MEDICAL HISTORY OF TRANS-CAUCASIA IN SO FAR AS IT AFFECTS AN ARMY IN THE FIELD.

By LIEUTENANT-COLONEL P. H. HENDERSON, D.S.O.

Royal Army Medical Corps.

CLIMATE.

As the climate of Trans-Caucasia varies considerably in different areas, it will be most convenient to consider separately (a) the Black Sea Basin, (b) the Armenian Highlands and (c) the Caspian Basin.

(a) Black Sea Basin.—In this part of the country, which includes the area west of the Suram Mountains, the climate is characterized by a moist atmosphere and a moderate temperature; the mean annual being approximately 60°F., with mean variations of about 42°F. in January, 63°F. in May, and 77°F. in August. The annual rainfall varies considerably in different districts in this area, reaching as high as 80 inches in Batum, 65 in Poti, and between 40 and 50 in Kutais and Sukhum.

The prevailing wind varies in different districts, being S.E. in winter, except at Kutais, where it is N.E. In summer it is N.W. in Batum, W.N.W. in Kutais, S.W. by N. in Poti, and S.W. in Sukhum.

The winter is mild, and though snow falls it rarely lies. The coldest period is from the middle of January to the middle of March, strong gales being common during these two months.

The summer is hot and muggy. Vegetation is luxuriant, and near the sea tropical, subtropical and temperate varieties are to be found.

(b) The Armenian Highlands (include Alexandropol, Araliki, Erivan and Shusha).—In this area one meets with climatic conditions somewhat similar to those met with in the other two; but, in addition, one finds here extremes of cold and heat, snow lying in several parts of the area till the middle of April. Spring is very short, lasting about a fortnight to three weeks, and is followed by a hot, dry summer which parches the country.

The mean annual temperature is approximately 50°F. with mean variations of about 19°F. in January, 60°F. in March and 73°F. in August. The mean temperature of Alexandropol district is however considerably below the mean for the area, reaching as low as 13°F. in January and only rising as high as 66°F. in August.

The average annual rainfall is about fourteen inches. The prevailing wind varies very considerably in the different districts.

(c) The Caspian Basin includes the area east of the Suram Mountains and comprises the districts of Baku, Leukoran, Tiflis and Temir Khan Shura. In this area the climate is, on the whole, dry and extremes of heat and cold are met with. The heat is most oppressive in the Kura Valley. In Baku sand and dust storms are common and after a heavy rainfall the streets and main drains are frequently silted up with sand and debris. The
mean annual temperature is about 56° F., with mean variations of approximately 34° F. in January, 65° F. in May and 76° F. in August. The average annual rainfall approaches eighteen inches. The direction of the wind varies greatly in the different districts.

**Clothing.**

Khaki serge is the most suitable uniform for eight months of the year. Drill uniform with shorts, the latter having prolongations for turning down at dusk, to prevent mosquitoes from biting, is recommended from May to the end of August. In several hill posts, however, it is necessary to put on serge in the evening even in summer. Helmets are not essential in summer if slouch hats are available. During our occupation they were worn during the three hottest months from about 9 a.m. till sunset.

**Sanitary Conditions.**

Although sanitary conditions as a whole are very much below the standard one meets with in Great Britain, there was evidence that a considerable advance had been made by intelligent Russians during the years preceding the Revolution of 1917, and an attempt had been made to introduce modern sanitary methods into the towns in Trans-Caucasia. Certain war sanitary appliances in the form of bathing and disinfecting trains, small portable steam disinfectors and bathing establishments comprising Russian steam and shower baths, were in advance of any similar appliances I have seen introduced for the British Army in the field. The huts forming the hatted hospitals in Batum, and certain of the ambulance coaches on the ambulance trains, particularly the bathing, cooking and dispensary coaches, were also superior to any I have met with in other theatres of war.

The bathing and disinfecting trains were capable of dealing with 600-800 men per day. Two such, made I believe in England, and presented by wealthy Armenians to the Imperial Russian Army, were taken over by the Division, but after we had placed the necessary sanitary personnel on board and put everything in working order the Georgian authorities suddenly removed the trains during the night to an unknown destination, and the British personnel had to make a hurried exit to avoid being carried away. The trains were made up of several coaches and contained an undressing room leading to the bathrooms, which were fitted with hot sprays. The bathrooms in turn led into a dressing room, where clean clothing was issued from linen and clothing stores. Here, if necessary, men could sit and wait till certain articles of clothing which might be required were disinfected, and they could have coffee if desired.

The dirty clothing was passed through a very large and efficient steam disinfector capable of registering over thirty pounds of pressure. There was also a vapour disinfecter for dealing with special articles of clothing. After disinfection washable articles were passed to the laundry coaches where they were washed, ironed, and returned to clean stores for re-issue. There
were also comfortable living quarters for the personnel of the train. The value of such trains which could follow up advancing troops, wherever a railway was intact, is inestimable.

The small portable steam and vapour disinfectors were a great improvement on the British Army "Thresh," as the former were light and easily drawn by one horse or mule while the latter is extremely cumbersome and difficult to transport.

The Russian steam bath followed by a shower is ideal as a means of cleansing the body.

**Water Supplies.**

Practically all the towns and villages are well supplied. Baku and Batum received piped supplies of upland service water of good quality and ample in quantity. Tiflis, on the other hand, is badly served both as regards quantity and quality. About two-thirds of its supply comes from the polluted Kura River, while the remaining third—obtained from a catchment area in the mountains—is of good quality. Purification is incomplete and unsatisfactory, and as the water from the purer source is mixed with that from the Kura River all the water delivered in the mains is unsafe for drinking purposes. In pre-war days and in the earlier phases of the war the river water was led by an aqueduct to settling tanks where it was treated with alum in order to precipitate suspended matters. From these tanks about half of it was then passed through sand filters and finally all three supplies, i.e., the comparatively pure but untreated upland surface water, the filtered river water and the river water after sedimentation, flowed into a common aqueduct to the pumping station where it was pumped into the mains.

During our occupation of the Caucasus both sedimentation and filtering plants were out of action and in addition only three out of seven pumps were working and these three were in a precarious condition. In consequence we had to adopt local means of clarification and sterilization. Each unit improvising its own filter of four-ply blankets on a wooden frame, the water being treated with alum. The filtered water was ultimately sterilized with bleaching powder.

From early spring when the snows begin to melt until the middle of summer, the Kura River is of good volume but the water is brown in colour and somewhat resembles coffee grounds, and during our occupation it was delivered in this condition from the pipes. In late summer and autumn the volume rapidly decreases and it becomes comparatively clear. The supply during this period is insufficient for the town and the practice is for the supply to be cut off from one half of the town during the forenoon and from the other half during the afternoon.

During this period, and also during the spring and early summer, units supplemented their drinking and cooking supplies from mountain springs water mules with pakhals being sent out daily for this purpose.
During winter, when more rain falls, a more ample supply of fairly clear water is available.

**DISPOSAL OF EXCRETA.**

The water carriage system is found in the larger towns, but the sewers usually discharge the raw sewage direct into the sea or a river.

In Batum all w.c.'s discharge into cesspools, of which there were over two thousand in the town. These are periodically emptied by means of tank lorries with lift and force pumps, or by tank carts with hand ladles. Part of the night soil is then disposed of about one mile to the east of the town through an opening in a concrete platform which connects up with a drain discharging into the Black Sea. The remainder, prior to our occupation, was dumped into a pond in close proximity to the Barracks on the west side of the town. On our arrival in December, 1918, it was found that the Turks had dismantled most of the lorries and carts, with the result that the cesspits were overflowing into the streets and gardens, and it was a considerable time before the lorries and carts could be repaired and the appalling state of insanitation improved.

In Baku the main sewers are frequently blocked by sand after rain storms.

**REFUSE.**

This was usually disposed of by dumping it into a stream or into the sea, or more commonly on a refuse heap in the vicinity of the town or village.

**CLEANLINESS.**

Although bathing facilities are in many places very good, the poorer classes are as a whole dirty and frequently verminous. To cope with this, good steam disinfecting and disinfestation plants had been established in most towns, and large numbers of smaller portable steam and vapour disinfectors were also to be found.

**STORM WATER DRAINAGE.**

Although the drainage in the towns is usually good, marshy areas in which mosquitoes breed freely were met with to the west of Batum, at Petrovsk, the Tert Marshes near Shusha, and along the valley of the Kura.

**PREVAILING DISEASES.**

The most important prevailing diseases met with were malaria (malignant and benign), typhus fever, small-pox, relapsing fever, dysentery, cholera, enterica, and the three varieties of venereal disease. Malaria usually first appears in June, reaches its maximum in August and dies off about October 10. The malignant type is most commonly met with during the last two months of the malarial season. The malaria-bearing mosquitoes met with were *Anopheles maculipennis*, *A. superpictus* and *A. bifurcatus*,...
although no doubt other species also existed. The most malarious areas in our occupation were Batum, particularly to the west of the town by the aerodrome and Ardaham Barracks (practically the whole of the Royal Air Force stationed here were infected), the marshy area on the banks of the Terter where the Berkshire Regiment was severely infected, and Petrovsk. Baku was comparatively free, and also Tiflis with the exception of houses situated close to the Kura River.

*Typhus fever* was very prevalent amongst the civil population owing to the verminous condition of the poorer people. The prisoners in the civil jails also suffered severely in consequence of the insanitary conditions under which they were compelled to live, no opportunity being afforded them of freeing themselves from vermin. There were comparatively few cases amongst the British garrison, but the death-rate was high.

*Small-pox* was fairly prevalent owing perhaps to a shortage of vaccine lymph amongst the civil population. About twelve cases occurred in the British garrison.

*Dysentery* was very common in the civil population.

In view of the insanitary surroundings and the consequent prevalence of flies and the very bad water supply at Tiflis it was thought that the British garrison might also suffer, but fortunately very few cases occurred.

*Cholera* occurs annually amongst the civil population throughout Trans-Caucasia and not infrequently assumes epidemic form. Special cholera hospitals are to be found in Baku and Batum. Although cases were common amongst the civil inhabitants during our occupation the British garrison escaped infection.

*Venereal diseases* were the chief source of inefficiency, all three varieties being commonly met with. A large majority of the prostitutes appeared to be infected. Prophylaxis with potassium permanganate, calomel cream, etc., was of definite value where intelligently and efficiently carried out.

The other prevailing diseases were less common. A considerable number of the troops in the Armenian Highlands suffered from snow blindness, necessitating the issue of smoked glasses.

Oriental sore is fairly common amongst the inhabitants, and the carrier of the infection is thought by many local doctors to be stomoxys.

**British Sanitary Organization.**

The country was divided into three sanitary districts, Baku, Tiflis and Batum, each under a sanitary officer who had at his disposal a sanitary section or portion thereof. Outlying posts were allotted to districts according to proximity and means of access.

**Medical Arrangements, Hospital Accommodation.**

Suitable buildings were acquired in all the towns occupied by the British. The only difficulty experienced was in Tiflis, where a stationary hospital and two field ambulances had to be accommodated. The Georgians
at first put many obstacles in our way and did their utmost to prevent us from obtaining suitable buildings, but eventually these medical units were established in a Georgian college, a seminary and a school, all well adapted for use as hospitals.

One field ambulance was converted into a venereal hospital of 200 beds, the other into a 200-bedded infectious diseases hospital for all infectious diseases except dysentery, the stationary hospital of 600 beds receiving all other cases. In Baku the hospital accommodation consisted of one field ambulance of 200 beds acting as a hospital for all infectious diseases except dysentery, and a casualty clearing station of 500 beds which received all other cases. The field ambulance was established in a school and the casualty clearing station in a large seminary which had previously been used as a hospital by the Russians.

In Batum the hospital accommodation consisted of a stationary hospital, a casualty clearing station and a field ambulance. The stationary hospital was established in Russian barracks which had been converted into a hospital by the Russians early in the war. It provided excellent accommodation for 600 patients and had two good operating theatres, one for septic and one for non-septic cases. All infectious cases were admitted here and also general, medical and surgical cases. It was well-suited for this purpose as it consisted of a number of separate pavilions and also had a good officers' pavilion consisting of a general ward and one or two bunks. The sisters were accommodated in charming cottages, one of which was set aside as a sisters' hospital of seven beds. The casualty clearing station (450 beds) was accommodated in a Russian huddled hospital. The huts were well constructed and admirably equipped with operating theatres and sanitary annexes. General, medical and surgical cases were admitted here. The field ambulance of 200 beds was established in huts similar to those of the casualty clearing station and acted entirely as a venereal hospital.

When Indian troops were added to the British garrison most of these medical units were provided with an Indian section.

At Krasnovodsk half an Indian section of a field ambulance was established in a school which provided good accommodation.

At Kars a section of an Indian field ambulance was opened in a suitable building. Smaller medical posts, British and Indian, were also established at Shusha, Borjom, Akhaltsikhe, Erivan, Ararat, Nakhitchevan, Artvin, Gagri, and many other posts held by British and Indian troops. The long distances separating these posts put a severe tax on the medical personnel and transport.

Medical and Surgical Stores:

These were supplied from an advanced depot of medical stores well situated in a commodious stone building in Batum railway station. This advanced depot in turn received its supplies from a base depot at Constantinople.
LABORATORIES.
One laboratory was established in the casualty clearing station at Baku and one in the stationary hospital at Batum and did excellent work in the diagnosis of malaria, typhus, relapsing fever, etc.

DENTAL CENTRES.
Dental centres were established at Baku, Tiflis and Batum.

MEDICAL TRANSPORT.
From Enzeli (N. Persia) and from Krasnovodsk (Trans-Caspia) cases were transported in reserved cabins in the ordinary passenger ships, medical personnel being provided from the medical units in Baku, as and when required.

A captured Bolshevik hospital ship with accommodation for twenty-five lying cases was about to be taken into use for this purpose and also for the evacuation of naval casualties in the Caspian, but owing to the decision to evacuate Trans-Caucasia the project was abandoned.

From Petrovsk casualties were evacuated to Baku in two ambulance coaches with a kitchen coach attached to passenger trains—personnel for the care of the sick being provided from the medical post at Petrovsk where the coaches were kept when not in use.

From Shusha cases were brought in Ford ambulance cars to a post on the Baku-Tiflis-Batum Railway whence they were transferred to the ambulance train. An excellent Russian ambulance train, with accommodation for 150 cases and provided with kitchen, dispensary and administrative coaches, and equipment and stores vans, was taken from the Turks on our arrival, and evacuated British and Indian casualties from Baku and Tiflis to Batum. The journey in peace time occupies about twenty-seven hours but the railway had become so disorganized, that the average journey took three to five days. The usual British and Indian personnel for an ambulance train was provided as a separate unit. A proportion of these carried rifles to ward off the attacks of local inhabitants and to prevent them from pillaging the train.

From Kars and other outlying posts on the railway cases were brought to Tiflis in ambulance coaches similar to those at Petrovsk.

Casualties from outposts in the Armenian Highlands were brought to railway posts by sleighs, travois, litters, riding mules, ambulance wagons and cars. From one outpost the only suitable transport was a sleigh and the journey occupied about five days.

From Poti, Sochi and Gagri on the Black Sea minor casualties were transported to Batum in the ration boat, severe cases being brought in on a destroyer.

Generally speaking good roads suitable for ambulance cars and wagons are few and are confined to the vicinity of towns and villages. There are, however, a few first-class military roads. In consequence of this the cars
of the motor ambulance convoy were distributed to posts where they could be utilized—wagons, litters and travois being used where the roads were bad.

Were it necessary to carry out active operations in the interior of the country, travois, litters, sleighs and riding mules would form an essential part of the ambulance transport.

**HOSPITAL SHIPS.**

These were sent from Constantinople to Batum when required and patients were evacuated by them to Constantinople or direct to England according to the nature and degree of their disabilities.

**CIVIL HOSPITAL ACCOMMODATION.**

There were several well equipped hospitals in each of the main towns, Baku, Erivan, Tiflis and Batum, but there was a great shortage of drugs, surgical dressings, vaccines and sera.

**RATIONS.**

Local beef, which consisted chiefly of trek ox and buffalo, was unfit for rations. Local mutton was of better quality but was much inferior to British or Australian mutton.

For a considerable time after our arrival, owing to the want of a ship containing cold storage and the absence of similar arrangements on the trains, the local fresh meat ration was very poor and bully beef was issued for a prolonged period.

The country abounds in all varieties of fruit, and fresh green vegetables are also easily obtainable, potatoes are not abundant. After a considerable time our onion and dry vegetable ration was supplemented by local purchase of fresh fruit and vegetables.

Scurvy did not occur amongst the British garrison but about a dozen cases were found amongst the troops which arrived from Mesopotamia.