

or, if in the black soil, among bushes where the soil does not bake and crack so much, and he burrows so that his sitting-room is near the surface, though approached by passages that are deeper, and he can easily work through the roof of it if water troubles him. The *Gerbilles* about here do not seem any less numerous than they did before the rains began. At any rate they are still excessively abundant.

The people use no means for destroying these rats. They seem superstitiously afraid of still more vexing the angry divinity. So they say "The rats were sent, and if we kill them, more will come." Or, thinking that those who died in the famine have now been born as rats, they say, "We did not feed them when they were starving, and now they have come back to eat us out."

The black-winged Kite (*Elanus caeruleus*), feeds on these rats, and is now, for the first time in my experience of thirty-three years, abundant in this part of the Dakhan. In former years I saw one or two in the course of the cold season. But this year I have seen them by dozens in a day and they are still here (in July,) and to be found all the way from Ahmednagar to Bijápúr.

XVIII.—*Notes on the Survey Operations in Afghánistán in connection with the Campaign of 1878-79. Compiled from Letters and Diaries of the Survey officers by MAJOR J. WATERHOUSE, Assistant Surveyor General.—Communicated by MAJOR-GENERAL J. T. WALKER, R. E., C. B., Surveyor General of India.*

(With Map—Plate XVII.)

The Campaign in Afghánistán has added considerably to our geographical and topographical knowledge of that country, thanks to the zeal with which the Survey operations were pushed on by the Surveyor General's and Quarter-Master General's Departments, aided by the Political and Military authorities. No less than 13 officers of the Survey of India were employed with the three columns—7 with the Quetta Column, 2 with the Kuram Valley Column and 4 with the Peshawar Column.

The operations of the professional survey were also, with the Quetta and Kuram Valley Columns, supplemented by the work of regimental and staff officers who in some cases were appointed Asst. Field Engineers to aid in the Survey, and in others worked independently under the military authorities.

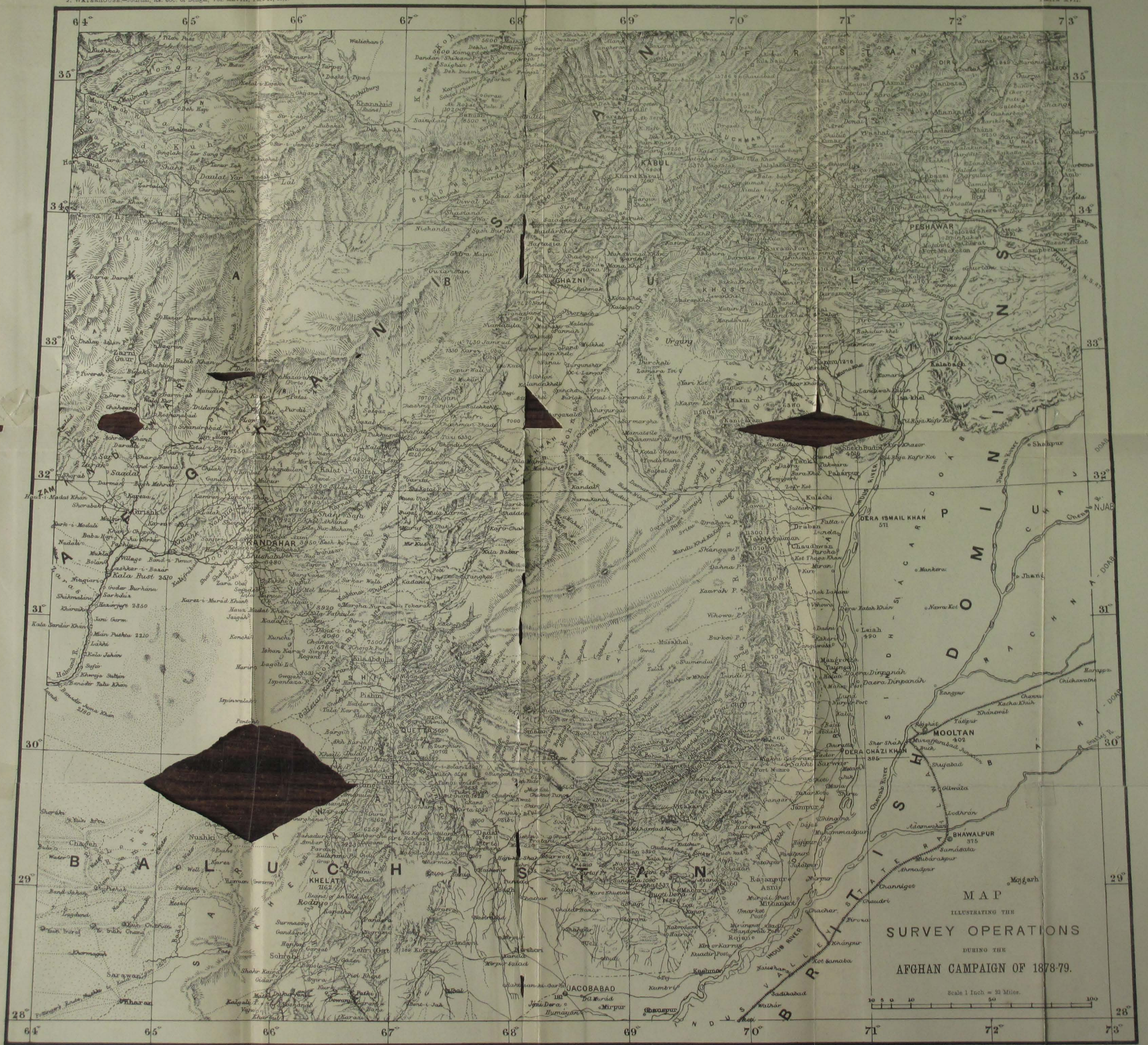
I. QUETTA COLUMN.

A large number of Surveyors being with the Quetta Column, a good deal of quite new country was explored and old reconnaissances checked and improved. The survey operations were, however, almost always in immediate connection with the military movements, and although every possible assistance and facility was freely given by the authorities, the work of the Surveyors had to be confined to a few miles on either side of the routes followed by the troops, and to fixing points from such mountain peaks as they had the opportunity of ascending.

Necessarily many of these routes were the same as had been surveyed in 1839-42, but, thanks to the advanced state of the operations of the Great Trigonometrical Survey of India, they can now be more accurately connected with the Geography of India, the connecting link being the preliminary triangulation carried on by Capt. Rogers, R. E., in the early part of 1878 and consisting, as stated in the *General Report of the Operations of the Survey of India for 1877-78*, p. 15, of an extension of the Indus Series by a secondary triangulation from the western Frontier of Sind into Baluchistán, along the line between Jacobabad and Quetta, and of a small triangulation in the Quetta Valley for the purpose of fixing the position and heights of the most conspicuous hills around, and connecting them with permanent marks which were put down for reference near the cantonments.

The survey operations with this column have consequently been based upon this triangulation. The fixed peaks on the Sulimani Range have been and will be very serviceable for the lines of survey from West to East across the great belt of hitherto *terra incognita*, between the road to Kandahár and the British Frontier.

Capt. M. W. Rogers, R. E. was attached to the advanced Force under General Stewart and carried on a route Survey from Quetta to Kila Abdulla at the foot of the Kwája Amrán Range, and thence to the crest of the Khojak Pass on the same range. He says this range was a great obstacle to the survey, extending right across the route and presenting no peaks for identification on the other side. It runs North and East, bearing 210° or thereabouts. There are in it three known passes, Khojak, Roghani and Gwája. The Khojak, the most northerly, starts from Kila Abdulla and was the one used by the army in 1839. It is about 10½ miles to the crest or *Kotal*, which is about 7,600 feet above sea level. The first 10 miles are not difficult, but the next 1½ are very steep, narrow and winding, and no work had been able to make it more than a practicable but difficult road. From the crest there is a very steep descent; a zig-zag camel track had been made and a straight (or nearly so) slide for guns (angle 30°); over this the field guns were lowered, but it would be almost impossi-

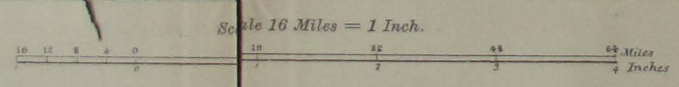


MAP
 ILLUSTRATING THE
 SURVEY OPERATIONS
 DURING THE
 AFGHAN CAMPAIGN OF 1878-79.

Scale 1 Inch = 32 Miles.



SKETCH MAP
 TO ACCOMPANY
 THE GEOLOGICAL SPECIMENS COLLECTED DURING THE MARCH
 OF THE 2nd COLUMN, TAL CHOTIALI FIELD FORCE,
 FROM
 KALA ABDULLAH KHAN IN THE KHOJAK PASS
 TO
 LUGARI BARKHAN
 Spring of 1879.
 COMPILED BY LT. R. C. TEMPLE, 1st. GHOORKHAS.



- REFERENCE.
- Line taken by the compiler during the march.....
 - Routes taken by the Quetta Column, Frontier Expeditionary Force.....
 - Lines taken by 1st and 3rd Columns, Tal Chotiali Field Force.....
 - Lines of Roads known to exist, but not traversed.....
 - Line of Railway.....

10281

10283

ble to bring them up again. To Chaman, on the Kandahár side from the crest, after the $\frac{1}{2}$ mile of steep descent, there is a gentle slope of $4\frac{1}{2}$ miles.

The country on the other side of the Khojak he describes as a plain with small hills and ranges rising from it. Towards the south-west it is a sandy desert to all appearances with no hills.

From a hill of 8,200 feet near the Khojak he observed two of his old stations Takatu and Chiltan and all recognisable peaks around, especially in front.

He then went with General Stewart to Gulistán Karez, at the foot of the Gwája pass, and traversed through the pass. He says this pass is but little known, but has always been the Kafila route. Colonel Sankey had improved it and made it a very good road, about 22 miles long with fairly easy gradients; its crest is some 700 feet lower than that of the Khojak, and native report, which says that the latter is closed every year after the first fall of snow, says that the Gwája has not been closed for 10 years. Captain Rogers visited what he believed to be the highest peak of the range, about 9,100 feet, and had a splendid view. He could see Quetta and some hills which the natives said were close to Kandahár. He carried on his traverse through the Gwája Pass *viá* Haoz and Jaktipal to Kandahár, the points he had fixed from the Kwája range aiding him greatly. He says the country between the Kwája Amrán Range and Kandahár is full of hills and ravines, flat generally and very fertile in many places.

In December, 1878, a route survey with chain and plane-table was made by Captain R. Beavan of the Survey of India, starting from Madadalari G. T. S., near the Bhandawali Post, *viá* Bugti Dera up to the point where the road emerges into the Katchi near Lehri.

At the request of General Stewart he then explored the routes on either side of the Bolán Pass with the object of finding an alternative route, and states that there is a fair track for camels from Naghesur by the Pashtal Valley to Kirta, up which a road might be made for carts at some expense, but no labour is obtainable in that part of the country.

There is also a route by the Mushkaf River from Sibi, or entering the hills by the Kumri stream near Dadur, over Takri Takht and down the Pishi stream into the Kirta (Laleji) Valley opposite Bibináni. This, however, crosses the range of hills which rise 400 or 500 feet above the plain on either side, and without tunneling it would be very difficult to make a road for carts.

The whole of the country is very stony, nothing underfoot but boulders and gravel with a small proportion of sandy soil. The hills are mostly in parallel ridges with stony plains intervening.

Captain Beavan then carried a route traverse up the Bolán Pass from

Dádur, closing on the bungalow at Darwáza. He was obliged to leave off at this point owing to want of water and absence of food for the camels. He commenced again from Quetta and carried on a traverse through the Gwája Pass towards Kandahár, by the same route as Captain Rogers, in rear of the advanced force under General Stewart, continuing it on to Girishk and thence back to Kandahár by another route through Yikchal, Kak-i-chopan, Khushki Nakhud, Atah Karez, Hadi Madat and Sangzuri.

This route survey from Quetta to Girishk has all been plotted on the scale of 1 inch to a mile, with as much detail on either side as could be managed, and a reduced map on the scale of $\frac{1}{4}$ inch to a mile has also been completed.

A survey of the route from Chaman, at the foot of the western side of the Khojak Pass, to Kandahár, *vid* Gatai, Mel Manda, Abdul Rahman ka Kíla and Mand Hissar, in all $77\frac{1}{2}$ miles, was made by Lieut. J. Hobday, s. c.

From Quetta, Lieut. Gore, R. E. was engaged about the beginning of March in making a survey of the Pishin Valley on the scale of 2 miles to an inch, assisted by Captain Maitland of the 3rd Sind Horse, Assistant Field Engineer. This survey is based on an independent base near Gulistán Karez and connected with Captain Rogers' triangulation in the neighbourhood of Quetta.

Lieut. Gore describes the Pishin Valley as practically dead flat and upwards of 25 to 30 miles wide. He had some difficulty in obtaining suitable points, as there is a singular want of well-defined and recognisable peaks on the borders of the valley itself. On the eastern side of the valley along the foot of the Ajiram range the ground is greatly broken and cut up, water is scarce and the country is inhabited by nomad Kakars.

In conjunction with Captains Heaviside and Holdich, Lieut. Gore fixed points across the northern end of the valley, in order to connect his work in Pishin with the survey of the Thal Chotiali Route made by the latter officers.

Early in April, Major W. M. Campbell, R. E. went from Quetta with a detachment to Shoráwak and made a route traverse with compass and perambulator of about 157 miles through Ispintáza, Hisábat, Bádalzái, Zabardasht, Shoráwak Karez, Iltáz Karez, Issurkai, Ispinkai, Chichizai, Showd, Panchpai, Shorad, Khanak, Barg and back to Quetta. This traverse, though rather rough, is valuable as being almost all through nearly unknown country, and it helps to mark some very important features, for instance, the edge of the great desert, the course of the Lora, the Khán's boundary &c. It gives the position of several ranges of hills and a fair idea of their nature and direction for some miles on either side.

Major Campbell was also able to make observations for latitude and longitude at several points and to connect his traverse by triangulation with reference to one of Captain Rogers' points, Chiltán, a high peak near Quetta and visible at great distances.

On his return to Quetta Major Campbell arranged with Capt. Rogers for determining by telegraph the difference of longitude between that place and Kandahár.

Shortly after the arrival of the army at Kandahár Captain Rogers accompanied the expedition to Khelát-i-Ghilzái and on the march carried on his traverse continuously, fixing as far as possible the positions and general features on each side of the Tarnak River. The Force marched up the right bank keeping near the river; the hills on both sides, Captain Rogers says, are pretty continuous, smaller and more broken up on the left bank and approaching more nearly to the stream. On the right bank the hills are more continuous and are from 6 to 10 miles from the stream; a succession of high rolling mounds interpose between them and the river, sometimes receding and allowing a small strip of fertile country to interpose and sometimes coming right down to the river bank.

The road winds along the foot of these mounds and a good view of the hills is difficult.

He was not able to say if this undulating country extended up to the hills; but, judging from the country near Khelát, which he explored more thoroughly, he would say it did not, but that between it and the real hills there were valleys and villages.

At Khelát-i-Ghilzái Captain Rogers fixed points to help in the survey of the country around. Colonel Sankey, Chief Engineer, employed some of his officers on a large-scale survey round the Fort, and Lieut. Ollivier, R. E. and Captain Sartorius of H. M.'s 59th Regt. were told off to work in connection with Captain Rogers further out. Owing to military reasons Captain Rogers was not able to go far, and did not cross the river to any distance until a few days before the Force left, when he got on a high hill south of Khelát and had a view towards the Arghasán Valley, which does not seem to be at all the chaos of indiscriminate hills entered on the maps; in fact in one direction he could see an opening of considerable width down which he could not detect a single hill with a telescope. Thanks to the exertions of Captain Chapman, Assistant Quarter-Master General, they were able to considerably improve the geography of the country. Supplied with points by Captain Rogers, Captain Sartorius made a topographical sketch of the country around Khelát and towards Ghazni. A small force went down the Arghasán Valley with directions to survey as much as possible. This expedition did not, however, bring in much as it degenerated into a simple route survey without any information 200 yards from the line.

Captain Rogers got leave to go down the Arghandáb Valley with a small force. He had with him Lieut. Ollivier, R. E., and did a fair amount of survey, about 400 square miles up to Kandahár. He describes the country as one vast conglomeration of hills and mountains very difficult to work in. The Arghandáb River is a large rapid mountain stream running in many cases between perpendicular cliffs; it is impossible to follow its course for more than a few miles at a time, it has numerous side streams along which are strips of fertile ground and villages. The halts are at these and the marches are generally up or down these side valleys and then over the intervening ridge into the next valley. Nearer Kandahár the hills are less continuous and the ground more open. The Survey party got on fairly well with the people, who brought in supplies and got well paid for them, but was unable to move without a strong escort as the people were not to be trusted. Captain Rogers says that so far as he has gone the distances and the positions of places such as Kandahár and Khelát are very fairly accurate, but the hills and general ideas of the country are faulty and require correction. For instance the part round Khelát-i-Ghilzái is entirely wrong. The Arghasán and Arghandáb Valleys are almost a blank. On the whole he thinks the Arghandáb Survey will be a good addition to the knowledge of the country. The route survey he made from Quetta to Khelát-i-Ghilzái is seemingly a repetition but, possibly, an improvement.

After the return of the expedition to Kandahár from Khelát-i-Ghilzái, Captains Heaviside and Rogers, R. E. were employed along with other officers of the Survey in making a survey of the country 12 miles round Kandahár on the scale of 1 inch to the mile, and several officers from different corps were appointed Assistant Field Engineers to take up the detail survey with plane-table.

Captain Heaviside has given an interesting account of Kandahár: he says it lies in a valley about 35 miles long, east and west, by 7 miles broad. The country to the east is a flat stony plain; to the west and south-west an area of some 40 square miles is thickly populated with numerous villages and a net-work of mud walls, orchards, and irrigation channels with but few roads, and what there are, narrow, tortuous, and more or less flooded by field irrigation channels.

Of the hills those to the north and north-east, distant 5 or 6 miles, are lofty and precipitous, completely shutting out the country beyond: those to the east though lofty are far distant. To the south-east there is a low short range, distant about 8 miles, over which glimpses of the country towards the Khojak Pass are obtained. To the south and south-west the country is open and the desert is seen as an elevated plateau. On the west there are sharp-peaked narrow ranges a good deal broken up, distant 4 or 5 miles, which become even more isolated and broken to the north-

west, and it is here that there are passes into the Arghandáb Valley whence the water is brought in which irrigates the Kandahár Valley. The water of the Tarnak is not, so far as he had seen, used for irrigation as it runs at too low a level. The city is built for the most part of mud and of sun-dried bricks, so little masonry is there about it; but it is built solidly, with walls 4 or 5 feet thick, on a large scale, and in the dry climate the weather does not very seriously affect even mud.

The high massive walls of the city appear in excellent order from outside, and it is only when one comes inside and stands on the tower of the citadel that the dilapidations become striking, and one comes to the conclusion that, with the exception of one or two mosques and a mausoleum, Kandahár is at least very much out of repair. The citadel is a palace with all the accessories of court-yards and stables on a large scale, surrounded by a high massive wall and ramparts of its own. The buildings in the citadel in many cases are of three and four storeys: the walls very thick, the rooms low and small, connected by numerous dark low passages with curious deep recesses, probably for servants; most of the buildings have well-lighted underground rooms—prophetic of great heat.

The bazar contains many good things of a certain class, and is crowded all day. The inhabitants treated the troops outwardly as if they were used to them, neither glad to see them, nor displeased at their being there, and they were at least ready to sell them anything.

There are excellent cheap sheepskin coats and stockings, *chogas* of *pashmina* and of capital close felt, which appears to be a Kandahár *specialité*: old British uniforms of all kinds, but very little English cloth, Manchester or other. The copper-work in pots and pans, the iron agricultural implements, the earthen-ware drinking and eating vessels all exhibit more finish and more artistic feeling than those of the Hindus. The leather too is much better prepared than in India, though there is still the same weak sewing.

But the feature as compared with the bazars of Hindustán is the variety and quantity of the food exposed for sale: fried fish and *kabobs*, stewed fruit and curds; the Kandahár bread, an excellent light flat cake; carrots, spinach and watercresses; while the stalls for the sale of raisins, almonds, dried figs, apricots and such pomegranates as Captain Heaviside had never seen before, were as common as public-houses in London.

In April, a party of surveyors, consisting of Captain Rogers and Lieut. Hobday with Captain Sartorius, 59th Regt. and Lieut. Baynes, 60th Regt. Asst. Field Engineers, accompanied a column going for revenue into the country north of Kandahár between the Arghandáb River and the hills of the north side of the Khakrez Valley, and the survey of this and adjacent valleys was carried out as the movements of the troops allowed, the northernmost limit being Asub Kila, or Gandáb, about 36 miles from Kandahár.

About 500 square miles were plane-tabled by Lieut. Hobday and Captain Sartorius on the $\frac{1}{4}$ inch scale ; a route survey carried on on the 1-inch scale by Lieut. Baynes, and a number of points fixed trigonometrically.

Lieut. Hobday says, that they found the people in the Khakrez Valley quiet and amenable enough. There was a fair sprinkling of villages and cultivation, and water plentiful. They came across a fair-sized plateau at an elevation of about 7,000 feet, with wild rhubarb, onions, and water-cresses in abundance. The elevation of the valley is much higher than that of Kandahár, and they consequently found it much cooler and got away from the flies. They also came across lead, iron, copper and crystalite.

At Girishk, Captain Beavan made a large-scale survey and completed a map of the position at Girishk and passage of the Helmand on the scale of 4 inches to the mile, including about 20 square miles of the Helmand Valley with the Fort and military position. He also determined the position of numerous hill peaks.

After his return to Kandahár he completed a survey of the new cantonment on the scale of 16 inches to the mile, and at the end of April was engaged in carrying on a general survey of the cultivated land adjoining the city of Kandahár on the scale of 4 inches to the mile.

When it was determined early in February to withdraw a part of the Force by the Thal Chotiáli route under the command of General Biddulph, Captains Heaviside and Holdich, *r. e.*, were appointed to accompany the Force as Surveyors, Captain Heaviside taking charge of the triangulation, and Captain Holdich of the topography.

Before starting, Captain Heaviside proceeded to the Kadanai Valley, where he measured a base line and carried a triangulation across the valley to the Hadah Hills and thence fixed several points to the North, East and West.

Captain Heaviside remarks that the name Ghanti given to the range between the Khojak Pass and Kandahár should be erased. The name is unknown and has probably been confused with the Ghetai Hills. It is very difficult to obtain correct names in Afghánistán, but from the Kadanai Valley the highest hill of the range is called Hadah ; it rises 2,500 feet above the valley and scarcely deserves the name of a mountain in this part of the country.

Captain Holdich joined Captain Heaviside in the Kadanai Valley on the 26th February, and notwithstanding the thickness of the atmosphere and inclemency of the weather was able to sketch in on the plane-table a fair portion of the valley. These two officers re-crossed the Khojak on the 6th of March by a capital road with easy gradients which had been recently

made, and Captain Heaviside was able to connect his Kadanai work with the Khojak points, but only by staying on the top for several hours waiting for breaks in the alternations of dust and showers below and snow above. From these points he carried a connection by triangulation across the Pishin Valley to Khushdil, but with great difficulty owing to the heaviness of the weather. Captain Holdich at the same time carried on his plane-tableing on the basis of two or three points fixed by Captain Rogers near Quetta, also on points obtained from independent bases, and occasionally from the traverse work with compass and perambulator, which was continued steadily through from camp to camp. From Balozai, two marches beyond Khushdil, he made a reconnaissance southwards with Col. Brown, R. E., to Gwal and Amadún, while Captain Heaviside accompanied General Biddulph on a reconnaissance to the head of the Zhob Valley.

Leaving Balozai on the 24th of March, the Thal Chotiáli Force marched nearly due east through Eusaf Katch to Spirargah. The route led chiefly up the bed of a main tributary of the Surkháb river over the Ushtárah Pass 8,000 feet high. The scenery about this pass was quite Alpine in character: the camp was pitched at the foot of a fine snow mountain, the hill sides were fairly clothed with a species of juniper, while the extraordinarily varied and brilliant colouring of the soil lent additional charm to the scene and was a pleasant change from the monotony of flat treeless valleys and bare rocky hills that characterised the country between Kandahár and Quetta. From Spirargah the Force marched over the Momangai Pass (8,500 feet) to Oboskoi, Chimján and Ningán where the Bori Valley was struck. From Ningán, the line taken lay north of the route through Thal and Chotiáli pursued by the 1st and 3rd columns, and the Bori Valley was followed and for a distance of 30 miles was found to be wide and open, well cultivated and more prosperous looking than anything they had seen since leaving Kandahár. This valley was quitted three marches beyond Ningán where the Anambár river passes through a gap in the range bounding the valley to the south. The Khru mountain which overhangs this gap was ascended in the hope that some points on the Sulimán range would be seen therefrom, but this expectation was disappointed. A connected triangulation had been carried on to this point, but triangulation had now to be dropped and the Survey carried on solely with the plane table, checked by traverses and Astronomical latitudes. Leaving the Anambár gap (3,800 feet) the Force, instead of following the Anambár river southwards to Chotiáli, marched to the south-east, crossing the Trikh Kurram Pass (4,200 feet) and thence into the Chamálang Valley in two long marches. From Chamálang the route led due south over the Hanukai Pass (4,400 feet) to Balladaka, and thence over the Han Pass to the Kaho Valley. Between Anambár and the Kaho Valley the country is

rugged and the valleys even uninhabited owing to disputes amongst the neighbouring tribes. Lugári Barkhán (3,500 feet) in the Kaho Valley, about 10 miles above Vitákri, was reached on the 8th of April, after a march of 190 miles in 16 days.

Captain Holdich sums up the results as 5000 square miles of $\frac{1}{4}$ inch mapping, 270 linear miles of traverse on the 1 inch scale, and several plans of sites &c. The mapping includes the heads of the Pishin and Kadanai Valleys and a good margin beyond the country actually mapped, of which the geography can be very closely conjectured, so that the south-east corner of Afghánistán may be said to be known. Captain Holdich also says that there is a more northerly route which he would have liked to have explored; the real high road, as he believes, to Kandahár, and even better and straighter than the Thal Chotiáli route, good as that was found. This route leads *viâ* the Zhob Valley and the Karwaddi Pass, of which at present only native information is available. A railway could be run without difficulty along the route followed by the Survey.

After the Thal Chotiáli Force returned to India, Captains Heaviside and Holdich remained a month at Fort Munro on the Sulimán Range and were enabled while there to connect two Trigonometrical points on the range with several points to the west along the route they had come by, thus leaving a gap in the triangulation of less than 30 miles.

On the 10th May Major Campbell and Lieut. Gore accompanied Captain Wylie, the Political Officer, from Alizai on a reconnaissance to the Toba Plateau on the north of the Pishin Valley. The first camp, Arsala ka Masjíd, $10\frac{1}{2}$ miles from Alizai, is in a *nala* about half way up the pass; 9 miles further, on the top edge of the plateau, at an elevation of 8,000 feet, they camped at Mandan, which is the name of the district and stream, though there is no village. Two marches further on they reached Haji Khán ka Kila, the extreme north-east point of their route. The country passed through is at first undulating, running into hilly towards the north. Major Campbell remarks that the name of what is called "Toba Peak" on the map is 'Kand.' The expedition marched back through Kakar Toba into Achakzai Toba, going *viâ* Sábur, Drajandar, Kurak, Gwal (one of Captain Holdich's points) and Ghan Oba, where they left the hilly ground and entered the open plain country called 'Tobin,' which lies west of Toba and borders the Kadanai Valley. It is the more extensive plateau of the two, but water is scarce. Hence they went to Sina across the plain over the ridge of the Khojak Hills (north of Pass) and down the Bogra Pass into the plain of Kadanai. Lieut. Gore says the upper part of the Bogra Pass into Kadanai is very steep and bad for camels for about $\frac{1}{4}$ mile, after that it is a good road.

The expedition was to go a short way up the Kadanai Valley, then up another road into Tobin, returning to Pishin by the Arambi Valley, quite a different route to that they went by.

The results of the Survey with this Column up to the end of May may therefore be summed up as follows :

Route Surveys from the Bhundowali Post to near Lehri, and from Dadur to Girishk.

Survey of the Bolan Pass and neighbourhood.

Survey round Quetta.

Survey of the Pishin Valley and reconnaissance of the Shorawak valley.

Reconnaissance of the Arghandáb and Arghasán Valleys from Kanda-hár to Khelát-i-Ghilzái.

Survey round Khelát-i-Ghilzái.

Surveys round Kandahár.

Survey round Girishk.

Survey of the Khakrez Valley.

Reconnaissance of the Kadanai Valley and survey of the Thal Chotiáli Route.

Reconnaissance of the Toba plateau and neighbouring country.

Captain Heaviside has given the approximate latitudes, longitudes and heights of the following places on the Thal Chotiáli Route, based on Captain Rogers' values, *viz.* :—

	Lat.	Long.
Takatú, east peak highest,	30° 24' 13"	67° 6' 15"
Chiltan, southern peak,	30° 1' 11"	66 48 42
Khojak, east point,	30 51 33	66 33 54
Kwája Amrán,	30 39 30	66 24 45
Height of Quetta 5,500 ft.		

The heights are aneroidal, and the passes are probably made a little too high.

	Lat.	Long.	Height
Major-General Biddulph's Route.			
Khushdil (Pishin Valley),.....	30° 42'	67° 5'	5,100 ft.
Suranari Pass,			7,000 "
Balozai,	30 38	67 18	6,300 "
Metrazai Pass,	30 45	67 30	7,100 "
Usharáh Pass,	30 36	67 32	8,000 "
Momangai Pass,.....	30 34	67 42	8,500 "
Chimján,	30 34	67 57	7,200 "
Ningán (Bori Valley),	30 27	68 23	5,350 "
Anambár Gap,	30 21	69 2	3,800 "
Chamálang Valley,.....	30 9	69 26	3,800 "
Hanukai Pass,			4,400 "
Han Pass,			4,800 "
Nahar Kot (Lugári Barkhán),	29 46	69 27	3,500 "

Major Sandeman and General Nuttall's Route.	Chimján as above,	30° 16'	68° 17'	
	Smalan,			
	Sagawe,	30 17	68 20	Height 5,500 ft.
	Baghao,	30 16	68 29	4,800 "
	Rehi,	30 9	68 35	3,900 "
	Tal,	30 1	68 43	3,200 "
	Chotiáli,	30 2	68 54	3,300 "
	Baramzai,	29 59	69 14	3,750 "
	Nahar Kot, as above.			

Balozai and Metrazai are in the Surkháb; the latter place being on the watershed at the head of the Surkháb and Zhob Valleys.

Since the above values were determined, Mr. W. C. Price has carried a triangulation from the Indus Valley Series across the Sind desert and up to Quetta. This connexion will enable the fair maps of Southern Afghánistán to be compiled on a base as rigorously accurate as other portions of the Survey of India.

II. KURAM VALLEY COLUMN.

The Kuram Valley Force, under Major-General Roberts, C. B., V. C., being smaller than the others, the Survey operations have also been on a less extensive scale than those with the other two columns and have been confined almost entirely to the Khost, Kuram and Hariáb Valleys. From November 1878 to March 1879 Capt. Woodthorpe, B. E., was the only officer of the Survey of India present with the Column, but Lieut. Manners Smith, Adj. of the 3rd Sikhs, was attached to the Survey party in November to accompany and assist Capt. Woodthorpe, and in March Lieut. Gerald Martin, of the Survey of India, also joined the party.

Capt. Woodthorpe had the great advantage of being in close and direct communication with Genl. Roberts and of accompanying him on all expeditions and reconnaissances, and thus had every opportunity for seeing and surveying as much of the country as was practicable under the circumstances.

Capt. Woodthorpe accompanied the Force in the rapid advance in November 1878 from Thall to the Peiwar, partly along the right bank of the Kuram River, *viâ* Kapianga, Ahmed-i-Shamu, Esor, Hazár Pír, the Darwáza Pass and Kuram, plane-tabling along the route. He took part in the military operations of the 28th November and 2nd and 3rd December, and had a very narrow escape during the action on the 2nd.

He had gone forward with the advance when they reached the stockades on the Spin Gawai at dawn; and when all the enemy had been driven out he returned with a message from Colonel Brownlow of the 72nd to the

General, who asked him to take back a reply. He was returning by the route he had just traversed, quite alone, and had left the breastwork where the rest of the 72nd were sheltering about 48 yards in rear, when he saw some 30 men occupying the crest within a few yards of him, and in the grey light he mistook them from their dress for some of the men of the Force going up in support of the advance, and, on the other hand, the enemy did not recognise him till he was within 6 yards of them and then fired upon him. A bullet struck him on the left side, completely carrying away the whole of the wood of his pistol stock, tearing his clothes, singeing his side and driving a piece of his clothes into the middle of the note-book in his breast pocket and spoiling several sketches.

He fortunately succeeded in regaining the breastwork amidst a storm of bullets, notwithstanding that he tripped and fell heavily down-hill about half-way.

After the battle he made a reconnaissance of the scene of action. He then went on with the Force into the Hariáb Valley, marching and plane-tabling through Ali Kheyl and Rokián, and was able to well delineate all the valley and as far as Rokián. From Rokián he was only able to carry on a route survey to the Shuturgardan, the valley being too narrow to admit of plane-tabling, and visits to places on either side were impossible. He was able to fix the Shuturgardan with sufficient accuracy and found it to be a good deal south-east of the position assigned to it on sheet No. 4 of the Atlas of India. The river a few miles above Rokián runs north-east from the Surkai Kotal instead of rather south-east, as in the map. Capt. Woodthorpe says that the old map is exceedingly accurate as far as the Peiwar, on the north bank of the river, but he has been able to improve it a little. On returning to Ali Kheyl, he visited the Matungeh Hill, a peak about $4\frac{1}{2}$ miles north of Ali Kheyl, about 12,900 feet above the sea, Ali Kheyl being 7,300. From Ali Kheyl he returned with the Force, marching and plane-tabling through Chapri and Karaia in the Mangal country, to Kuram. On passing through the Mangior defile between Chapri and Karaia on the 13th December, the baggage and rear-guard were attacked by Mangals.

Shortly after the return of the Force to Kuram, Capt. Woodthorpe and Lieut. Smith visited the Safed Koh, riding out from Kuram to some villages called Zerán, where they picked up a Turi guard, having also some Gúrkhas with them, and also had to change their mules for coolies, as they were told the mules could not go very far. They had, however, to take on the mules belonging to the Guard, as sufficient coolies were not procurable, and these mules got up within 2000 feet of the pass and would have gone right up, but there was no camping-place further on till the ridge was crossed and the road had descended again some distance towards the

plains. The route they followed was the regular Jelálábád road up which the Turi mules always go. They met a large number of unarmed traders coming in from Jelálábád. They reached a point about 13,600 or 14,000 feet high, but could not reach the highest point—Bodin Peak. The ridge was very steep and difficult and the path over snow-fields. From the point they reached they had a good view of the Fort at Kuram and all the peaks towards Khost. It was bitterly cold up there but they got angles to all the peaks they wanted.

Early in January the Survey party accompanied the expedition into the Khost valley, marching *viâ* Jaji Maidan, Bakk Akubi to Matún. From Matún Capt. Woodthorpe explored the valley to the west, in the direction of Degán, and also accompanied a signalling party to a hill on the watershed between the Shamil and Tochi rivers, near the small Wazírí village of Nandir, and commanding an excellent view of the surrounding country. From this point heliographic communication was established with Bannu and Hazár Pír. On the 27th January the Force left Matún, marching back to the Kuram *viâ* Sabari, Esor, Hazár Pír and Ibráhímzai. During this expedition the greater part of the Khost valley was surveyed and mapped on the $\frac{1}{2}$ inch scale, the part wanting being at the extreme west.

After the return from Khost the survey party was engaged in making a route survey with plane-table and perambulator of the new road to Thall, *viâ* Ibráhímzai, Hazár Pír and Ahmed-i-Shamu; Capt. Woodthorpe also visited the Shobakgarh Range and fixed the position of the pass through that range to Khost.

About the middle of April the Survey party accompanied the Force to Ali Kheyl and remained there, surveying in the neighbourhood of the Peiwar, till the end of the month, the snow being about 18 in. deep on the hills at the time, and the weather very stormy and unfavourable for work.

Capt. Woodthorpe, accompanied by Lieut. Martin, paid a second visit to the Matungeh Hill, near Ali Kheyl, but they were disappointed in not being able to see and communicate with Gandamak, for which purpose signallers had accompanied them. They had a fine view, seeing far away into the plains near Ghazni and also to the Shuturgardan Kotal. The last 1500 feet of the ascent was very trying, on account of the snow with which the hill was covered and a biting cold wind that was blowing at the time, but notwithstanding this they managed to get through a good deal of work before returning to camp in the evening.

At the end of April Capt. Woodthorpe and Lieut. Martin went from Ali Kheyl *viâ* Belút to make a reconnaissance of the Lakarai Pass at the request of General Roberts.

From Belút the road lay along the bed of the Lalidar or Naridar stream

for some seven or eight miles, passing between thickly-wooded spurs of the mountains. It then winds up the spurs towards the Kotal, among the pines and here begins to be somewhat steeper, until it arrives at a small saddle from which to the Lakarai itself the slopes are somewhat slighter. From a little below this saddle to the Kotal the snow was very deep, 2½ to 3 feet. On the north side it was deeper still, and sometimes lies 7 to 8 feet thick. The height of the Kotal is about 10,600 feet.

They crossed the Kotal and continued some little distance down to where they could get a fairly good view of the river-bed and the villages below. The part of the road near the Kotal is called Mangal Tangi and the villages in the valley are Gabar Mangal. They are Taghan, Langar Kila, Sirkoti and Nazir Mahomed.

The nearest is Taghan, about five or six miles from the Kotal, and is a fairly large village. They were unable to go down to this village, partly because it was getting late and partly because the villages were unfriendly. They could see the tops of the Jizin and Jagdalak Hills and, as at Matungeh, some of Major Tanner's points, but the height of the Safed Koh on the right and the hilly nature of the country in front prevented their seeing Gandamak or Jagdalak. Lieut. Martin was also able to see the other side of the Safed Koh and so check, correct and add to the work he had done at Matungeh. The weather was very cold with a wind which almost made their fingers too numb to draw. Lieut. Martin gives a very graphic description of the beauty of the scenery, which he describes as quite Alpine.

During the month of May reconnaissances were made to the Sirkai and Shuturgardan Kotal; to the Zarrazod Peak, near the Mangior Pass; to the Istiar Pass and head of the Mangior defile, looking over the Ahmed Kheyl country; to the Kafirtaga Hill and to the Naktek Peak, over the Ahmed Kheyl and Lajji country, on which occasion a good deal of work was done and the positions of the Ahmed Kheyl and Lajji villages fixed, and a good deal of the topography between Ali Kheyl and the principal part of the Kuram sketched in as well as the ranges and principal water-courses on the opposite side.

Lieut. Martin gives some interesting details regarding the course of the Kuram river. There are two principal sources. One rises near the Shuturgardan, flows east and then south; the other rises in the Peiwar range, flows west and meets the former at Ali Kheyl and continues along with it in that direction until it arrives at the Ahmed Kheyl *great* village. Here the bed narrows and the closeness of the rocks gives it the name of "Tangi." This is the spot where the river suddenly turns south into a

mountainous land ; and here the Ahmed Kheyls have a fort and stop and rob travellers to Ghazni or those going by the Spiga Kotal to Kábul, and on this account (so he was informed) this road, though the best and shortest to Ghazni, is generally avoided. The Umar and other hill streams here join and all flow together through a very mountainous rugged country. This part of the Kuram then turns sharply eastwards and flows on towards Kuram itself. In this portion of its course myriads of mountain streams and torrents feed it and thus it increases in size rapidly. From the joining of the Ali Kheyl and Umar until it comes into the Kuram Valley its course is through a very mountainous country inhabited by various robber tribes, Mangal, Ahmed Kheyl and Lajji.

On the 20th June Capt. Woodthorpe and Lieut. Martin, accompanied by other officers of the force and a party of signallers, ascended the Sikarám Peak (15,600 feet) on the Safed Koh, which had been already ascended by Mr. G. B. Scott, of the Survey, attached to the Pesháwar Column. Unfortunately the day was hazy and they were unable to see or do so much as they had expected.

The area surveyed by this party may be roughly estimated at 4,500 square miles and has been mapped and published on the scale of 4 miles to an inch.

III. PESHÁWAR COLUMN.

The Survey operations with the Pesháwar Column, though not extending over such a length of country as those with the Quetta Column, have, perhaps, been more productive in new work, owing to circumstances having permitted a more complete survey of the country on either side of the route traversed by the Force than could be accomplished with the Quetta Column.

Five officers of the Survey Department—Major H. C. B. Tanner, B. S. C., Capt. E. W. Samuells, B. S. C., Capt. E. P. Leach, B. E., Capt. C. Strahan, B. E. and Mr. G. B. Scott, were employed from time to time during the occupation of the country by the British troops.

Of the operations connected with the earlier part of the campaign, the information furnished by the Survey Officers is unfortunately scanty. The results, however, speak for themselves.

Major Tanner completed a Military reconnaissance of the country between Jamrúd and Jelálábád on the scale of 1 mile to the inch. Nearly the whole of the portion between Jamrúd and Dakka, including the routes taken by the three brigades, was surveyed on the 2-inch scale by Mr. Scott, and afterwards reduced to the 1-inch scale in Major Tanner's office.

Major Tanner also made a reconnaissance on the scale of 1 inch to the mile of the hills lying to the immediate south of Dakka.

Capt. Samuells greatly distinguished himself at the taking of Ali Masjid by carrying on his survey under a heavy fire. Very shortly afterwards he was attacked with typhoid fever and died at Pesháwar on the 21st December, 1878.

Between the 1st November and 5th February, Mr. Scott had nearly completed a plane-table survey of 320 square miles—lying between Lat. $33^{\circ} 55'$ and $34^{\circ} 15'$, Long. 71° and $71^{\circ} 30'$, comprising most of the country south of the Kábul river between Dakka and Fort Michni to the north, and in the neighbourhood of the Khyber and Bázár Valley to the south.

He was then called on by Major Hastings, the Deputy Commissioner of Pesháwar, to survey the portions of the Shinilo and Hyder Khán Kafilah routes to Dakka which he had not been able to complete before, and also to survey certain additional portions of the Kábul River. Whilst engaged on this work he and his party, which consisted of a few *kalashis* and a guard of 20 Sepoys and 2 non-commissioned officers of the 24th Panjáb, N. I., were attacked by a strong party of Momunds and a hand-to-hand fight ensued. Mr. Scott displayed great gallantry, coolness and good judgment on the occasion, and probably saved the whole party from destruction, as has been cordially acknowledged by the Panjáb Government and by His Excellency the Viceroy and Governor-General in Council.

Capt. E. P. Leach, R. E., joined the Force in January and did good service for about two months in surveying the Bázár Valley and a good deal of the country round Jelálábád, chiefly in the Shinwári country on the northern slopes of the Safed Koh. He was attacked on the 17th March by some Shinwáris, while surveying near the villages of Maidanak and Girdi, and received a severe wound on the arm, which obliged him to return to Pesháwar.

Capt. Chas. Strahan, R. E., replaced Capt. Leach in April and was employed in surveying the country in the neighbourhood of Safed Sang and to the north of the road between that place and Jelálábád.

On the occasion of the first expedition into the Bázár Valley by the Column under General Maude on the 20th and 21st December, Mr. Scott accompanied the Force and surveyed along the route. During the second expedition of the 24th January and subsequent days he again accompanied General Maude's Column *viâ* Burg to China and completed a survey of the eastern part of the Bázár Valley and the scene of action towards Bara, while Capt. Leach, who accompanied General Tytler's Force from Basáwal *viâ* Chunar and Sisobi to China, returning from China to Dakka over the

Sisobi Pass *vid* Chunar, did a good deal of survey in the western part of the valley, and was able to fill in a considerable portion of the hill tract between Dakka and the Sisobi Pass, the position of which was accurately fixed.

While the Force remained in the valley no surveying beyond the immediate vicinity of the camp at China could be undertaken, nor any exploration made towards the Bara and Tirab Valleys, the Zakha Kheyls at once opposing the advance of any reconnoitring parties in those directions.

Capt. Leach remarks, as the result of observations on this expedition, that the passes over the Safed Koh apparently exist at intervals of 5 to 10 miles, and the one they crossed—the Sisobi—was under 5000 feet and a comparatively easy one for camels.

The higher ranges of the Safed Koh are fairly wooded, but the Kábul river runs through a bare stony plain from Jelálábád to the Khyber, and cultivation is very limited.

The most notable feature of the country is the elevated valleys which are composed entirely of beds of conglomerate brought down from the main ranges, and which rise gradually several thousand feet before the steeper slopes like those of the Himalaya commence. It is difficult to explain the formation, but it presents all the appearance of a sudden disintegration of the mountain ranges by volcanic action, the drainage lines cutting out broad channels in the most erratic manner over the deposit thus formed, and the spurs apparently having been half-buried by the immense masses of loose stone.

The route between Dakka and Jelálábád was surveyed by Major Tanner, the survey comprising nearly all the country between the road and the Kábul river and the villages 2 or 3 miles to the north of the river, and it was afterwards added to, chiefly towards the south, by expeditions from Jelálábád.

Capt. Leach, writing in January of the route between Dakka and Jelálábád, says that the country is disappointing and the fertile valley of Jelálábád, so far as he could see, was a myth. There are few trees and for several miles to the south of Jelálábád there are undulating ranges of low hills with broad expanses of waste land covered with stones. This is the character of the road the greater part of the way from Dakka, and the tract of country it passes through is to all appearances a continuous river-bed. Round Jelálábád itself there is a certain amount of irrigated cultivation, but the camp and roads were deep in dust and there is absolutely no vegetation on the hills.

Various attempts were made to explore the hitherto unknown tract of country lying along the northern slopes of the Safed Koh range to the

south of the Kábul river between Basáwal and Jelálábád. Regarding this tract Capt. Leach says the valley proper extends about 10 miles on the southern side of the Kábul river and is fairly level, then comes a belt of low broken hills inhabited by the Shinwáris and then the main spurs of the Safed Koh Range which, in many cases, run nearly parallel to the main range and not at right angles, as shewn in existing maps.

The first of these expeditions was made by Major Tanner and Capt. Leach to the Shinwári village of Mazína, 14 miles south of Jelálábád, with a view to proceeding as far as possible towards the slopes of the Safed Koh and surveying the entrances to the Papin and Ajam passes; but as the Khán of Mazína refused to be responsible for any further advance into Shinwári country, the expedition had to be abandoned. Major Tanner was, however, able to fill in the drainage and low hills between Háda and Mazína, and he remarks that the country between Háda and the Mazína upland is intersected by numerous watercourses all paved with round boulders. The plain and broken ground between them is also thickly strewn with shingle and boulders, but after ascending a slight pass to the east of Za Khel, they suddenly found themselves in a beautiful plain highly cultivated and with forts and clumps of trees on all sides. The Safed Koh were but 10 miles off, with the valleys and slopes covered with beautiful pine forests. Between them and the foot of the mountains intervened more shelving stony ground with undulations that hid the cultivated lands of Deh Bala (the high village) from them. The cultivated lands stretch from Mazína northwards to Sber Sháh and almost reach the arid tract near the Chorazali road. Mazína is some 1200 feet above Jelálábád.

Early in March Capt. Leach received permission to survey over the old route between the Safed Koh and the Kábul river, followed by Burnes in 1839, confining his operations to the country eastward of Mazína. His first halting-place was at the Fort of a friendly Khán, 13 miles south of Jelálábád, and he had intended marching to Marhaiz, 9 miles further south and within 4 or 5 miles of the foot of the Safed Koh proper, whence he would have been able to get up to the lower spurs and snow-line, Marhaiz itself being 4000 feet; but as the Khán who escorted Capt. Leach said they would be certain to be attacked if they camped at Marhaiz, he changed his plan and went to his old camp at Mazína, where he had another day's work in the same direction and managed to get near enough to fix all the Shinwári villages at the foot of that particular part of the main range.

Capt. Leach says the country is a difficult one to sketch without actual survey.

The main range is easy enough and its features tolerably regular, but the lower slopes are completely buried by a glacis of low broken masses of

conglomerate and sandstone, so that the gorges to the passes and all the defiles are invisible till one is close to them, and nearly all the villages are quite out of sight. These lower ranges are generally detached and the valleys, or *daras*, are several hundred feet below them. He followed one of these *daras* down to its junction with the Kábul. For mile after mile they passed through a continuous belt of cultivation, thickly studded at every quarter of a mile with tidy-looking forts and showing every sign of comfort and prosperity.

Ascending either bank of the stream one passed at once from fertility to absolute barrenness, and a few miles away from the *dara* it was almost impossible to make out its course or to trace its windings through the hills to the foot of the range.

On the 17th March Capt. Leach was surveying the slopes of the Safed Koh in the neighbourhood of the Shinwári villages of Maidanak and Girdi, from 16 to 20 miles south of Barikhab, when he was attacked by the villagers and after a hard fight succeeded in withdrawing his party and the military escort. In the course of the fight Capt. Leach was severely wounded by a sword-cut in the left arm, Lieut. F. M. Barclay, who was in command of the escort of 45th Sikhs, received a wound which proved mortal, and two men were killed.

A few days afterwards an expedition under General Tytler was sent from Barikháb against the Shinwáris who had attacked Capt. Leach, Major Tanner and Mr. Scott accompanying the expedition as Surveyors. Major Tanner visited the scene of the encounter and was able at a height of 4,300 feet to see many points north and west of Jelálábád that he had never before seen, especially the Hindu Kúsh near Bamian, and the same range north of his position. He finds that Fardjgan is not at the foot of the Hindu Kúsh, but at the foot of one of its spurs.

Mr. Scott also accompanied General Tytler to the attack on Deh Sarak, and on this expedition and that to Maidanak made a reconnaissance of about 120 miles of Shinwári country and the neighbouring slopes of the Safed Koh.

The long halt of the Army at Jelálábád enabled the Survey Officers to make the most of such opportunities as they had for completing the survey of the almost unknown country around, but as a rule they were unable to proceed further out than the limit of a day's ride out and in, and this prevented them from extending their explorations so far as they would have been able to do under more favourable conditions.

During December and January the survey operations in the neighbourhood of Jelálábád were much hindered by a persistent opaque brown haze which entirely blocked the view beyond a few miles. Luckily Major Tanner was able to fix his position the very morning of his arrival, other-

wise he would not have been able to determine the true position for several weeks. And this was of the more importance because Major Tanner found that the position assigned to Jelálábád on existing maps was erroneous and that its true position is Lat. $34^{\circ} 29'$, Long. $70^{\circ} 30'$, instead of Lat. $34^{\circ} 24'$, Long. $70^{\circ} 26'$.

To the eastward, north of the Kábul river, Major Tanner accompanied an expedition through Kama into the hilly country beyond Girdao. Kama is described as a thickly-inhabited alluvial tract, intersected everywhere by canals and studded with many fortified villages and forts.

Major Tanner surveyed the course of the Kunár river for about 15 miles from its junction with the Kábul river, and filled in the country to the north of Jelálábád between the Kunár river and the Kábul and Lughmán rivers, known as the Dasht-i-Gamberi, a waterless alluvial sandy plain, together with the hills to the north of it, to a distance of 16 to 18 miles from Jelálábád.

Major Tanner was also able to make a rough sketch of the Kunár Valley, filling in the names from native information. The course of the Kábul river, westward from Jelálábád beyond the Daronta Pass, was laid down to a short distance beyond its junction with the Lughmán River, about 14 miles from Jelálábád, and Major Tanner found that this part of the country was very erroneously delineated on the old map, the course of the Kábul River being placed many miles too far north.

On the occasion of the expedition to Lughmán under General Jenkins, the Lughmán river was traced by Major Tanner and Capt. Leach as far as Trigarihi, 26 miles from Jelálábád, and a fair survey was made of the Lughmán Valley from the Daronta Pass to the junction of the Alishang and Alingár Rivers. A more extended sketch, based upon trigonometrical points, was also obtained of the surrounding hills and heads of the above river valleys and extending westward to the Bád Pukht and Tang-i-Shaidán Passes. Observations were taken from a point 4,200 ft. on the Panchpai Range. The forces met with no opposition, and Major Tanner says that the people came in crowds round his plane-table, curious to see the English. He found the Tajik or Kunár language prevalent.

Accompanying a column under General Macpherson, Major Tanner surveyed the country between Jelálábád and Bahram Khán's Fort, going *viâ* the Tatang Pass, over the end of the Siah Koh Range, and returning along the foot of that range to Jelálábád *viâ* the Lakki Pass.

Previous to the advance of the army Major Tanner surveyed and fixed the course of the Surkháb River as far as Sultánpur, with all villages and many forts, thus completing the survey one march on the road to Kábul with all the country to the north of it as far as the Siah Koh Range.

On a subsequent occasion Major Tanner went to Sultánpur and surveyed a strip of the country south of the road, meeting nothing but a waste of stony hills and deep ravines. Low hills to the south prevented his seeing the cultivated tract and villages under the Safed Koh. It had been intended that he should survey Burnes' old route between Fathiabád and Chapriar and also that he should, if possible, visit and report on the bridge over the Surkháb river near Gandamak and also visit the old British cantonment at Kája, but unfortunately heavy rain stopped the work and the party were obliged to return to Jelálábád.

On the advance of the army to Gandamak, in April, Major Tanner, Capt. Strahan and Mr. Scott accompanied the Force and surveyed the road to Gandamak and the country north and south of it between the Surkháb and the Safed Koh, Capt. Strahan taking the northern portion and Mr. Scott the southern.

In the reconnaissance to Gandamak Bridge (Safed Sang) Major Tanner found that the topography of the old map was very inaccurate. The general slope of the Surkháb is about 200 feet per mile and in one part the gradient of the plain which reaches to the foot of the Siah Koh was a great deal more, hence the unexpected bends and turns the streams make in a country covered with ridges and hillocks, where the southern edge has been upheaved in moderately late times.

Major Tanner also made a reconnaissance to the Wara Gali Pass, over the Siah Koh Range, extending as far as the watershed. The pass is easy but rocky. The slopes of the Siah Koh are craggy and have only sparse scrub for about half a mile. Unfortunately the weather at the time was bad and no observations could be made to peaks to the north.

Capt. Strahan's particular work was the survey of the country between Safed Sang and the Surkh Púl and he made a really fair survey (much more than a sketch or reconnaissance) of about 80 square miles north of the road up to the Surkháb and got a good general sketch of the Siah Koh beyond, up to the crest of the first range.

Capt. Strahan remarks that the name Safed Sang (white stone) had not been written against the camp so-called, because there is no village of that name, which refers to some big white stone in the river there. The nearest village is Hashim Kheyli. He also remarks that the weather at Safed Sang at the end of April was very changeable, one day high wind with dust, then cold wind with rain or hail, then a hot sultry day, the latter being the rarest and the other two about equal. The thermometer rose from 85° to 95° maximum, and was about 58° minimum.

The valley at Safed Sang is of no great width, and all the low ground within easy reach of camp was mapped by Capt. Strahan with very fair

accuracy and detail. From four stations round about he was able to fix almost every prominent point in the Safed Koh and Siah Koh and also in the Karkacha range some 25 miles to the west.

As soon as he heard that the troops were likely to return to India, Capt. Strahan sent Mr. Scott to the Safed Koh with instructions to get in all the sources of the Surkháb as far as possible, and to fill in all up to that river south of the road which will form the limit of the Survey. He himself started for the Siah Koh and did two days' good work from two peaks from which he had a most extended view. From the first he could see beyond Kábul and the Hindu Kúsh, somewhere near the Khevak Pass, but the high peaks there and about Kohistán and Panjshir were cloudy. From the second peak he could not see in the Kábul direction, but picked up some peaks on the Hindu Kúsh and got second rays to two peaks in Káfiristán, somewhere about the sources of the Alishang and Alingár rivers. He intended to have visited a third peak but was ordered to go with Capt. Stewart of the Guides, to Ali Kheyl by the Lakarai Pass over the Safed Koh. This attempt unfortunately failed.

Mr. Scott got to the top of the Sikarám Peak, on the Safed Koh (15,622 feet), and did a great deal of good work, observing to one solitary peak in the Hindu Kúsh in a part of the range unseen by any of the surveyors before, as it was hidden by the Káfiristán hills.

The total area actually surveyed during the progress of the operations of the Pesháwar Column may be roughly estimated at about 2,500 square miles, a great part of which is quite new and the remainder correction of the old, incorrect and imperfect surveys. Besides the above 1,100 square miles were sketched from native information by Mr. G. B. Scott. It has all been mapped and published on the scale of 4 miles to an inch.

During his stay at Jelálábád, Major Tanner took the opportunity of studying many points of interest connected with the numerous antiquities in the vicinity and the languages of the people, chiefly of the Káfirs.

At Háda, about five miles south of Jelálábád, he came across a splendid subterraneous palace of the old Káfir kings, known as the Palace of Oda, Hoda or Hodé Rájé, and had it excavated, finding several beautiful plaster heads and fragments.

He made some study of the language spoken north of the Kábul river, through Kunár, Lughmán, Kohistán &c. He says it has a most perfect grammar and is an Aryan language, he thinks very old and pure, and allied to that of the Káfirs, which he finds to be also Aryan and not Turanian. He had the names of several tribes of Káfirs, viz. Sána, Wáma, Kantáwar, Bukiwáma, Muliarwáma, Shinogur, Kaliagal, Waigal and Nishigam. Each tribe is said to have a separate language.

In the course of one of his excursions up the Siah Koh he collected

specimens of five kinds of pines. Of these the Chilgoza (edible pine) grows at from 7000 to 9000 feet ; the Deodar from 7,500 to 10,500 ; the Paloda from about 9,000 to 12,500. A pine with small berries like an *arbor vita* grows above the deodars.

Major Tanner had all along been most anxious to avail himself of the rare opportunity which offered for exploring the interesting and almost unknown country of Káfiristán, and after a great many difficulties was able to make a start in that direction with the aid of the Chúgani Chief, Azím Khán, with whom he had an interview at Jelálábád through the instrumentality of Mir Ahmed Khán, of Shewa in Kunár, and Shaik Hussain Khán, also of Kunár. He describes Azím Khán as a handsome, pleasant looking man, of ruddy countenance, rather short, but as strong as Hercules. His followers also had soft pleasant faces. The chief presented him with honey, horns and cheese, and Major Tanner gave him presents of *lungis*, sweetmeats &c. in return ; after receiving these the chief held out his hand and protested a lifelong friendship, declaring that his country and towns were open to Major Tanner at all times. He promised to take him all over Kohistán and to the gates of Káfiristán.

Notwithstanding the very disturbed state of the country north of the Kábul river, and its being in a state of anarchy, in which every man's hand was against his neighbour, Major Tanner started from Jelálábád on the evening of the 15th May, disguised as a Kábuli, with six of Ahmed Khán's men and two of his own. After a little difficulty at the ferry over the Kábul river, they crossed the plain of Besud and entered the Paikoh Tangi Pass. They walked quickly through the beautiful plain of the Kunár Valley and reached Ahmed Khán's Fort at Shewa, where he was well received by the owner. Hardly had they entered the Fort, which is really a walled village containing not only Ahmed Khán's houses but those of his retainers and friends as well, than there was a great disturbance and firing of shots caused by the discovery of people coming down on the ripening crops, but they were beaten off. The next day passed quietly. Major Tanner had arranged with the Chúgani Chief Azím Khán to meet him at Shewa and the chief had been with Ahmed Khán some days, but deferred starting owing to the disturbed state of the country. On the next morning, at dawn, a large party of Ahmed Khán's enemies, hearing of Major Tanner's arrival and of that of their enemy Azím Khán, attempted to surprise the Fort, but Mir Ahmed Khán having been informed beforehand of their intentions had taken precautions and they were driven off with the loss of three men.

Major Tanner took advantage of the defeat of these hostile clans to make a start before they could collect again and, all arrangements being

complete, he set off in the evening with five Chúganís, three of his own men and Azím Khán. The greater part of the road led along the bank of the Kunár river, which they left at Islámpur, and then commenced the ascent of the sloping terraces near the hills.

When near Budiali, being apprehensive of meeting enemies of Azím Khán and Ahmed Khán, as they had been all along the route, they made straight up the face of the hill near that town. These hills are absolutely dead and barren, but at about 800 feet they found tufts of grass and at 1000 feet a scrubby bush. In the morning they went down to the bottom of the range they had been climbing all night and then ascended another ridge, the hills changing in appearance as they climbed; at first a bush or a tree, then a wild olive, and, after going up some 1,500 feet, some green grass and a bush that bore some pleasant-tasting edible berries. The crest of this ridge was nearly 1,800 feet from the base and after proceeding along it for about an hour they reached one of Azím Khán's hamlets and rested there. The hills around were steep and craggy and supported stunted oak, wild olive &c., and at the rude huts there were clusters of date trees.

Major Tanner remarks that these are the only date trees he has seen so high as 4,500 feet, except those which grow at some places on the highest crags of the Western Ghauts; but while on the Ghaut the fruit ripens about May, these trees showed no signs of buds even in that month.

Starting again, they followed the valley which rapidly ascended till they made the crest at 5,300 feet, and there they looked down on to Shúlút, about 1000 feet below them, and near the upper end of a narrow but highly cultivated valley. Shúlút was reached at sunset, and Azím Khán advised Major Tanner to pass himself off as a Khán from Kábul travelling to see the country, for the village was inhabited partly by his men and partly by another tribe. His Kábuli disguise had been hateful to him all along, but he was glad of it now because the people in a friendly sort of way came and sat down and moved about among the party at their pleasure. He was given food, a *chupatti* and a piece of cheese, but was too much fatigued to eat much. After a good sleep they went off early in the morning and ascended the pleasant valley of Shúlút. Oaks and olives clothed the sides of the hills and carefully-terraced fields were ranged along the sides of the streams. The notes of parrots, blackbirds and cuckoos were heard and little birds twittered in the branches. They crested the head of the valley at 7,300 feet and a noble view was before them. On one side Kúnd and its pine-clad spurs and white rounded snow crests, and on the other the Kunár valley, and beyond it the Bajour and Momund Hills. Below these were the terraces of Aret and just above them the chief town of that name, just clinging to the sides of a steep spur. Besides the chief town were smaller

ones in different parts of the valley. Every possible spot was terraced, and there did not seem room for another acre of cultivation in the neighbourhood.

They had a descent of over 2000 feet, and at 5,200 reached the beautiful mountain torrent that waters the cultivation. Crossing it by a wooden bridge, they passed under groves of walnuts and along the edge of delightful terraces of waving wheat. There was foaming and rushing water everywhere, and creepers and ferns grew in the crevices of the rocks, and on the flatter parts of the craggy spurs grew oaks and wild olive. Houses built partly of wood and partly of stone, with flat roofs and carved supporting posts and bearers, were situated here and there, sometimes in groups and sometimes singly on the most exposed positions. The chief Azím Khán conducted Major Tanner to a house some 200 feet above the stream and about half a mile from the chief town. Up the valley, looking past walnut groves, terraces and hamlets, he could just see the round snow peaks of Kúnd, rising out of the black pine forests that clothe the mountains from 7000 to about 11,000 feet. Below were groves, scattered houses and the roaring torrent fed by the snows of Kúnd. From all he could gather this collection of villages does not much differ from those of the Káfirs who build partly of wood and partly of stone.

Major Tanner says of the principal village that the houses are piled one above another, and every beam, doorway and shutter carved in a most elaborate manner. The designs are crude, it is true, but such a mass of carving he had never before seen anywhere.

In the principal town there are many hundred houses, and in the whole group he was told there were 1000, and this cannot be over the mark.

Major Tanner's arrival caused a disturbance on the part of the inhabitants which was only put down by the Chief's authority. He is all powerful and his word appears to be law.

In Aret, the largest Chúganí colony, there is no *baniya*, so that the people have to take their goods two days' journey before they can find a market.

Major Tanner found Chúganistán more extensive than he had been given to understand it was. What the number of the tribe may be Azím Khán could not say, but in the valley of Aret alone, there must be at least 5000 and they have many villages, or rather the heads of many valleys, the lower portions of which are inhabited chiefly by the Safis, the hereditary enemies of the Chúganís. The Safis are Afgháns and the Chúganís in Major Tanner's opinion are converted Káfirs. He liked the Chúganís; they are a quiet set, said to be faithful to their masters and true to their engagements. They are brave and well-disposed towards the English and,

Major Tanner thinks, would probably offer a good field for recruiting amongst a hardy race who have no sympathy with the Afgháns.

Major Tanner says that Azím Khán's wife and children moved about among them, and did their household duties without any shamefacedness. As they came up the valley, all the women greeted the Málík with a smile and conversed without restraint. The young women have very handsome features, and some are very pretty but much disfigured by dirt.

A few days after Major Tanner's arrival in Aret, he had a bad attack of fever, which he got over and, though weak, made all arrangements for a final advance, when he had a second and very severe attack to which he nearly succumbed and which compelled him, most unfortunately, to abandon his design and return to Jelálábád.

After an appeal to Azím Khán's 'friendship', he was allowed to leave and was carried off between two poles to Jinjapur, about two days' journey. By the kindness of the Jinjapur Málík he was safely conducted by the Málík's two sons and a large armed party, through a hostile country to the mouth of the Dar-i-nur, and eventually he reached Ahmed Khán's Fort at Shewa where he was safe, though the Fort was attacked immediately after his arrival by an armed party they had met on the road when going down the Dar-i-nur.

From Shewa he went down the Kunár river to Jelálábád on a raft.

The untoward failure of this expedition is much to be regretted as Major Tanner would undoubtedly have been able to throw much light upon this little known country had he been able to carry out his plans.

