

Djerchy Glacier Expedition

Terskey Ala-Too

Kyrgyzstan July 2018

Expedition Report

1. Main Text

Author: Cliff Powys
chapmanpowys@gmail.com
+61 2 9557 6794

An expedition to explore and climb 4000m peaks in the Djerchy Glacier basin.

Thanks

The expedition wishes to thank the following for their support:

The Mount Everest Foundation for a grant of GBP1200

The Austrian Alpine Club (UK) for a grant of GBP1000

Expedition Foods (UK) for a discount of 20% on their freeze dried meals

Mr George Cave for his patience in answering a variety of questions

ITMC for their efficient and flexible arrangements

Various doctors in the UK and Sydney for their advice on the medical kit

Contents

1. Main Text

Abstract	2
Introduction	3
Expedition Members	5
Expedition Log	6
Planning and Logistics	17
Previous Mountaineering Activities	17
Mapping	18
1:50,000 Soviet Map Extract	19
Russian Glacier and Pass Map	20
Expedition Style	21
In-Country Arrangements	21
Equipment	21
Food	22
Medical	23
Transport	24
Treasury and Grants	24
Rescue and Insurance	25
Communications	25
Importation	25
Environment	25
Terrain and Future Climbing Opportunities	26
Approach to the Djerchy Valley	26
The Djerchy Valley	26
The Djerchy Glacier and its Basin	27
The Northern Side Valley	28
The Southern Side Valleys	28
Conclusion	35
Bibliography	36

Abstract

English:

The expedition aim was to explore the Djerchy Glacier basin, with its side valleys, and to climb as many of its surrounding 4000m peaks as was consistent with safety. The aim was partially satisfied in that the area was explored and photographed. Due to a heatwave snow and glacier conditions were poor and only limited climbing was possible. It was intended to place a base camp at 3200m and an advanced camp at 4000m. The valley leading to the glacier proved to be more difficult than anticipated and camps were actually placed at 3000m and 3500m. Despite these difficulties, it is thought that the area holds excellent potential for first ascents if the snow and glacier conditions are good.

Kyrgyz:

экспедиция максаты Djerchy Торн түбүн изилдөө үчүн, каптал өрөөндөрү менен, коопсуздук менен шайкеш болгон анын айланасындагы 4000 м төмөнкү чокулуу көп чыгышат эле. максаты аянты чалгындалган жана сүрөткө түштү деп жарым-жартылай канааттандырды. Улам жетер кар жана мөңгү шарттары начар жана чектелүү гана чыгуу мүмкүн болду. Бул 3200m бир лагерине жана 4000 м төмөнкү учурда өнүккөн кошуун жайгаштыр багытталган. Суу алып баруучу өрөөн күтүлгөн жана кошуундар, чынында, 3000 жана 3500m жайгаштырылган караганда кыйла татаал болуп чыкты. Бул кыйынчылыктарга карабастан, бул аймак болсо, кар жана мөңгү шарттары жакшы биринчи Шаарга чыгуу үчүн жакшы мүмкүнчүлүккө ээ деп эсептелет.

Russian:

Цель экспедиции состояла в том, чтобы исследовать бассейн Джерси-ледника с его боковыми долинами и подняться на многие из его окружающих пиков высотой 4000 м, что соответствовало безопасности. Цель была частично удовлетворена тем, что площадь была изучена и сфотографирована. Из-за жары снег и ледники были плохими, и было возможно только ограниченное скалолазание. Предполагалось разместить базовый лагерь в 3200 м и передовой лагерь в 4000 м. Долина, ведущая к леднику, оказалась сложнее, чем предполагалось, и лагеря фактически были размещены на высоте 3000 м и 3500 м. Несмотря на эти трудности, считается, что область обладает отличным потенциалом для первых восхождений, если условия снега и ледника хороши.

Introduction

The expedition originated in discussions between Cliff Powys and two other Austrian Alpine Club (UK) (AACUK) members during a walk in the Austrian Alps in 2016. The original intention was to go to a valley in the eastern Terskey Ala-Too as a group of three and attempt some 4000m first ascents at around PD standard. The group grew to four with the addition of the daughter of two of the members. Unfortunately the chosen area turned out to be a hunting reserve for Russian visitors and had to be changed. At that point it was decided that a group of eight would be a safer number and the expedition was advertised on the AACUK website and in the newsletter, although the expedition was never an official Club trip.

After two of the original members dropped out, a meeting of the now eight members took place in North Wales on a weekend in November 2017. One of the eight was obliged to drop out but was quickly replaced. By that point it was established that the group had the potential to work well together and organising responsibilities had been distributed. A further meet of all final members except Cliff took place in the Lake District in June 2018.

There were a number of motivations for the expedition. In no particular order:

1. To explore an area that had seen no mountaineering expeditions.
2. To make some first ascents of 4000m peaks at around PD standard.
3. To pass on some expedition skills to the less experienced members with a view to them organising future expeditions.
4. To have fun and return safely.

The area of exploration was the Djerchy Valley of the Terskey Ala-Too about 20km south of the village of Temir-Kanat, which is 15km south of Lake Issyk-Kul. On the Russian military 1:50,000 map sheet k43-082-2 the base camp was at 578493. The coordinates for Google Earth are Lat 41°58'20.41" N Long 76°55'13.8" E. It is at approximately 3000m.



A general area map with the Djerchy River and Valley shown below Temir-Kanat

Expedition Members

David “Birdy” Bird: an experienced mountaineer who has climbed snow and ice in Scotland, Norway, and the European Alps. Age 55. Finance industry. Medical kit.

German “Hermann” Dector-Vega: has climbed trekking peaks in Nepal and Orizaba in Mexico. AAC alpine skills course in 2017. Age 42. Sustainable transport economist. Handyman and camp organiser.

Charley Hinds: an adventurous soul with a good trekking and outdoor background. AAC alpine skills course in 2017. Age 27. Translator. Grant applications.

Dante Makin: considerable UK rock climbing experience and two short seasons in the European Alps. Age 25. Architectural technician student. Food.

Dave Milner: an experienced school group leader in the European Alps who has also climbed in Peru and trekked in various parts of Europe and Asia. Age 67. Semi-retired economics teacher. Equipment.

Amelia “Cliff” Powys: has 55 years of alpine and higher mountaineering experience. Age 70. Retired but ex RAF and IT industry. Leader and dogsbody.

Isobel Stoddart: has good all round rock and ice climbing experience in Europe, the United States, and Peru, as well as a considerable ski mountaineering background. Age 49. Sustainable transport advisor. Helped with medical.

Luke Travis: considerable UK rock climbing experience and two short seasons in the European Alps. Age 28. Business studies student. Treasurer and helped with food.

Although the technical mountaineering experience of the members varied widely, they all had sound experience of living and looking after themselves in the outdoors. They were deliberately chosen to have a variety of ages and occupations to provide some range of outlooks and views. Dante and Luke were climbing partners and Charley and Hermann had done their alpine skills course together.

Despite the inevitable expedition disagreements, the group generally worked well together and most jobs were simply done rather than allocated.

During the organisation stage members had responsibilities as listed above. The process was that Cliff wrote a brief for each area and then the responsible member settled the details with assistance from Cliff as required. This was done to provide “learning by doing.”

Expedition Log

Sunday, 1 July 2018

Cliff arrived in Bishkek in the early morning and checked in at the Soluxe Hotel. In the afternoon he walked over to Osh Bazaar and found the main food and equipment areas.

Monday, 2 July 2018

Hermann arrived early in the morning. Cliff, Hermann, and Charley met at the hotel reception and drank tea until the others arrived around 1030. After a wet walk to a, closed, Osh Bazaar the group made its way to ITMC, our local agent. Despite some confusion on Cliff's part, the office was located and Lilia proved to be very helpful and efficient. The pick up from the hotel was arranged for 0900 on 6 July.

Dinner was at the Taksim restaurant, just down the road from the hotel, in a touristy yurt room.

Tuesday, 3 July 2018

The group met at 0800 for breakfast. Dante and Luke were detailed to buy the local food and Birdy and Dave to find the local equipment. Cliff and Isobel went with the food party and Charley and Hermann with the equipment party.

The food people found all that was required in Osh Bazaar except the chocolate bars, fruit drink powder, and drinking chocolate. The large amount of cheese was located in a dairy hall in one of the main buildings. Cliff eventually found the underground biscuit area where a wide variety of sweet things was available. The other items were run to earth in the Народный supermarket on Kiev Street in the afternoon.

The equipment people found most of what they wanted but substantial mattocks, for toilet and waste pit digging, were in short supply. However they managed to find a lighter tool that did the job. 10L water containers were a real problem and Birdy and Dave had to visit a smaller market to find them. Charley caused some amusement in the Bazaar by sharpening stakes for marker flags with an axe. Not an activity for "ladies" in Bishkek, perhaps! Birdy conducted a conversation with a local via translations on his phone in an impressive technological display. The gentleman was most helpful.

Reunited, the group had lunch in a canteen just outside the Bazaar. A lady from Birmingham heard the English and joined them for some time off from trying speak Kyrgyz. Dante had tried the local yoghurt balls and found them not to his taste. His face was a picture. Dave amazed most by liking them and buying a bag full.

Dinner was at Taksim again with a later visit to the Metro bar on Chui Avenue. The group were entertained by a local singing Amy Whitehouse songs to considerable effect. Some left quite late, encouraged by news of England's victory over Sweden in the World Cup, and were further engrossed by a street game involving balloons, darts, and soft toy prizes.

Wednesday, 4 July 2018

Breakfast at 0800 again. Birdy and Dave left in search of water containers and something to help burn toilet paper. They found the containers and settled for BBQ starter fluid, that worked well. Dante and Luke went to the Uzbek embassy to get visas for their post-expedition travels.

The others spent the morning in Cliff's room packing up food and equipment. This yielded nine sacks of Bishkek-bought goods. Hermann proved to be a particularly scientific packer. They then took the afternoon off after coffee and cake on Chui Avenue.



Hermann, Charley, and Isobel with serious cheese and sausage. ©Cliff Powys 2018

In the evening, dinner was at Navat Restaurant on Shopokov Street. This was a large Kyrgyzstan place with a very varied menu, including a good vegetarian selection.

Thursday, 5 July 2018

Most of the group did a day trip to the Ala Archa National Park for a walk up to the refuge there. It was a very scenic outing. The refuge is of corrugated iron and is self-catering with bunks, stove, and calor gas. The rest stayed in town for a rest.

Friday, 6 July 2018

Breakfast was at 0730 and ITMC arrived at 0850 to transfer the group by mini-bus to their compound. Although a Gaz-66 had been booked, ITMC provided a, larger, URAL truck for no extra charge. It was a formidable vehicle, as was its driver Genady. Even though he spoke no English, he proved to be an amicable and helpful soul. The group left ITMC at 0930 and stopped at the “Better Foods” roadside canteen for lunch at 1230.

On arrival in Bokonbaevo, some shopping was done for fresh bread, eggs, butter, and vegetables. Some of the group hired a private car as a taxi and had a swim in the Issyk-Kul lake. The Guljan guest-house booked by ITMC was comfortable and the food was good.



Guljan Guest-house in Bokonbaevo. ©Cliff Powys 2018

Saturday, 7 July 2018

After breakfast at 0730, the truck left at 0820. Initially Genady did a complete circle from/to Bokonbaevo but after some discussion with locals from Temir-Kanat the truck headed up a side road towards a tourist yurt camp, south of the main, dirt, road. Eventually a nomad yurt camp was reached at 1230 and 2900m. Genady decided he could go no further as he was concerned that the truck might roll on the next steep gradient.



The formidable URAL truck. ©Cliff Powys 2018

The nomads invited the group to tea with kumis (mare's milk), bread, and delicious cream. In return the group offered Snickers Bars and some postcards of the Lake District. After some negotiations the nomads agreed to carry the expedition's baggage to a good camp site at 3000m and about 5km away.

Arriving at the site at 1830, base camp was set up. Herman and Charley cooked an excellent meal of eggs, vegetables, and sausage. Dante had diarrhoea and did not partake. There was an evening thunderstorm that set the pattern for days to come.



View up the Dierchy Valley from base camp. ©Cliff Powys 2018

Sunday, 8 July 2018

After breakfast at 0700, some of the group went for a walk up the valley. The river was in spate and not crossable. The ground was rough but walk-able with loads. All the side streams could be crossed.

Dante did not have a good night but improved during the day. Birdy and Dave took on water duties, Hermann and Charley cooking and camp organisation, Isobel volunteered for washing up, and Luke excelled himself digging pits for the toilet and organic waste disposal. The only irritation was from the local cows, who were determined to investigate the tents. The weather forecasts were not good. The temperatures were high and much rain was predicted.

Monday, 9 July 2018

All the climbing gear and freeze dried food was carried to a depot at 3500m and about one hour from the glacier tongue. The glacier was reconnoitred and found to be in a state of melt but accessible without a river crossing, which looked tricky. There appeared to be few crevasses on the lower glacier. The group did some crevasse rescue and Kiwi Coil demonstrations at the depot to ensure that everyone understood the techniques to be used. All were back at base by 1515. The trip to the depot took about 2.15 hours. A particularly curious cow, christened "Medusa", tore a hole in the mess tent that was fixed by Dante and Luke with gaffer tape. Fine day but ominous forecast.



"Medusa" lurking about base camp. ©Cliff Powys 2018

Tuesday, 10 July 2018

Another fine day with some cloud. The group did another carry to the depot. Birdy, Charley, and Luke did a further glacier reconnaissance. The glacier appeared to be hard to gain on its True Right with a jump over a stream channel, "Charley's Leap". Alternatively it could be accessed via a moraine wall with a high risk of stone fall. Option one was recommended. The rest moved the depot to a staging camp site about forty minutes from the glacier tongue. Everyone was back at base by 1700, after a short but vigorous thunderstorm at 1630. Dante and Dave were given an equine lift by two young riders from the yurt camp. In return they received Pringles, chocolate, biscuits, and tea.

Wednesday, 11 July 2018

The group had a rest and organisation day. Birdy and Cliff sorted out the various medical kits. There was a heatwave in Bishkek with temperatures up to 40°. This was being reflected by high day and night temperatures, well above freezing, in the mountains. It was decided to make the staging camp the advanced base camp. The site is at 3500m and climbing will involve about a 1000m altitude gain and some 4km horizontally. Hermann and Charley cooked chapatis, sausage, and tofu for lunch. There was heavy rain and hail from 1350 to 1620. All will move to advanced camp tomorrow.

Thursday, 12 July 2018

The weather forecast for the next four days was for heavy rain, around 30mm a day, each day. After a long discussion the group decided to wait out the bad weather in the comfort of base camp. Everyone except Cliff and Dante went up to the glacier to try “Charley’s Leap”. It turned out to be unnecessary as the flow in the channel had decreased, leaving an easy step across. Radio calls were scheduled every two hours and the radios worked well. A herder came for tea and biscuits. He was intrigued by the mess tent cooking equipment and the hand sanitiser gel, which he tried. “Medusa” was again active and got Cliff’s towel and Hermann’s shorts, although both were rescued.

Friday, 13 July 2018

Weather better with some rain at 1200. Unfortunately Charley was unwell with symptoms of weakness, cold, nausea, and stomach cramps but no vomiting or diarrhoea. She was left in her sleeping bag for two hours and then given some warm saline, which promoted some vomiting, after which she felt slightly better. She was put in the sun on a mattress and under two sleeping bags and she fell asleep. It was thought that some field onions, picked and eaten on 12 July, might be to blame. Cliff decided that if Charley was not better in the morning she would have to go back to Bishkek for treatment. Hermann volunteered to go with her if necessary. Luke was to supply Hermann with KGS10,000 for expenses. Dave, Hermann, and Isobel explored one of the side valleys and were back by 1600. Birdy and Dante cooked chapatis for dinner. Charley was not taking solids and was vomiting liquids but Isobel was giving her ORS tablets with water.



Dante willing a chapati to cook with Luke setting the table. ©Cliff Powys 2018

Saturday, 14 July 2018

Charley was much better and able to have breakfast. The afternoon was wet. Birdy, Dave, Hermann, and Isobel walked up to another side valley and took photos. The side glacier has retreated significantly compared to the old Soviet maps. Sausage and cheese for lunch and red wine stew for dinner. Forecast for next four days was 24mm, 18mm, 24mm, and 18mm respectively. As time was now pressing it was decided to move to the advanced camp to take advantage of any break in the weather. The seams on the toilet tent were failing but Hermann fixed them with gaffer tape.

Sunday, 15 July 2018

The group walked up to advance camp with the final loads. Cliff strained a lower back muscle and half his load was carried up by the others. Gear was distributed and packed for next day. Dinner was the first of the freeze dried meals. Macaroni and Cheese and Spaghetti Carbonara were both considered to be good. The camp site was rocky but adequate with water from a side stream towards the glacier.

Monday, 16 July 2018

The group left at 0700 and arrived at the glacier foot at 0800 to gear up. Two ropes were formed. Birdy, Dave, Hermann, and Isobel on one and Cliff, Charley, Dante, and Luke on the other.

Birdy's rope explored the ice fall with a view to finding a safe way through and going on to climb Peaks 4425.7 and 4506.1 at the head of the glacier. They tried to get through on the True Right, centre, and True Left in succession. The glacier was in a melt state with running streams and some fresh snow. All the snow bridges found were in a poor state and were considered too insecure to cross. Conditions in the ice fall were simply not safe. The freezing level had been above 4250m for days and the conditions reflected that.

Isobel, Dave, and German spent the late afternoon and early evening exploring side valley 3. (See **Terrain** below for valley numbers.) They ascended the large lateral moraine and walked along its top for approximately a kilometre, reaching a height of c. 3990m. At this point the moraine merged into the loose rocky side of the valley. They gained views into the two glaciated basins with mountains above and a dramatic glacier icefall across the valley.

Cliff's party took the side glacier approach to Peak 4429. Most of the glacier had gone compared to the old Soviet map. Perhaps half of it still existed, high up beneath the peak. Consequently the approach was over mixed rocky ground with snow patches and boulder fields. Eventually a nice snow ridge and slope was followed onto the glacier. After a rest at the foot of the final slope, Cliff led up 100m of 40 to 45° poor to moderate quality snow with some ice to the ridge top about 20m vertically below the summit. At that point Cliff decided that the final rock tower was unprotectable and too loose to continue. The diagonal descent to the glacier was over very loose scree and poor snow. The ridge leading to the col that a Russian party had crossed in 2012 was too loose to follow and heavily corniced on its southern side. After some rain the party returned to the advanced camp to end a twelve hour day.



Cliff leading the final slope to the ridge of Peak 4429. ©Dante Makin 2018

Tuesday, 17 July 2018

The group decided that conditions were too poor to climb safely and that it was necessary to return to base camp with a view to doing some more walks.

Birdy, Charley, Dante, Isobel, and Luke did two carries to get all of the gear and equipment back down to base camp. It started to rain at 1600 and did not stop until it had dumped about 34mm.

After some further discussion the group decided that there was no point in staying in the valley as the weather forecast continued to be poor. Cliff sent an email to ITMC requesting a truck pick up from the yurt camp on 19 July. The remaining whiskey was drunk that night.

Wednesday, 18 July 2018

This was a day of making arrangements and drying out. Cliff rang Lilia at ITMC at 0920. It was not possible to be picked up on 19 July and Lilia needed time to talk to their drivers. At 1500 Cliff rang Lilia again and was told that 20 July was OK and the pick up would be from the yurt camp. Some of the group went for a walk down the valley to check the best route out and the site for a possible gear dump. In the evening the group had a lengthy discussion on how to get the gear and food to the yurt camp. Two options were arrived at. The preferred one was to hire horses from the nomads again to do the whole carry on 19 July and spend the night at the yurt camp. The nomads had indicated that they might be able to do that but the matter was still unclear. The alternative was to take all the surplus stuff to a nearer herders' camp and give it away. The group would then carry as much as possible of the remainder to the yurt camp on the nineteenth, making a depot there before spending that night at base camp. The final carry would be done on the twentieth. All depended on the horses.

Thursday, 19 July 2018

After breakfast at 0700 Birdy, Isobel, and Luke walked to the yurt camp, with a radio and the climbing gear, to ask if the horses would be available or not. Meanwhile the others packed up the base camp as far as was possible with a view to taking the surplus to the nearer camp if necessary.

Isobel called to say that the horses would be coming at 1200 and the three returned to base camp. There was no sign of the horses at 1400 and so Isobel and Hermann went back to the yurt camp to check. Isobel called again to say that the horses were on the way and they duly arrived at 1500. The group eventually camped in a pleasant green dell below the yurt camp.

During their first visit, Isobel and the others had been entertained to a meal of various, unidentified, sheep parts by the yurt nomads. Kumis was also offered. Not a meal for vegetarians! The ladies at the yurt were much pleased by the gift of pots and pans.

Friday, 20 July 2018

Ironically the day was fine. A lot of gear and food sorting was done and some of the group went swimming. Some champion cheese eating was done but much still remained. Hermann and Isobel walked down to the main road at 1300 to guide the truck in. At 1600 the URAL arrived at the camp site. It was loaded quickly as the driver was concerned about an imminent downpour making the grass too slippery. After a bumpy but otherwise uneventful journey down the hill, the truck turned onto the main, dirt, road to take the long way round to Bokonbaevo. This caused some consternation but Hermann, who was in the cab with the driver, commented later that he thought that the driver had said that the short way was blocked by bridge repairs. After some delays caused by tarmac layers in Temir-Kanat and uncertainties about the guest-house, a weary group had showers and an excellent dinner in Bokonbaevo. Cliff used Birdy's phone to change the bookings at the Soluxe Hotel in Bishkek and some made separate arrangements. Most of the group went out for a drink later.

Saturday, 21 July 2018

The group travelled non-stop back to Bishkek. ITMC took charge of the bags of rubbish that the group had brought from base camp. All except Dante and Luke, who had booked a hostel, checked into the Soluxe. That evening the group had an excellent farewell dinner at a Georgian restaurant followed by, for some, a long night out and the expedition officially ended.

Planning and Logistics

Further details of the more complex areas can be found in the appendices.

Previous Mountaineering Activities

Cliff searched for expedition reports online in various databases, including the BMC/MEF, American Alpine Club, and RGS sites. He also did extensive Google searches using local place names. This activity yielded twenty-five reports on mountaineering expeditions to Kyrgyzstan. Cliff then sought the assistance of a former Russian climbing partner to search the files of Russian walking and climbing clubs, mainly based in Moscow. That search uncovered activities in the group's area in the 1980s and 2012.

From the West there have been three expeditions to the western end of the group's section of the Terskey Ala-Too; a British expedition in 2013, a Swiss expedition in 2014, and a Czech expedition in 2015. However none of these expeditions visited the eastern end or the Djerchy Valley. Photographs from the British and Swiss groups were on Panoramio but are now unavailable due to the site's shut-down. The Czech report is at: <http://publications.americanalpineclub.org/articles/13201213706/Kongurlong-Valley-Climbs> The British expedition climbed two peaks on the north central edge of the mountain group, including Mount Attie (4676.8 or 4635m) at the head of the Djerchy Glacier, but from a northern approach.

The Russian reports were more helpful. The Tsvetkov expedition of 1980 and a follow up expedition in 1982 were primarily concerned with glacier mapping and pass crossing and do not seem to have climbed anything around the Djerchy Glacier. However they did take many photographs. The 2012 Ermilov expedition was carried out by a group of friends who were mainly interested in glacier walking and pass crossings in Russian style. They climbed some mountains but not in the Djerchy area. They also took many photographs. As they crossed onto the Djerchy Glacier via a north/south pass, spent a night on the Glacier below the ice fall, and then exited to the south, their photographs were of particular assistance. Some of them can be found in the photographic section of this report.

Cliff's conclusion from his research was that the Djerchy peaks, with the exception of Mount Attie, were almost certainly unclimbed and that any ascents would, at the very least, be the first recorded.

Mapping

The basic topographical map resource for the expedition was the old Soviet map series at 1:100,000 and 1:50,000. They may currently (4 August 2018) be found at: <https://maps.vlasenko.net/soviet-military-topographic-map/>

The sheets used were k43-070 and k43-082 at 1:100,000 and k43-082-2 at 1:50,000.

They were supplemented by a trekking map at 1:100,000 published by Leave No Trace Centre for Outdoor Ethics. The map is available in Bishkek for around KGS200. It was useful for the approach. A general map of Kyrgyzstan at 1:750,000 published by Gizi Map of Hungary was also used.

In order to reference Russian glacier and pass numbers, specialised maps with the numbers were downloaded from:

<https://nakarte.tk/#m=13/41.94985/76.85606&l=O/Wp/-cseyJuYW1lIjoiTW91bnRhaW5zIGJ5IEFsZWtzZXkgVHN2ZXRrb3YiLCJ1cmwiOiJodHRwOi8vbWFWLmctdXRrYS5ydS97en0ve3h9L3t5fS5wbmciLCJ0bXMiOmZhbnHNILCJzY2FsZURlcGVuZGVudCI6ZmFsc2UsIm1heFpvb20iOilxNSIsImIzT3ZlcmxheSI6dHJ1ZSwiaXNUb3AiOnRydWV9>

The passes are given Russian climbing grades on these maps.

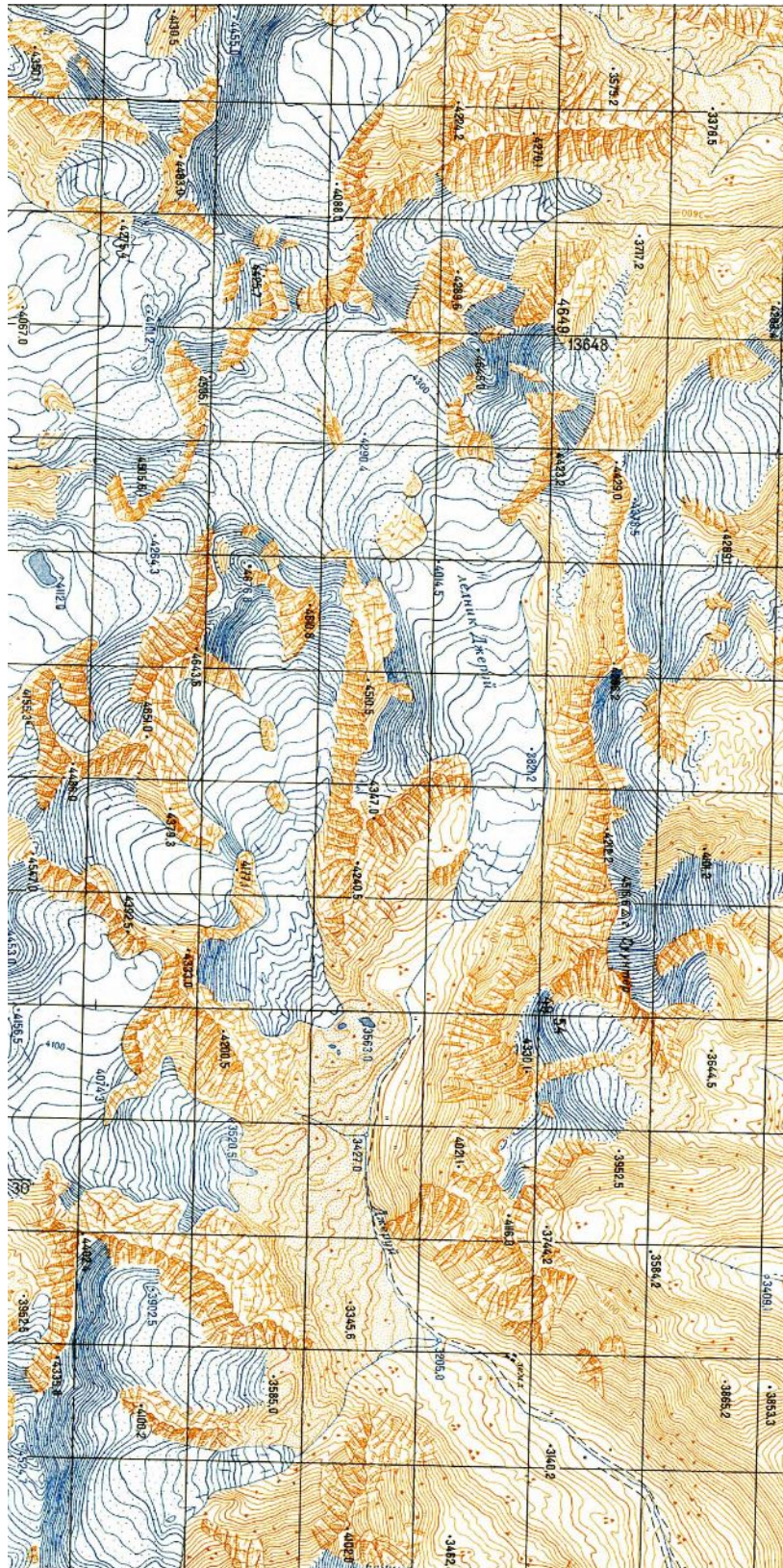
A list of passes in the area was also useful and is at http://wiki.tlib.ru/Перечень_перевалов._Западная_часть_Терской-Алатау

The Djerchy Glacier is Glacier No.37 on the Russian maps.

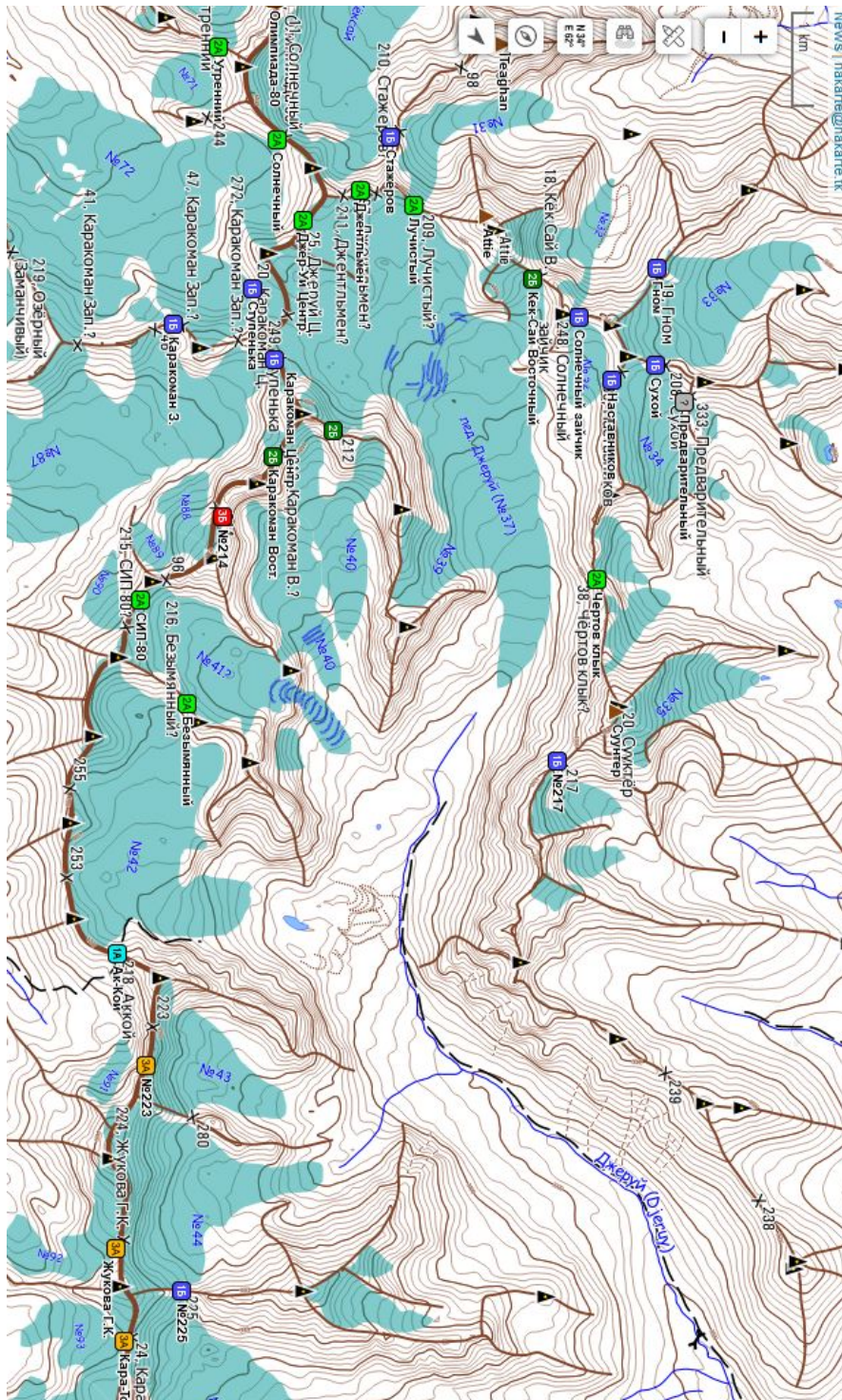
Another useful resource for maps and general information on the area was Vladimir Komissarov's "Mountaineering Regions of Kyrgyzstan" published online as a PDF in 2017.

An attempt was made to purchase satellite photographs of the area but the cost proved to be prohibitive.

Google Earth was used to measure distances and slope angles. The detail on the Djerchy Glacier section was not as good as that lower down the valley but some useful information was obtained. The pictorial representation of the area is generally accurate, with the usual Google Earth tendency to round features off. No major discrepancies were found.



1:50,000 Map of Djerchy Valley with 1km Grid Squares



Russian Glacier and Pass Map with Numbers

Expedition Style

From the beginning an expedition aim was to pass on knowledge of expedition planning and execution to a younger generation of the AACUK. With that in mind a comfortable and democratic style was adopted. There was to be a base camp with a mess tent and toilet tent as well as one or more advanced camps from which the climbing would be done. Putting the advanced camp(s) as high as possible, around 4000m, provided more time for climbing difficulties and made evacuations easier if anything went wrong during a climb. The leadership style was to be democratic, with group discussions on all major decisions as a learning tool. Although the camps were both lower than intended, the principles held.

In-Country Arrangements

After reading the reports Cliff decided to use the ITMC agency in Bishkek for the group's ground arrangements. ITMC had been praised for their reliability by various teams and are also the handling agents for the International School of Mountaineering annual expeditions.

This proved to be a wise choice as ITMC demonstrated both reliability and flexibility through a number of changes of direction and detail during the planning period and the expedition itself. Both drivers proved to be helpful and resourceful. ITMC provided airport/hotel transfers, truck transport to/from the climbing area, accommodation in Bokonbaevo at guest-houses, gas cannisters, and the rental of snow stakes. The expedition was not in a border area and so no permits were required. However ITMC could have obtained them if necessary. No visas were required for Australian and UK citizens.

ITMC are highly commended to future expeditions.

The hotel in Bishkek, the Soluxe Hotel on Kalyk Akieva Street, was also a good choice. The staff were most helpful, the rooms clean and comfortable, and the included breakfast plentiful. The hotel was a ten minute walk from the Osh Bazaar and a twenty minute walk from the city centre.

Equipment

Primary responsibility for equipment planning and procurement was taken by Dave Milner. Cliff provided an initial equipment spreadsheet, which Dave refined as required via a spreadsheet on Google Documents. Dave purchased all the group gear. It was established early on what gear would be brought from the UK/Australia and what would be bought in Bishkek.

In line with the expedition style, Dave sourced a mess tent for eight people and a toilet tent. The Quecha Arpenaz mess tent did well and withstood some strong winds, rain, and hail. The Kampa Loo Loo toilet tent had to be repaired several times and did not survive the expedition. It turned out that only Cliff had a suitable two person tent and so Dave and Cliff chose the Alpkit Viso 2 as a sleeping tent and Dave purchased one for the group. Birdy and Dante also bought Viso 2s. They proved to be excellent expedition tents. Hermann brought his, one person, Marmot Grid tent. It was intended as a medical isolation and storage tent but Hermann actually used it satisfactorily as his sleeping tent throughout.

Climbing equipment was chosen with snow and ice primarily in mind as the rock quality was anticipated to be poor. However two sets of stoppers were taken just in case. Snow stakes were rented from ITMC due to baggage weight problems. Other than for glacier travel, little of the climbing gear was actually used. Due to the wet snow conditions, two deadmen might have proved useful if snow belays had been necessary.

The Lake District meet in June 2018 was used to distribute UK-sourced equipment and food to meet airline conditions. In the event no excess baggage charges were incurred as Turkish Airlines proved to be quite accommodating.

Detailed equipment listings can be found in the appendices section.

Food

Dante Makin took primary responsibility for food planning and was assisted in the purchasing by Luke Travis. Cliff provided an initial, somewhat frugal, spreadsheet which Dante turned into a more generous diet. Two of the group were vegetarians.

The basic food plan was to have two menus; base camp and advanced camp. They would have common breakfasts and day snacks but different dinners. The aim was to minimise the amount of end of day cooking required at both camps, but particularly at advanced camps, whilst providing for some variety and luxuries.

Dante was able to achieve this by sending out a food questionnaire. Members indicated their preferences in the various areas, e.g. chocolate bars, and these were duly observed. The result was a menu that satisfied all tastes whilst providing good nutrition. Multi-vitamin tablets were taken to address any shortcomings. No attempt was made to provide a set number of calories per person/day. In practice each person would have had around 4000 kcals available per day but some ate more and some ate less. Although porridge became less attractive for some as the trip went on, there were no complaints about the food – a sure sign of success!

The base camp dinners were supplied by Cliff. He cooked and home dried four types of meal; red wine stew, khorma curry, spaghetti sauce, and chilli con carne. There were vegetarian varieties of each meal using Textured Vegetable Protein rather than minced beef. The meals could be rehydrated and cooked in about an hour using minimal fuel and effort. They were eaten with pasta and were successful.

The advance camp dinners were freeze dried meals from Expedition Foods. The version used was the 1000 kcal meal. Members were able to choose the varieties they wanted. All the meals used proved to be acceptable and most were judged to be excellent. The large size allowed some members to eat what they could for dinner and have the remainder cold for breakfast. Expedition Foods provided a generous 20% discount, for which the expedition is most grateful.

The most popular luxury item was probably Pringles. Birdy had invested carefully in the whiskey supply; which was much appreciated by those who partook. The Soreen lasted and lasted well beyond its “Use By” date. Hermann and others used the fresh food to good effect.

It is probable that too much cheese was taken, and possibly too much food generally. Certainly there were some notable instances of heroic cheese consumption. All the cheese and sausage bought in Bishkek was at least acceptable. No doubt more food would have been eaten if the group had been able to climb more. At least no one went hungry.

Detailed food listings can be found in the appendices section.

Medical

David “Birdy” Bird took primary responsibility for the medical supplies. Cliff compiled an initial spreadsheet of medical supplies that he culled from a list in Drs Jim Duff and Peter Gormly’s “First Aid and Wilderness Medicine”; two copies of which were taken on the expedition. He also wrote a medical brief. Birdy then submitted the list to a medical friend of his and, with some input from Isobel’s medical contacts, produced the final listing. Birdy bought most of the kit in the UK, with the help of some donated antibiotics and some items from his personal supplies. Isobel and Cliff also contributed various antibiotics.

Birdy also sent out a medical questionnaire to all members requesting information on any pre-existing medical issues, previous cold injury or altitude problems, allergies or intolerances, or required medications. There was only one pre-existing issue and that member provided a medical certificate to demonstrate that it was not a reason for not participating. The member also carried specialised medications. One allergy was found but it did not cause any problems.

Four of the party had first aid certificates but no member had any more advanced medical qualifications. Consequently the medical aim was not to cure problems but rather to stabilise a casualty for 72 hours to either enable medical aid to reach the group or to give the time for evacuation. Some medical items, such as a suture kit, were not taken due to the absence of people with the necessary skills.

Birdy’s detailed comments and medical incidents report, along with a full medical kit listing, can be found in the appendices section.

The principal health problem encountered was not a question of incidents but of water supply. The Djerchy River proved to be far more silty than had been anticipated. A Katadyn water filter was taken to cope with that problem but the, brand new, filter found the silt to be too much and filtering time was very slow. Birdy and Dave had taken on water supply responsibility and cleaned the filter repeatedly but to little avail. Eventually they found a sluggish side stream that, although it was contaminated with animal droppings, did at least filter in a reasonable time. Most of the water that the group consumed was in fact also boiled. All this largely solved the problem and there were no instances of health problems due to bad water.

Antiseptic hand gel was taken and bottles were placed in the mess and toilet tents. All members took advantage of this. Gel was also used on the table cloth supplied by ITMC. Washing up was mainly done in the Djerchy River using scrubbers and river silt/pebbles. None of this caused any problems.

Multiple toilet pits were dug, mainly by Dante and Luke, and the turf replaced when they were full. All toilet paper was burned. Pits were also dug for other organic waste.

Unfortunately the cows tended to dig these up to eat the contents. However no problems eventuated. At the advance camp a toilet pit was constructed and was satisfactory for the short stay. The poo bags that had been taken were not necessary and were not used.

Transport

The URAL truck from ITMC proved to be highly suitable for rough and off road travel. The rear compartment was reasonably comfortable and provided ample space for eight people and all the expedition equipment and food. Cliff had actually booked the smaller Gaz-66 truck, for a lower price than the URAL, but ITMC substituted the URAL for no extra charge. In retrospect, the Gaz-66 may have been too small for best comfort, although it would probably have been adequate.

The expedition hired transport from the nomads at the yurt camp to carry equipment and food to and from the base camp. That was a distance of about 5km. The amount offered and accepted was KGS10,000 (about GBP114) in each direction. The locals provided both horses and donkeys for the outbound carry but only four horses for the inbound carry. The consequence was that members found themselves having to carry the three tables. The price charged seems fair and the locals did a good job after some delays. However it is suggested that future groups make clear the number of animals required from the start. Unfortunately the nomads only spoke Kyrgyz, which was not spoken by any of the members, and this made communication rather nebulous, if friendly.

Treasury and Grants

Luke Travis took on the Treasury job and Charley Hinds looked after the grant applications. Both were supported by guidelines written by Cliff.

Luke initially tried to open a UK business bank account for the expedition. This proved to be extremely difficult due to various regulations aimed at such behaviour as money laundering. Eventually he opened a simple personal account that proved to be satisfactory. Members paid money into the account and sums were disbursed as required on Cliff's authority. Luke submitted screen shots of the account transactions to Cliff each month. At the beginning of the expedition, Luke converted most of the funds into USD as there was some doubt about being able to change GBP at a good rate in Bishkek. In the event that proved not to be a problem. At the end of the expedition it proved to be impossible to convert the KGS and USD to GBP on a weekend as the banks were not open and the money changers did not have enough GBP. This problem could have been avoided if it had been possible to do the exchange on a weekday. The remaining funds were taken back to the UK as USD and exchanged to GBP there.

A full statement of the expedition accounts can be found in an appendix.

The expedition members had a wide range of ages and Cliff is an Australian citizen. These facts caused Charley some difficulty in her search for grants, as most grants are based on age bands and/or UK nationality. However she was able to obtain GBP1200 from the Mount Everest Foundation, with the aid of German at the required interview, and GBP1000 from the Austrian Alpine Club (UK). This was an excellent result and reduced the cost of the expedition for members considerably.

Rescue and Insurance

Although the Kyrgyz government run a rescue service, the more efficient option is that run privately by ITMC. See: <http://www.rescue.centralasia.kg/>

Registration with the service requires various details, covered on the website, and must be completed at least two weeks prior to departure. All services must be paid for and ITMC insists on full insurance details, or another payment guarantee, being provided.

All members of the expedition had current membership of the Austrian Alpine Club and were covered by the Club's insurance. Some of the members had additional rescue insurance through other organisations to which they belonged. Some members also purchased general travel insurance to cover in town accidents and so on. All of these details were supplied to ITMC.

Communications

Two kinds of communication were provided, to the outside and within the expedition.

External communications were by a Thuraya XT-Lite handset that was provided by Cliff. There was no problem getting a strong connection in the Djerchy Valley or in Bishkek. Weather forecasts for Vladimir Putin Peak, the nearest reporting point to the Valley, were sent to the handset every day by Cliff's partner. SMS messages were also used, although delays in receipt could be up to twenty-four hours.

Internal communications were by a pair of GME TX675 two watt UHF sets provided by Cliff. They proved satisfactory for communications between the two ropes and during the withdrawal. Radio schedules were decided each day and were generally at two hour intervals.

Importation

Cliff assembled a list of all the group equipment, food, and medical supplies that would be taken into Kyrgyzstan. David Bird then contacted the Kyrgyz Embassy in London to check if any of the items would cause a problem with their customs service.

They responded that they could see no problems. David commented that they seemed to be used to mountaineering expeditions bringing kit into Kyrgyzstan. In the event there were no issues on arrival.

Environment

An environmental policy was written by Cliff, the import of which was "Take nothing but photographs, leave nothing but footprints". This was largely achieved. All human waste and organic food waste was well buried and the turf replaced. All inorganic waste was carried out and disposed of in Bishkek. Any electronic waste was returned to the UK for disposal. The base camp tent sites caused some yellowing of the grass but that should soon disappear. The ABC site was too rocky for any significant effects.

Terrain and Future Climbing Opportunities

The map references given are for the Soviet 1:50,000 sheet k43-082-2.

Approach to the Djerchy Valley

The expedition took the road south from Bokonbaevo in the direction of Temir-Kanat. Just to the east of Temir-Kanat is a rough vehicle track leading to a tourist yurt camp that can be seen at about 2400m to the south from the main, dirt, road. Follow this track over several minor streams and bear to the east of the tourist camp as the track rises. After a number of steep slopes and a minor valley, the nomad yurt camp and its corrals will be reached. This is where the expedition transferred to horses.

It is possible that a vehicle with a low centre of gravity could get further into the Valley along the continuation track. However it would be necessary to descend a steep section to gain the Valley floor. If this were achieved, then it should be possible to reach the buildings at 593507.

The descent follows the same route in reverse.

The Djerchy Valley

The Valley is a typical glaciated valley running ESE for about 3km and then NE for 8km. A braided river runs through its lower part with a pedestrian bridge, not marked on the map, at 593507. The northerly, True Left, slopes of the Valley are mainly steep scree and loose-looking rock walls leading to the ridge above with a considerable boulder slope at the Valley bend. The Djerchy River, at the time of the expedition, was in spate and would have been difficult to cross above the bridge with loaded packs. It was extremely silted to the point of being an almost unusable water source and side streams were used.

The southerly, True Right, slopes were more amenable to foot and horse traffic and comprised a series of well grassed old moraine terraces cut by side streams and lateral boulder fields. Two of the side streams presented difficulties but were passable. The boulder fields and some steep gullies were very difficult to cross and were avoided by moving higher up the terraces and by following a series of miniature valleys. Nearer to the base camp at 578493, the River bank offered the easiest passage with some usable horse pads. In the upper Valley, easy but rocky flats led to the ABC at 533480. It took about 2.15 hours to walk from BC to ABC with loads. It was about 6km with a 500m rise.

The side valleys that open to the South of the Valley are described below.

See photographs 1 to 5 in Part Three of this Report.

The Djerchy Glacier and its Basin

The approach to the Glacier from ABC went West and then North through an area of mounds of scree and loose earth cut by small streams. It took about 40 minutes. The Glacier tongue was easy angled on its True Right side and gaining the Glacier above was straightforward.

The lower section of the Glacier sloped at an initial 30° angle but soon levelled out. The surface was covered with small rocks and rock grit; presenting a dark surface. There were many surface streams, some of them quite large. There were few crevasses but they were poorly bridged and rotten snow also concealed some of the streams.

See photographs 6 to 8 in Part Three of this Report.

The ice fall stretched across the whole of the Glacier at about 495479. It was split into three possible pathways by two sets of tiered seracs. The True Right avenue appeared to be threatened by rock fall from the slopes. The centre possibility was the one taken by the Russians in 2012 but in 2018 showed some serac danger on its True Left. The True Left route was probably the most feasible. However the melting state of the Glacier in 2018 meant that all of the snow bridges encountered were rotten and considered to be unsafe. In better snow conditions the True Left passage will probably be the best option, although it will mean a traverse right across the head of the Glacier to reach Peak 4676.8.

See photographs 11 to 14 in Part Three of this Report.

Mt Attie (Peak 4646) is a fine looking mountain from its Eastern side. The North ridge looks like a good prospect on mixed snow and rock.

See photographs 15 and 16 in Part Three of this Report.

The mountains at the top of the Djerchy Glacier all look attainable on PD to AD snow slopes. However the icefall would have to be passed in good conditions.

See photographs 11 to 14 in Part Three of this Report.

The True Right wall of the Glacier holds a number of possible ascents. The wall from Peak 4676.8 in the West to Point 4347 in the East is made up of steep snow, ice, and rock. However it seems subject to considerable rock fall and freezing conditions would probably be required. It would probably be better to approach the East part of the ridge by climbing the snow slope between Point 4347 and Peak 4510.5.

See photographs 8, 10, 14, and 17 in Part Three of this Report.

The Northern Side Valley

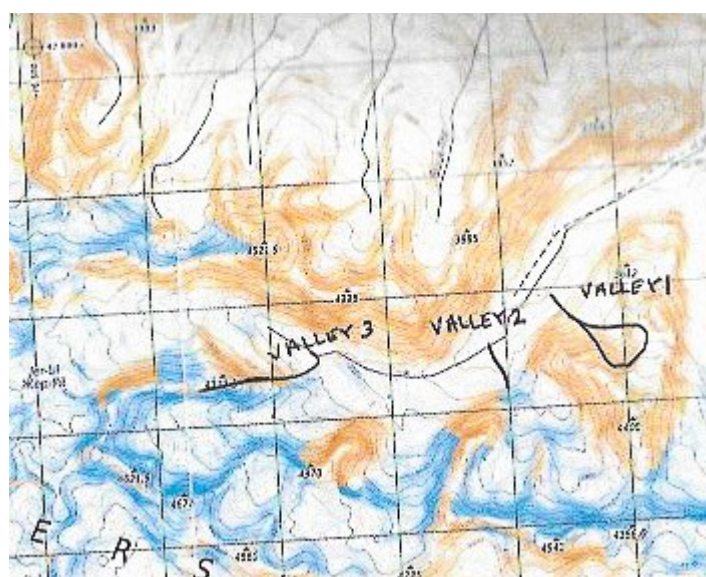
The mountains to the north of the Djerchy Valley are probably better climbed from their Northern sides. The Southern slopes look very loose, although they would probably not require the use of the rope.

Peak 4429 is located at the head of a small Northern side valley lying parallel to the main Djerchy Glacier. It was previously occupied by Glacier 36 but that glacier has now retreated to about half way up the valley. The route taken climbed up the True Left moraine wall of the Djerchy Glacier to gain the lip of the side valley. The valley was then followed over a series of snow and rock bands and ridges to reach the remnants of Glacier 36 on the True Left. The poor snow and loose scree slope to the left of the summit was then followed to a point on the ridge about 20m below the top. The rock was very loose and a lack of protection terminated the ascent at that point. The Western side of the ridge was very steep with considerable serac danger. The ridge itself was very loose with some cornicing. The descent was over more poor snow and loose scree to gain the Djerchy Glacier just below the True Left of its icefall. The area is not recommended, although Point 4423.2 should be attainable over snow slopes in good conditions.

See photographs 17 to 20 in Part Three of this Report.

The Southern Side Valleys by Dave Milner

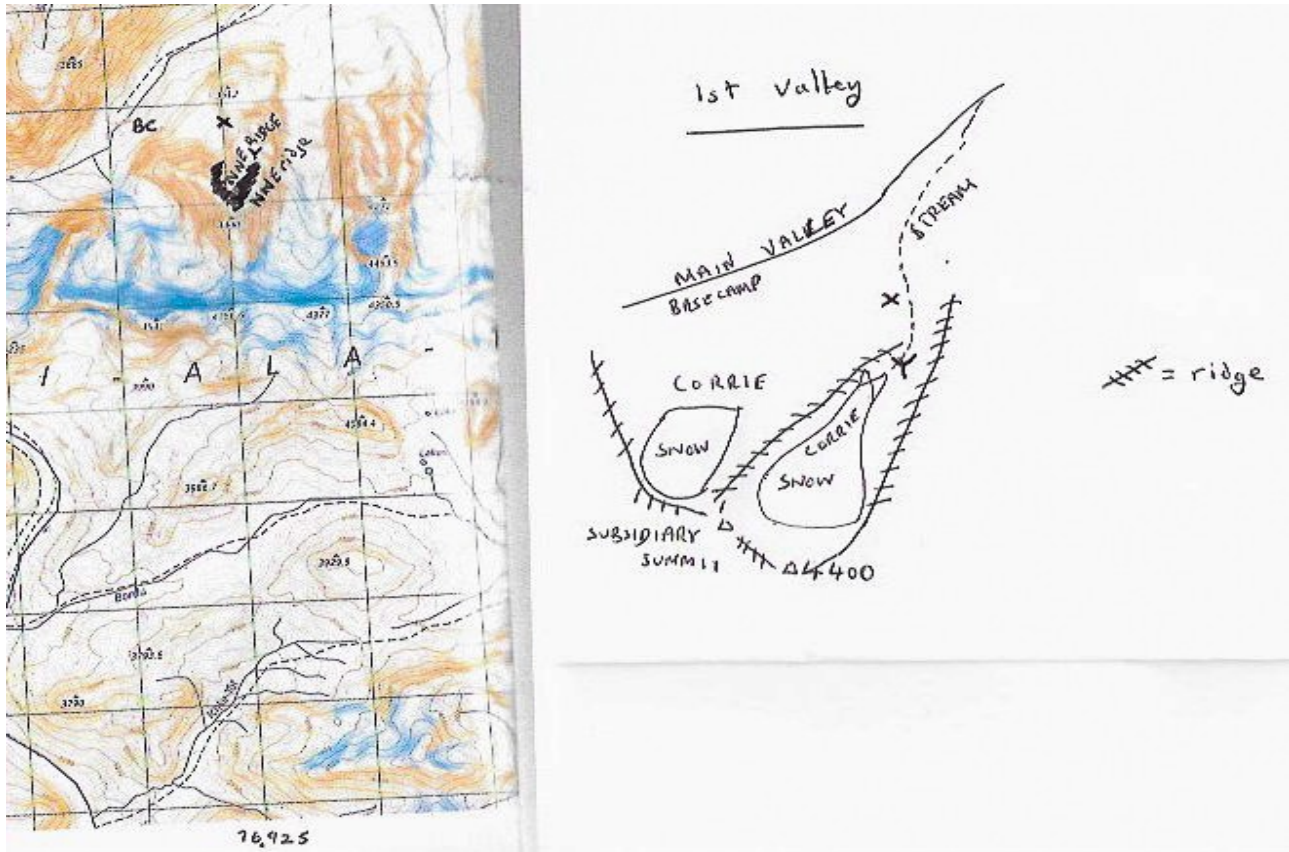
Members of the expedition visited three side valleys. These are described in order ascending the main valley from base camp. References are taken from the trekking map "South Shore - including routes from Kochkor, scale 1:100,000". No date is shown on the map but much of the glacier information, and the fact it was on sale in Bishkek in July 2018, indicates that it is recent, certainly more so than the Russian military maps. [Cliff: It is believed to date from 1999. Certainly it is much later than the Soviet maps.] All distances, times and locations are approximate.



South Side Valleys Map

1. Valley to SE above base camp leading to peak 4400m

Base camp approx. 76.910/41.960. Highest point reached approx. 76.930/41.945 at the foot of the snowfield indicated on the map at c. 3800ms. (Point Y). The retreat of the glacier/snowfield in recent years has left a great deal of moraine material above point X. this is steep, rocky, loose rock and scree.



Valley 1 Map

Access to this point is can be obtained by one of two routes.

Either follow the obvious stream that flows from the snowfield from further down the valley (not shown on any maps) or ascend steep slopes directly from the base camp site to the place where the stream leaves the moraine amidst a boulder field. (Point X). One hour walking.

Ascend steep slopes northward to gain the ridge. Traverse rising to the right to below the cliffs of the ridge to gain a view into the two corries. Contour right across a boulder field below the cliffs until the foot of the snowfield is reached. A stream flows from the snowfield and there are places to put tents in the moraine boulder field. To the right is a small climb up the moraine to the NNE ridge between the corries that leads to the subsidiary summit. One hour walking from Point X. This is the recommended approach.

Or alternatively, from Point X move to the right (true left) of the stream and ascend through grass and rocks into the lower corrie. 1 hours walking. Water and camp sites abound here. From here ascend scree/loose rock on the moraine to the left and continue upwards towards the ridge between the two corries until the snowfield can be seen to the left. One hour hard walking minimum.

See photographs 23 to 26 in Part Three of this Report.

Possible routes to the top of the peak 4400ms at 76.925/41.937

The NNE ridge This is rock until the snowfield/glacier near the summit is reached. It looks jagged and would be at least AD.

The snowfield/glacier from Point Y. (a) This appears moderate in slope and a route on the left to join the NNE ridge looks possible at maybe PD, though there may be avalanche danger crossing below the summit. (b) It appears possible to take the snowfield/glacier on the right to join the NNE ridge between the two corries at a higher grade than the left.

The NNE ridge between the two corries that leads to the subsidiary summit. This is all rock until below the subsidiary summit and would be at least AD.

The lower corrie offers a variety of gullies that join the NNE ridge (PD) and the possibility of ascending the large snowfield/glacier on the right of the NNE ridge that leads to the subsidiary summit. (AD?)

It is advised that all these routes be attempted from an advanced camp near their starting point.

2. First valley to SE upstream from base camp with large stream

From approx. 76.890/41.950 ascend beside the stream up a long established terminal moraine. Take the right side (true left) of the stream and take the gully on the right of the stream gully. Ascend over boulder fields to the top of the ridge. This is a moraine promontory which at one time marked the junction of the two glaciers and overlooks the end of the glacier, which has retreated several hundred metres in recent years. One and a half hours walking from the valley. Camp sites are possible by the stream that issues from the glacier. A route up the left side on rock/scree looks possible to gain access to the glacier basin higher up. Eventually this will lead to the peak 4356.6ms at 76.925/41.920. To the right is a rock ridge then another glacier snout and basin behind. It was difficult to see beyond the snout. The highest point reached was approximately $\frac{3}{4}$ km from the valley floor at a height of 3350m.

See photographs 27 and 28 in Part Three of this Report.

3. Valley running west from 76.860/41.950

Shown on the map as filled with a glacier that has now retreated hundreds of metres. Access was gained from ascending the obvious large lateral moraine to the south of the Djerchy Valley several hundred metres below the glacier snout. This moraine is c.100 metres high. On gaining the ridge a view into the valley 150 metres below running west appears. Follow the moraine top westward for 650 metres until it stops. Height approximately 4200 metres. One and a half hours from valley floor. The views include a tremendous icefall to the south, two large glaciers, one running from a large basin to the SW and another from a large basin to the west. Continuing along the mountainside from the end of the moraine would enable this glacier basin to be gained. It would be also possible to ascend the valley floor to the junction of the two glaciers. If this were done it would be necessary to ascend icefalls to gain the glacier basins. The left (SW) glacier was heavily crevassed, the right (W) was smoother with many water run-offs. The peaks surrounding the basins look quite intimidating.

See photographs 29 to 31 in Part Three of this Report.

Conclusion

Although only one day of climbing was possible the other aims of the expedition were met.

The area was thoroughly explored and access routes and peaks photographed.

Participants were exposed to the realities of planning and executing a full scale expedition to an, in the mountaineering sense, unexplored area.

All the members returned safely, despite some minor issues, and enjoyed the experience.

The area is certainly worthy of a follow up expedition to climb the 4000m peaks at the head of the Djerchy Glacier. There appear to be no major difficulties in ascending the peaks, other than the passage of the icefall.

It is recommended that any future expedition consider the merits of a visit in early September. Although the glacier would probably be dry, the night time temperatures may be lower and the snow conditions better. However, with global warming, a visit to the area at any time in the summer months may prove to be something of a lottery. In this respect the area is unfortunately no different to many others.

Bibliography

Maps

Gizi Map, Hungary, 1:750,000, "Kyrgyzstan", includes Bishkek at 1:30,000

Leave No Trace Centre for Outdoor Ethics, South Shore Trekking Maps – including routes from Kochkor, 1:100,000, 1999

Soviet Military Maps, 1:100,000, sheets k43-071 and k43-082

Soviet Military Map, 1:50,000, sheet k43-082-2

Russian Glacier and Pass mapping at:

<https://nakarte.tk/#m=13/41.94985/76.85606&l=O/Wp/-cseyJuYW1IljoiTW91bnRhaW5zIGJ5IEFsZWtzZXkgVHN2ZXRrb3YiLCJ1cmwiOiJodHRwOi8vbWFWLmctdXRrYS5ydS97en0ve3h9L3t5fS5wbmciLCJ0bXMiOmZhbnHILCJzY2FsZURlcGVuZGVudCI6ZmFsc2UsIm1heFpzb20iOilxNSlslmlzT3ZlcmxheSI6dHJ1ZSwiaXNUb3AiOnRydWV9>

Expedition Reports

Many reports were consulted but these were found to be the most useful:

First Ascents in the Djangart Region 2010

Cambridge Tien Shan Expedition 2012

Bristol Djangart Expedition 2013

The above are available from the BMC expedition database at:

<https://www.thebmc.co.uk/expedition-reports/Default.aspx>

Ermilov Expedition Report 2012

It is available, In Russian, from:

http://westra.ru/passes/Reports/view_reports.php?place=59

Books

Mountaineering regions of Kyrgyzstan, Vladimir Komissarov, 2017. Available at:

<https://docs.google.com/file/d/0B2-VwKVVUIq-N3BzYmN6WVNhRWs/edit>

Pocket First Aid and Wilderness Medicine, Drs Jim Duff and Ross Anderson, Cicerone, 2017

Royal Geographical Society Expedition Handbook, RGS, 2004. Available at:

<https://www.rgs.org/in-the-field/advice-training/resources-for-expeditions/expedition-handbook/#>