Journal of the Royal Army Medical Corps

Original Communications.

MALARIA IN INDIA.

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PART I.

In the Report on the Health of the Army for 1928, Ferozepore heads the list of stations infected with malaria, so perhaps a few notes on the district and on the steps taken and suggested to combat the disease may be of interest to readers of the Journal of the Royal Army Medical Corps.

It is proposed to divide the article into two main sections:—
(a) A description of the area under consideration.
(b) Anti-malaria works and suggestions.

Ferozepore District, which has an area of approximately 4,286 square miles, is the most southerly of the five districts of the Jullundur Division of the Punjab. Jullundur is said to have been so named after Alexander the Great; the Indian having difficulty in pronouncing his name, called him “Alacjulluudur,” this being shortened later to the present name.

The founder of the district was probably Firoz Shah Tughlak, though possibly one of the Bhatti chiefs, Firoz Khan, may have been the founder.

The district has a population of about 959,000 and lies between latitude 26° 56 and 31° 11 North and longitude 73° 55 and 75° 37 East.

Ferozepore Cantonment itself lies fifty miles from Lahore and eighty miles from Ludhiana, on the Grand Trunk Road.

The district is bounded to the north-east by the River Sutlej and by...
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the Kapurthala State, to the north-west and west by the united streams of the Rivers Sutlej and Beas, to the east and south-east by the Ludhiana district and the Indian States of Faridkot, Patiala, Nabha and Jhind, and on the south and south-west by the Hissar district, Bikaner and Bhawalpur.

The surface of the district slopes very gently from the north-east towards the south-west, the average fall being about one and a half feet to the mile. It is of alluvial formation and contains no hills.

Ferozepore Cantonment is about 650 feet above sea-level. At the Ludhiana border the river is about 725 feet above the sea; at the Bhawalpur border, 115 miles down stream, the level is 565 feet.

The River Sutlej was crossed until quite recently by the Kaiser-i-Hind railway bridge at about five miles from Ferozepore City. This bridge, which was built in 1886, was 4,000 feet long, consisting of twenty-seven piers, with a cart road above the railway. The dismantling of this bridge was completed towards the end of 1929, following the completion of a large barrage for conveying water to the Bikaner desert. The barrage was opened in 1926, a new bridge having been built which carries the railway and a cart road side by side.

There are several depressions throughout the area, due to old channels of the Sutlej, disused canal beds and such like; these fill up during the monsoon but are usually dry during the rest of the year.

The country is not well wooded, though in some areas low scrub jungle may be found, and along the sides of roads and canals there is usually considerable shade. The most common trees met with are the kikar, shisham, siris and tamarisk, whilst round the villages one sees the banyan and pipal.

Numerous plantations of fruit trees are met with, including the mango, orange, lime, pomegranate and banana, with occasional apricot and grape. Fruit is on the whole of poor quality.

Vegetables, both English and Indian, do well and there is usually a good variety of these to choose from.

Along the banks of the river and in other uncultivated areas are to be found quantities of high jungle grass, the haunt of all kinds of small game.

There is no big game in the district; tigers and leopards were found many years ago but have long since disappeared. Black buck (Indian antelope) and chinkara (ravine deer) were plentiful up to within the past few years but have now moved into the neighbouring States and Jain country; the horns are small and scarcely worth collecting. Nilgai (blue bull) are met with occasionally, but the shooting of these is forbidden in most places.

Wolves are rare, having been hunted by the local natives on account of the reward paid for their destruction. Jackals and foxes are fairly common and have good skins in the cold weather.
Wild pig abound in some places and occasionally give good sport to the local Tent Club, but owing to large hunts frequently organized, chiefly by the Sikhs, the numbers are now markedly less. At some of these hunts hundreds of beaters are engaged, every form of weapon, from shot-gun to club, is used, no respect being shown either to size, age or sex, as the flesh of the wild pig is very highly prized as food.

Owls are sometimes met with in the river or on the large jheels, but as a reward is also paid for these their numbers are less than formerly.

Snakes are common, the cobra, both black and yellow, the common krait and the echis being the chief poisonous species; several harmless species are also found.

The long-nosed, fish-eating crocodile (gharial) is found in the river, the largest specimens seen by the writer measured about eighteen feet in length. Owing to the large number shot yearly they are now becoming scarce, except at long distances from cantonments. Many years ago I collected ten of varying sizes in one afternoon, whereas now one is lucky to get ten shots in a whole day.

The district is now looked upon as one of the best in the Punjab for the shooting of game birds, visitors coming from many surrounding places for this form of sport. Owing to the great increase in the number of guns owned by Indians, and to the netting and trapping methods employed, some species are not so common as formerly, but black partridge, grey partridge, quail, snipe, curlew and several kinds of plover abound at certain times; sand grouse, both imperial and common, are found in certain areas. The common "blue rock" pigeon and, at certain times, the eastern stock pigeon are to be met with everywhere.

One does not usually include the common house kite and the crow, both scavengers of the worst type, in a list of game birds, but both of these were formerly eaten by the natives, the bazaar value being half an anna and one picc respectively. I have not personally met anyone who has eaten these birds, though possibly the practice still continues, but on more than one occasion have been asked to give the carcase of a jackal to men who wished to eat the flesh; in fact, I have had the skin removed free of charge, the carcase being taken as payment for the work.

The river and numerous jheels abound in many kinds of water birds; geese, several species of duck and teal, while occasional flights of demoiselle cranes are seen in large numbers. Swans have been met with, but not of late years.

Of non-game birds one meets herons, spoonbills, paddy birds, coots, cormorants and dabchicks; several years ago I saw two pelicans on a sand bank. Vultures, hawks, kites and owls abound. Parrots, minahs, bulbuls are to be seen in most of the gardens and along the main roads. Several species of doves are to be found, but these live a very precarious existence owing to the raids on their nests by crows.

Near the river one may see large flights of very small birds, called "lal
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muniah” by the natives; the males are bright red and possess a very pretty note. They are a species of wax-bill and are sometimes seen in shops in England, exposed for sale; the name “abbadobats,” by which they are usually known, is said to be derived from Abbotabad, the place from which they are originally said to have been exported.

Good fishing is to be obtained in the river and in some of the larger jheels, the chief species to be met with being the mahseer, rohu, sowal and bachwa; porpoises and large turtles are also common.

Butterflies and moths abound at the commencement of the hot weather and during the rains, two of the most striking species being the “death’s head” and oleander hawk moths. During one season I caught as many as sixty distinct species of Lepidoptera in the garden of my own bungalow.

Many species of Coleoptera, Diptera, Hymenoptera and other insects are to be found. White ants are common and speedily destroy the bottoms of wooden boxes if these are not raised from the ground by means of bricks; when ants are “swarming” during the rains, thousands can be destroyed by placing a bath, containing water, under a strong light.

Sandflies are found throughout the year, except in the months of January, February and December. They are most plentiful during March, April, May, August and September. So far the following species have been identified: P. papatasii, P. sergenti, P. minutus, P. babu.

Mosquitoes are plentiful; the following species of anophelines have been caught in the cantonment area: A. turkhudi, A. maculipalpis var. indiensis, A. sinensis, A. barbirostris, A. subpictus (= rossii), A. culicifacies, A. pulcherrimus, A. stephensi, A. fuliginosus. Of these anophelines, I have actually caught the last five species. A. culicifacies is the chief vector of malaria in the district.

Spiders, scorpions and other members of the Arachnidæ abound. One particular species of tick is worthy of being mentioned on account of its beauty; it resembles a piece of bright scarlet velvet and is only seen at the beginning of the monsoon.

The climate is on the whole healthy. There is a bracing cold weather, beginning in November and ending in the middle of March, though the nights are cool in October and up to the middle of May. The end of May, the whole of June and part of July are extremely hot, the temperature remaining high until September. The monsoon usually breaks about the middle of July, the period just before the rains being very unpleasant. Should there be a break in the rains in July or August, the conditions become very oppressive, owing to the increased humidity of the air.

Slight showers are usually experienced about the end of December—the “Christmas rains”—and again in March. From the experience of the past few years it appears as if there is a slight alteration in the rainfall; this may be just a coincidence or may be due to increased evaporation caused by large areas being now under cultivation which were formerly barren, and to the opening of large canals in the district.
Thunderstorms with heavy rain and hail occur at times in April and May, and may cause great damage to crops.

Earthquakes are rare and when felt are very slight.

The district is famous for its dust storms, which may spring up at any time, so much so that there is an old proverb, “Kabul ka sarda, Firozpur ka garda,” meaning “Kabul for sarda melons, Firozpur for dust.” These storms, while they last, are very unpleasant; everything rapidly becomes coated with a thick layer of dust, and since all doors and windows have to be shut, the inside of one’s bungalow is very soon hot and oppressive. At the beginning of the hot weather these storms are of almost daily occurrence, their arrival being notified by the unrest and “cawing” of the crows. The air is frequently dust laden for a week at a time.

Provided that ordinary precautions are taken, one should remain healthy during the hot weather, the chief causes of illness being due to constipation, lack of exercise, which should be taken in moderation, over-indulgence in highly iced drinks, both alcoholic and non-alcoholic, and exposure to the sun.

Hot-weather precautions do not concern this article, but from the observations of several years it appears as if these are being overdone in some stations; the remark of a medical officer to the effect that in a certain unit the men were developing bed-sores through want of exercise gives a rather exaggerated picture of what is actually the case, but one would certainly like to see a revival of the old pre-war “Dog and stick parade,” at which all available dogs were turned out with a company, each member of which carried a stick and where everything put up by the dogs, from hare to pig-dog, was hunted to the death. These parades were not unpopular with the men and gave them quite a lot of exercise and amusement.

Statistical tables are of little interest, being in most cases inaccurate; they are expensive to produce in print and take up much room, so instead of these a few details may now be given regarding the temperature and rainfall. The highest actual temperature recorded in the shade since 1905 was 126° F. in June, 1910, though a shade temperature of 120° F. is by no means uncommon. The lowest record is that of 28° F. in February, 1905. The winter of 1928-29 was very severe and much damage was done to crops. On the last day of January, 1929, the temperature recorded on the verandah of the British Military Hospital was 30° F.; the reading on the grass must have been several degrees lower.

Rainfall varies considerably in different years, the average being about 17.17 inches; the maximum recorded being 37.74 inches in 1908-09, and the minimum 6.47 inches in 1896-97. Flooding occurs at times during the monsoon, as owing to the flatness of the country the water cannot drain off. In 1900 about six hundred and fifty houses collapsed in Ferozepore City and it was necessary to cut the main Lahore-Ludhiana road to save the Artillery lines in cantonments.

There is little ancient history attached to the district. It is almost
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destitute of ancient buildings. None of the present towns or villages date from an earlier period than the reign of Akbar. This is due to the fact that within the last four centuries the whole of the western side of the district has been over-run by the River Sutlej.

The fort of Ferozepore is stated to have been built in the time of Feroze Shah, Emperor of Delhi from A.D. 1351 to 1387, but nothing save a mound, on the top of which is a Mohammedan tomb, marks the spot.

The Manj Rajputs say that the town was named after their chief, Feroze Khan, who lived in the middle of the sixteenth century. The place was desolated by a pestilence in A.D. 1543.

The Dogars occupied Ferozepore in A.D. 1740, and in A.D. 1763-64 Hari Singh, Chief of the Bhangi Misl, seized and plundered Kasur and its neighbourhood. One of the Sirdars in his train was Gurja Singh, who, taking with him his brother Nusbaha Singh and his two nephews, Gurbakhsh Singh and Mastan Singh, crossed the Sutlej near Kasur and took possession of Ferozepore, the fort of which was in ruins. The district then contained thirty-seven villages, the proceeds of which were shared between Gurbakhsh Singh, Burban Dogar and Muhammad Khan, son of Gul Khan, but the two latter joined forces and expelled the former's garrison from the newly-repaired fort of Ferozepore.

In A.D. 1771 Muhammad Khan started for Amritsar with some horses for sale; he was attacked and taken prisoner at his first camp by Gurbakhsh Singh, who then recovered the fort at Ferozepore. In the same year the Sutlej changed its course and carried away or rendered waste all the villages of the district except seven.

Sardah Nihal Singh, one of the followers of Maharaja Ranjit Singh, hemmed in the Ferozeporians, about A.D. 1808, in spite of the protests of Mr. Metcalfe, the British Agent, and shared the produce of the district with one Dhanna Singh. As soon as the latter heard that the British Government had undertaken the protection of all the country south of the Sutlej, he addressed a letter, dated March 28, 1809, to Sir D. Ochterlony, the Agent for Sikh affairs, begging for the Company's protection; this was agreed to. He died in A.D. 1819, leaving his widow Lachman Kunwar as his heiress. Sardarni Lachman Kunwar died in A.D. 1835 and, leaving no children, the heritage of her territory fell to the British Government.

In A.D. 1838, owing to the importance of the place, it was resolved to make Ferozepore the station of an Assistant Political Agent. Mr. Edgeworth was appointed on December 5, 1838, and held the position until relieved by Captain H. M. Lawrence on January 17, 1839.

The first Sikh war broke out in 1845. The Sikhs crossed the Sutlej on December 16, 1845, the battle of Mudki was fought on December 18, 1845, followed by the battle of Firozshah on December 21, 1845, that of Aliwal on January 28, 1846, and of Sobraon on February 10, 1846. The Sikhs withdrew beyond the river, pursued by a British force, which soon after dictated peace under the walls of Lahore. As a result of the war the
British Government acquired Khai, Mudki and all the Lahere territory on the east of the Sutlej.

In 1857 the Indian Mutiny broke out. The following account of events is taken from the Punjab Mutiny Report:

"At a court of inquiry assembled some time previous to the Delhi mutiny, a Native Officer of the 57th Native Infantry, at Ferozepore, declared that it was the purpose of his regiment to refuse the Enfield cartridge if it was offered to them. This raised a strong feeling of suspicion against the corps, but the 45th Native Infantry, which was not on good terms with the 57th, and had openly declared their contempt of the resolution of the 57th, was considered staunch.

"On the 14th of May, as soon as news, by express from Lahore, of the Delhi disaster reached Brigadier Innes, who had the previous day taken over command, he ordered the entrenched arsenal to be immediately garrisoned by part of Her Majesty's 61st Foot and the Artillery.

"All ladies were also removed thither, and the two regiments of Native Infantry ordered into camp in positions of about three miles apart. The way of the 45th Native Infantry lay past the entrenchment; as they approached, their column insensibly swerved towards the glacis; the movement had barely been observed when they swarmed up the slope and attacked the position. The Europeans in an instant divined their intent, and rushed to the ramparts with the bayonet. The attack was repulsed; but before the 61st could load the sepoys dashed at the gate, whence they were flung back and then with an air of injured innocence they reformed their column and marched quietly with their European officers to the camp.

"During the night the church, the Roman Catholic chapel, the schoolhouse, seventeen officers' houses and other buildings were burnt to the ground by the men of the 45th, but not before the Chaplain, the Rev. R. B. Maltby, failing to obtain a guard of Europeans, had boldly rushed into the blazing church, through the infuriated sepoys, and had succeeded in rescuing the registers out of it.

"On the 14th the treasury was moved into the entrenchment, and it was discovered that of the 45th Regiment, there remained only 133 men; the rest, with a large part of the 57th, had deserted. The remaining portions of these regiments were subsequently disbanded.

"Danger impended over this district from both north and south. To avert the threatened incursion of the mutinous troops from Lahore, the large ferries on the Sutlej were guarded and the boats from the small ones sent to Harriki. To check the approaches of the wild tribes from Sirsa and Bhattiana, General Van Cortland, in a fortnight, raised a levy of 500 Sikhs, a force which, subsequently uniting with Raja Jawahir Singh's troops and other bodies sent down from time to time by the Chief Commissioner, amounted to 5,000 men of all arms, and performed excellent service in Sirsa and Hissar."
“Major Marsden received information at one time that a fakir, named Sham Das, was collecting followers with a treasonable intent. He promptly moved against the rebel and coming up with him by surprise, attacked and completely defeated him with the loss of several men. Sham Das was seized and executed. This took place in June, near Jaitu or Saidoke; Sham Das had collected about 4,000 adherents and Major Marsden had with him a wing of the 10th Light Cavalry and two guns.

“This act of vigour on the part of Major Marsden was a most important step in the preservation of peace in the district; for at that time any show of success for the evil-disposed would have raised the whole region in revolt.

“In the western division 157 extra men were entertained in the police establishment, and the feudatory chiefs furnished a body of 200 horse and 40 foot. Every highway robber was executed at once.

“This display of severity, with the presence of General Van Cortland’s force and increased energy on the part of the civil authorities, preserved the peace of the district well. On the 11th July, the 10th Light Cavalry was, as a precautionary measure, dismounted and disarmed; but on the 19th August the men made a rush at their horses, cut loose about fifty of them, and seizing every pony or horse they could find in the station, including many officers’ chargers, mounted and rode off to Delhi. With the connivance of the native horse-keepers of the Artillery, they also attacked the guns, but were repulsed, though not until three of the 61st Regiment had been killed and three wounded, of whom one was a female. They also cut down Mr. Nelson, the Veterinary Surgeon of their Regiment.

“Of the 142 mutineers captured, 40 were executed and the remainder, with 25 of the artillery horse-keepers, transported or imprisoned. In the jail eighteen persons, including the Nawab of Rania, who had been captured by Mr. Ricketts in the Ludhiana District, were hanged.

“The siege train was despatched from the arsenal on August 18th, when more than two thousand cart-loads of munitions of war were sent to Delhi, during the siege.”

The colours of the mutinous regiments were placed in the Armoury of the Arsenal, where the remnants may still be seen, though they are in a very dilapidated state and fall to pieces if touched.

Ferozepore City lies about two miles north of the cantonments and three miles from the River Sutlej. It is 645 feet above sea-level. The wall surrounding the city is “kachha” and is pierced by ten gates, of which the Delhi and Ludhiana towards the south, the Makhu towards the east, the Bansanwala towards the north, and the Kasur and Multan to the west are the most important. A metalled road, 23,870 feet long, circles the wall. There are no very imposing buildings in the city, but there are several bazaars; in one, the Ludhiana, large numbers of wheels for country carts are made; the carpenters in neighbouring villages, who make the bodies of the carts, are not able to make the wheels. The gate of this
bazaar is said to have been copied by Mr. Knox, Deputy Commissioner (1867-68 and 1869-71), from some gate in Baghdad, whence it is called the "Baghdadi" Gate.

Outside the city are the dispensary and school, both situated on the Knox Road, about 100 yards from the Delhi Gate; the Municipal Hall and Jail are also situated on the Knox Road.

Near the cantonment railway station is the Francis Newton Mission Hospital, founded by the American missionaries about 1870; much good work is done at this hospital amongst the poor.

The Ferozepore Cantonsments were first constituted in 1839 and have since then been continuously occupied by troops. They lie about five miles east of the Sutlej and two miles south of the city. The cantonments are well laid out and fairly well shaded by trees. The water supply, of which more anon, is derived from wells, which average twenty-five to thirty feet in depth, according to the season of the year.

The garrison consists of: The Brigade Headquarter Staff; one Field Battery, Royal Artillery; one Medium Battery, Royal Artillery; one Indian Cavalry Regiment; one British Infantry Battalion; one Indian Infantry Battalion; one Indian Training Battalion; a very large Ordnance Department; the usual details, R.E., R.A.M.C., I.M.S., I.A.S.C.

The arsenal was started, in 1840, as an ordnance magazine, the rest of the ordnance buildings being in what is now known as the "Old Fort," which contains the I.A.S.C. supply stores, Government bakery and, in course of construction, a Motor Transport Company Depot.

In 1858 the arsenal was moved to its present site, about one and a half miles north-west of the main cantonment, a dry gun-cotton store, powder magazine and ammunition stores being added in that year.

In 1860 the gun-sheds and a large number of divisions of the arsenal were completed and the building of the fort round the arsenal was commenced.

In 1863 the Royal Artillery barracks were built, and in 1868 the married quarters.

During 1884-86 the fort was altered to its present form. As built in 1858 the inner quadrangle was much lower than at present and the outer hexagon a very "kachha" affair. The wall of the inner quadrangle has been considerably raised and the outer hexagon made much stronger. The moat and bastions were added during this period. The circumference of the outer wall of the fort is said to measure approximately three miles, and some idea of the amount of work carried out in the arsenal may be obtained by considering the fact that, including coolie labour, over 2,400 men are employed there.

There is a good Government dairy in the cantonment, which has a herd of about fifty to sixty head of imported and half-breed cows and a few buffaloes.

The Officers' Club is a very fine building, locally known as "Coates'
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Folly,” having been originally built by a trumpeter of the name of Coates, who was left a fortune but later became bankrupt. When I first saw the ball-room, in 1909, the original ceiling remained; this had been painted by Italian artists, imported by Coates; but now, owing to part of the roof having fallen in, the whole has been boarded over and whitewashed. The club building is now owned by Faridkot State.

The British Military Hospital and the Families Hospital are situated near the British Infantry lines; the hospitals, originally built as cavalry barracks, consist of three blocks, each of two stories. The buildings are on a par with those of other stations.

The re-introduction of the Brigade Laboratory or some such arrangement seems to be strongly indicated, so that work can be done locally instead of delay being caused by sending specimens to the District Laboratory; only very elementary work can be done in the clinical side, room which is poorly equipped. Referring to some old records, regarding work in connection with malaria, one finds the following:

<table>
<thead>
<tr>
<th>Year</th>
<th>Blood films examined</th>
<th>Mosquitoes caught and differentiated</th>
</tr>
</thead>
<tbody>
<tr>
<td>1912</td>
<td>807</td>
<td>2,091</td>
</tr>
<tr>
<td>1913</td>
<td>1,639</td>
<td>1,608</td>
</tr>
<tr>
<td>1914</td>
<td>1,150</td>
<td>3,980</td>
</tr>
<tr>
<td>1915</td>
<td>1,553</td>
<td>2,169</td>
</tr>
</tbody>
</table>

The increase of local facilities for research would be advantageous to all concerned and any difficulties could be overcome by having a Command Laboratory from which confirmation of local results could be obtained or advice given if asked for.

The Indian Military Hospital has been entirely reorganized on a new site near the Indian Cavalry lines, is up to date and vastly superior in every way to the hospital for British troops.

There are a few memorials in various parts of the cantonment. Of these the oldest is St. Andrew’s Church, commonly called the “Monumental Church”; this was erected in memory of those who fell throughout the Sutlej Campaign. The foundation stone was laid by the Archdeacon of Calcutta on St. Andrew’s Day, 1847. The church was opened for divine service on September 19, 1852, and was consecrated by the Bishop of Madras on January 21, 1857.

The church was destroyed by fire, either by rebels from the Sadar Bazaar or by mutinous sepoys, on May 13, 1857, when, as has already been mentioned, the registers and communion plate were rescued by the Rev. R. B. Maltby at imminent risk of his life. On Christmas Day, 1858, the church was reopened for public worship. The rebuilding of the church included a thatched roof and kachha floor, without a tower; these were subsequently replaced and the church finally completed in 1869 or 1870.

On the way to the fort may be seen the Saraghari Memorial, a well-built domed building surrounded by a well-kept garden; this was erected prior to 1909 and I have not been able to obtain any information as to its
origin. It is generally believed that the memorial was erected in memory of the Sikhs who fell during the Sutlej Campaign.

In more recent years two more war memorials have been erected on the Mall, near the Royal Artillery and Indian Cavalry Messes. The following information concerning these was kindly given to me by one of the officers of the 10th Battalion, 14th Punjab Regiment:—

"The two memorials were unveiled, on December 3, 1923, by General Birdwood, as G.O.C.-in-C., Northern Command; the whole garrison paraded for the ceremony.

"The rectangular one, looking like the Cenotaph at home, is the memorial to the 20th Punjabis, now our 2nd Battalion; the other is to the old linked battalions, 19th, 22nd and 24th Punjabis, now our 1st, 3rd and 4th Battalions.

"Another memorial, shaped like a rifle cartridge, has been erected at Attock in memory of the 5th Battalion, formerly the 40th Pathans."

Those who served with the Indian Corps in France may possibly remember this gallant regiment and the unpleasant experiences of some of its members when entering Ypres, after the enemy gas attack in April, 1915.

REFERENCES TO PART I.

[1] Punjab District Gazetteer, vol. xxx a, Ferozepore District, 1915 (from which most of the historical portions of the above article have been extracted).

(To be continued.)