissue beneath. After the wounds caused by the application of the actual cautery have healed counter-irritation should still be kept up over the joint for some time. Pressure by means of an elastic bandage must also be used.

Supposing suppuration has commenced as in the case of D. C., it is possible that the matter may have formed external to the articulation, in fact this is frequently found to be the case in this form of disease; crepitation could not be felt, but it was supposed that the pulpy matter between the ends of the bones probably filled the articulation and so masked this symptom.

Sir W. Fergusson was fond of repeating the formula that, amputations are the opprobrium of surgery, and in no cases is this more certainly true than in diseased joints; unless the patient's strength is persistently diminishing, his digestive organs becoming impaired, and further efforts to save the joint are attended by risk to life, amputation should not be resorted to. In cases of advanced pulpy degeneration ankylosis of the joint may result if the parts are freely laid open, the granulation tissue broken down, and efficient drainage established, the limb being kept at perfect rest. I have watched cases of granular disease of the knee, ankle and elbow joint which, although very protracted in their treatment, have ultimately yielded good results. But you must give

your patients affected with pulpy degeneration of the joints fair play, and one of the most essential conditions to their recovery is light and pure air, together with rest for the affected joints.

After operating on a case of pulpy degeneration of a joint, suppuration for a time is rather to be encouraged than otherwise, and probably the chloride of zinc paste applied to the diseased tissues destroys them more effectively than any other remedy at our command. As soon as the sloughs produced by this application have separated, the hospital red lotion may be freely syringed two or three times a day through the diseased structures; as the suppuration diminishes, iodoform with tannic acid may be dusted over the granulating surfaces.

With reference to the subject of excision of joints I shall have more to say when I come to speak of the diseases of special joints; I may here remark that in adult patients I should amputate the lower third of the leg or of the thigh rather than excise the ankle or knee joints. On the other hand, with reference to the upper extremity, we are seldom justified in performing an amputation, at any rate until after re-section has failed to remove the local disease.

NOTES ON EARLY SANITATION IN INDIA.

BY SURGEON-GENERAL C. A. GORDON, M.D., C.B.

(Continued from page 274.)

The despatch quoted at the close of the previous paper undoubtedly reads badly with regard to surgeons. In all branches of the service however the records of the time show that abuses and impositions were practiced. It is important to observe while such conditions prevailed, that the Court of Directors studied the well being of the soldier in their employment, even to authorizing the dismissal on the spot of incompetent medical officers. Some of their measures might truly serve as an example to be followed with advantage in more modern times. In April of the same year, during an engagement with the French near Trichinopoly, the English lost several men by sunstroke, and, for fear of losing more, out of the small number then in the field, pursuit of the French was prevented.

Cargoes of slaves from Madagascar and elsewhere were periodically landed in India, their value placed to the credit of the Company, the slaves themselves employed as soldiers and in various other occupations. The surgeon of each vessel so bringing slaves received five shillings a head for so many as "shall be delivered alive." With regard to the French troops in the coast, it was customary to receive reinforcements once a year from France, some ships bringing seven hundred men each. Of the classes from which the men were taken, it is said that "they were the scourgings of jails and sweepings of the galleys." This being so, it is easy to understand the estimation in which, as already observed, they were held by native chiefs.

In 1753, an expedition under the command of Briga-

dier-General Stringer Lawrence marched from Wandewash towards Trivedy, and thence to Trichinopoly. The rainy season had set in; the rivers were *swelled*; the roads difficult to travel on; the troops without tents; the men falling sick every day; the situation of Trivedy very unwholesome. At the beginning of the year the force this officer had under his command, included 700 Europeans; in April he was joined by 200 more; deducting from these 150 left behind and 100 as casualties, there remained 650, out of which number, on arrival at Trichinopoly on 17th May, 100 were at once sent to hospital. The march was begun on 1st of that month. Under these circumstances General Lawrence reported to the Council that the monsoon was no season proper for action. If, he observes, your garrison is sick, what must be the case of poor fellows who did not lie one night dry for three weeks, the greater part of them down with agues and fevers.

With regard to the troops remaining at Trichinopoly the Council wrote that the tenderest care should be shown as to the preservation of their health; and it is well known there is hardly a town but what is capable of quartering the troops. They add:—"It seems very particular that best part of an army of near six hundred men should be sick directly, and the question may be reasonably asked, why were they not sent into garrison as they fell sick, for only one hundred were sufficient for the security of Trivedy." The circumstance is thus rendered sufficiently clear that Government had already begun to consider how the losses then taking place among their troops could be prevented by the application of what have of late been called "sanitary measures."

A surgeon sent from Madras to Trivedy refused to go to camp unless the officer commanding let him supersede Mr. Boswell, which General Lawrence states he had no orders to do. "Besides," he adds, "the latter has behaved with great diligence, and it would be a pity to put any one over him." The incident is recorded as it involves a principle of great importance in sanitation as in other respects concerning administration, namely, not to supersede a man who has done good work in a particular sphere by one who has yet to be tried therein.

The Court of Directors, writing to the Council of Fort St. George, observed that "the sooner barracks are erected for the soldiery the better," and add, "therefore as soon as Colonel Scott and Mr. Brobier have agreed upon the most convenient situation, they must immediately set about them." It may therefore be taken for granted that this indicates that convenience of situation was the only point deemed of importance sufficient to be mentioned in reference to the intended buildings.

In the same year the Medical Board of Calcutta sent orders to have the jungles of Jessore cleared away, stagnant pools filled up, and everything done to ensure free ventilation. In their report they recommended widening the streets, improving the drainage, and closing the burial grounds, "with a view of improving the sanitary condition of Calcutta." Nor can it be said that any more effectual measures than are thus indicated have been devised even now in 1879 by so-called "sanitary reformers" of the period.

In 1754, the Court of Directors, while intimating to

the Council that Artillery and Infantry of the King's forces were proceeding to Madras, ordered: "You must take care that the said forces are properly accommodated with barracks or places to live in, and in general that they be treated with humanity, and as much care as if they were our own troops." Here then is further evidence of a desire on the part of Government to protect the health of the troops as far as, under the circumstances of the times, that could be done. In the same year Colonel Lawrence, profiting by the experience of the previous year, housed his forces engaged in the defence of Trichinopoly during the rainy season, taking advantage for that purpose of the Wariore pagoda, situated due west from that city.

In 1755, Captain Polier, who was in the field, wrote to the Council:—"My soldiers fall sick daily of intermitting fevers, occasioned by the continual rains they are obliged to bear nightly as well as the great heats by day." He adds, "I endeavor to lodge them in choultries. The misfortune is, we find nowhere any large enough. However the sick have been constantly sheltered." Thus is the circumstance made evident that this officer knew perfectly well what was the cause of the sickness from which his troops suffered, as also the "sanitary" measure indicated for its prevention; and it is satisfactory to see that the actually sick were sheltered.

The available records of 1756 make no allusion to matters connected with sanitation except in regard to barracks for the troops in Fort William. They are said to have had within them one long wooden platform for the soldiers to sleep on, to have been open to the west by means of arches, and to have had without a small parapet wall corresponding to the arches. In fact the so-called barracks were mere *sheds*, the sleeping *berths* within exactly such as in 1870 the French troops huddled in and around Paris made use of.

In 1757, with a view to benefit the soldier, it was agreed that he should receive his pay in four instalments during the month. Each company was divided into four divisions, a sergeant and corporal appointed to each, and they were held responsible that the men appeared "in a soldier-like manner." Each "division" was further divided into messes for the greater convenience and regularity of their diet.

In 1758, "in order to prevent the ill consequences which may arise from drunkenness among the military, &c., of which too frequent instances have of late been seen in garrison," it was resolved "that the arrack farm be taken off, and that notice be affixed to the town gates forbidding all persons on pain of death to sell arrack or toddy to the military." And yet we at the present time read that in former days the vice of drinking was *encouraged* by the regulations in force. As in many other respects so in this assertions are made with partial knowledge, or none at all, of conditions as they actually were.

The members of the Council Board were directed "to visit the hospital at least once a week, and report at their next consultation the state and condition thereof with respect to the treatment of the patients, their provisions, attendants," &c. Mr. Powney having been accord-

ingly detailed to make the first visit, reported that he "had visited the hospital and found the patients very well satisfied with their treatment in general, except that they complain of the "price of their provisions." Ordered at the same time that the surgeons do lay before the Board in writing a plan for the better regulating the hospital as well in respect to the attendance of the surgeons as for the better supplying the patients with better provisions, and generally all other matters that may occur to them as proper for the more effectually obtaining all the good purposes of that institution."

Under the plea of purchasing provisions the troops had been in the habit of obtaining permission to go to Saint Thomè and there getting drink. An order was therefore published prohibiting them from going except accompanied by a non-commissioned officer.

In July of this year Mr. William Gray was appointed Surgeon to the Honorable Company's troops and all sick non-commissioned officers and soldiers ordered to be in future sent to him to be examined before they are admitted into the hospital.

An instance of severity of punishment for being intoxicated is given. John Smith, Marine in Captain Manley's Company, confined by Captain Manley for being drunk and alarming the garrison, was found guilty of the crimes laid to his charge, and sentenced to receive five hundred lashes.

During this year the circumstance is on record that the action of the French at Pondicherry was seriously impeded in consequence of the want of means of transport, including bullocks and coolies, and by their inability to obtain suitable guides. Thus in June of that year Lally's force began its march to Tanjore without organised carriage, without money and without necessary provisions; all these having to be procured en route, discipline among the soldiers became seriously relaxed, at the same time that the people of the country were alienated; at Devicotta the troops had nothing to eat except unhusked rice; it was even probable that they would offer submission to their English enemies in order to obtain food, and it was not until they had reached Karikal that they obtained a regular meal. When on 8th of August he determined to retreat from Tanjore, his first preparation was to send off a detachment of 150 men as an escort to the sick and wounded of his force, together with his stores to Karikal; when on the 10th his withdrawal began he marched in two columns, the baggage and carriage for the sick in the interval between them, these protected in front and in rear by artillery.

The second siege of Fort St. George by the French occurred in the latter part of 1758 and early part of 1759. In connection with other arrangements it is recorded that all the invalids who are able to load and fire were ordered into the Fort. Different officers were detailed to issue each of the following articles to the troops, namely, water, firewood, rice, paddy, arrack, cattle, sheep, salt provisions, salt, curry stuff and other articles; straw, pots, pans, baskets, *oyl*, &c. Provisions were issued at

7 A. M., arrack at 6 A. M. and 4 P. M., both on the requisition of officers commanding Companies. Also "as it is to be apprehended many of the dogs in town will run mad when there comes to be a brisk fire from the garrison, it is ordered that all dogs in general be hanged or otherwise killed and carried out beyond the north glacis and there buried." That the white troops wore their ordinary English uniform appears from the circumstance narrated that d'Estaing, an officer of the besieging force, seeing some troops dressed in *scarlet* immediately outside the fort, indiscreetly approached them and was taken prisoner.

The French appear to have erected straw huts for their protection. It is mentioned that those behind Lally's battery took fire by a shell from the Fort. When in February 1759 the siege was raised, in the pagoda used as the enemy's hospital were found 44 sick and wounded soldiers without one person to attend them.* Lally's sudden march, so the record says, may account for his leaving these people behind, but nothing can justify his abandoning them without leaving a line to recommend them to our care. They however found that humanity in their enemies which was denied them by their General. Immediately orders were given that the same care should be taken of them as of our own people, and the greatest part have since recovered. In fact they were looked upon as *neutrals* from the circumstance of their being sick and wounded, notwithstanding that a century had yet to elapse before the "Geneva Convention" was to spring into existence and become fashionable.

According to a General Return of troops in Fort St. George on 12th December 1758, that is, the day on which the siege began, the total strength of non-commissioned officers and soldiers of all classes except sepoy was 1,758, of whom 178 were sick, giving a ratio of sick to strength equal to 10 per cent. By the General Weekly Return for 17th February 1759, that is, the day on which the siege was raised, the total strength of non-commissioned officers and soldiers exclusive of sepoy is given as 2,001. Of this number 216 were sick or 10 per cent of strength, 117 wounded or a little over 5 per cent, making in all a ratio of non-effectives equal to 15 per 100. Among the pioneers 2 are shown in the return as attending the sick.

It appears that throughout the period of the siege the following casualties occurred, viz., in a strength of 122 officers 13 were killed, 15 wounded, 2 died by disease and 4 prisoners. Of the troops 205 were killed, 182 wounded, 52 died by disease, 122 were captured by the enemy, and 20 deserted. As reinforcements appear to have entered the fort during the siege, it is impossible to indicate ratios of casualties to strength.

The siege of Fort St. George having been raised, orders were issued for a force from the garrison to take the field. A contract was entered into for the necessary draft bullocks to be furnished and *diet* for the

* According to Malleison there was a Surgeon left in charge of them.

troops. A "state" of the hospital was laid before the Council; also a roll of troops remaining in the fort and an account of all provisions in store. A number of tents having been brought by "Europe ships" for sale, orders were issued for their purchase on the most favourable terms to be obtained.

The contracted time of many of the Swiss soldiers then in the service of the Company having expired, a bounty of £10 was allowed to each of those who re-enlisted, whereas to the English soldiers under similar circumstances no more than 30 pagodas, about £3 was granted.

In the same year General Momson ordered that the men of the force under his command should have no more drams allowed, for the reason that the money received by the sale of cattle *drove* from the enemy's country was all expended. Beef and mutton were to be allowed for a few more days, but an order of 26th June directed the men to provide themselves with meat after to-morrow.

The agent for making clothing for the sepoys produced to the Council Board various patterns of clothing for the sepoys. These were approved and ordered to be prepared at a cost of Rs. 6 for the coat of a Havildar and Rs. 4 for a Naique.

An issue of provisions and arrack was made to the troops on the occasion of the King's birth-day.

The privilege of selling arrack was again let out "to farm." Soldiers were allowed to purchase two drams and a quart of fresh *toddy* per day, the dram to be one-fortieth part of a gallon, the price five *doodies*, and of the pint of *toddy* two *doodies*.

"When any man is sent to hospital, his coat and hat is taken from him and kept by the officer commanding the company or detachment to which he belongs till he is discharged.

Soldiers for guard are to parade clean dressed, their hats well cocked and in white spatterdashes and black gaiters."

The men were divided into messes; "an officer to visit their barracks every day and see that each mess boils their *pots* and *buys wholesome victuals*, likewise to see that the barracks are kept clean and that the men's arms and accoutrements are properly hung up

Men in the field who get drunk are to be tried and punished severely so soon as the army comes to their guard. The men are directed to wear their accoutrements across their shoulders. On the line of march the *doolies* are to be in front of the men. *Puckally* bullocks march with the column. Quarter Masters are, if possible, to contrive some method of carrying camp kettles so that the men *may not carry them themselves*."

The troops were ordered when on the march to wear the skirts of their coats tacked back, and on no account to alter the *cocks of their hats*. The natural inference then is that the troops at this time marched in *heavy marching order*; that their uniform and head gear were on field service exactly as on private parade. No wonder then that casualties from sunstroke among them were numerous.

After the battle of Wandewash (1760) Sir Eyre Coote wrote to the Council that his force was in great want of surgeons. "If it is possible," so he wrote, "to send surgeons and *proper people* from Madras to attend the wounded here who are very numerous, you may be the means to save the lives of many gallant men, several" of whom have not been dressed since the day of the action, namely two full days before he wrote. He added, "I shall be obliged to carry away some surgeons; out of the few, numbers must lose their lives, as I have some thoughts of carrying on the siege of Arcot immediately." To this the Council replied that "we should be very happy if it were in our power to give you all the assistance that is wanting for the care and comfort of the wounded; a large supply of medicines was sent out a few days ago, and yesterday, another surgeon went from hence to join you. We have ordered as many cots as possible to be sent to you, and would recommend to you to send to Madras as many of the wounded as are able to bear the journey." The Council expressed their inability to find enough conveniences for the care of our own wounded and the enemy's too. "The French should send surgeons and necessaries for the care of their own people as is always customary in Europe."

The troops in the field were dieted by contract. The allowance per man per day, beef or mutton lbs. 1½, biscuit lb. 1, or rice lb. 1½. Arrack 2 drams of 4 to the gallon. For this the price given to the contractor was 4 fanams and 40 cash in places south of Fort Saint David, and 3 fanams 50 cash in places to the north of it.

At this time the daily hire of draft oxen with the drivers was 4 fanams 60 cash; carriage oxen with their drivers 3-40.

These prices being considered too high, a fresh contract was entered into for 10 cash per day for victualling each man, and 10 cash per day for the hire of draft and carriage bullock.

The force under Sir Eyre Coote, when preparing for the siege of Arcot, was described as very sickly, and the Council solicited to appoint somebody to act as Surgeon-General, for "the affairs at present of that branch are greatly confused by not having some person at the head of it."

The Commander-in-Chief had great reason to think that the liquors left by the enemy in Black Town were poisoned, several men who drank them having dropt down dead very soon after. He therefore recommended them to avoid all such as had been left.

In Cantonments it was ordered that from the 1st of March the allowance of provisions and arrack should be struck off, the men to pay for what provisions they receive from the victualler.

[To be continued.]