of pools and groves—the product of mirage. That rare creature, the so called " wild cow " of the Arabs, was only seen in captivity, at Ma'an ; it is a species of antelope, the *Oryx beatrix* of science, and perhaps, it is said, the " reem " or " unicorn " of the Bible ; yet, with its suggestion of a hump on the back, it might well claim some cousinship with the little Brahmani bulls of Benares.

Nor are traces of human life by any means lacking. There are no roads, it is true, nor even paths, across the desert ; but at long intervals may be seen small heaps or low columns of stones, which have been set up by the Bedouin as landmarks in the trackless waste. Bedouin camps, with their low black tents and picturesque groups of Arab men and women, dogs and camels, are very occasionally seen from the train. Still more rarely a swift-trotting dromedary, or *thelul*, carrying the desert post, glides rapidly by. But in the 500 miles that separate Ma'an from Medina there would seem to be only two settlements worthy the name of village—those of Tebuk and El Ula.

The Commission did not travel further south than Medain-i-Salih, and the notes relating to places situated between there and Medina are of necessity based upon hearsay.

SIR AUREL STEIN'S NEW EXPEDITION IN CENTRAL ASIA.

By Sir AUREL STEIN, K.C.I.E., D.Sc.

In May last the Secretary of State's sanction was received for the long-planned expedition by which I wished to resume my geographical and archæological explorations in Central Asia and Westernmost China. H.E. the Viceroy and the Government of India had from the start accorded generous support to the plan. By the close of July I managed to complete in Kashmir the practical preparations for the journey, which is likely to extend over two years and a half. Much of my time was still claimed by work on the publication of the scientific results from my Central Asian explorations of 1906–08. In order to facilitate the extension of the proposed fresh topographical labours the Surveyor-General of India had kindly agreed to depute with me my experienced old travel companion, Rai Bahadur Lal Singh, Sub-Assistant Superintendent of the Survey of India, and to make available also the services of a second surveyor, Muhammad Yakub Khan, along with all necessary equipment and an additional grant.

For the initial portion of my journey, to the border of Chinese Turkestan on the Pamirs, I chose a route which was new to me and which had a special interest for the student of the geography and history of the Hindu-Kush regions. For long years I had wished to explore the valleys of Darel and Tangir, prominently mentioned in the accounts of

early Chinese Buddhist pilgrims who passed there on their way from the uppermost Oxus to the Indus and the sacred sites of the Indian North-West Frontier. The disturbed political conditions of the local tribal communities had rendered those territories so far wholly inaccessible to Europeans. But in recent years Raja Pakhtun Wali, of the Khushwakt family once ruling Yasin and Mastuj, had succeeded in gradually establishing a chiefship of his own among these small Darel republics. The friendly relations into which he had entered a short time ago with the Gilgit Political Agency opportunely enabled the Honourable Mr. Stuart Fraser, Resident in Kashmir, to secure the Raja's permission for me to visit those valleys. For the prompt use made of this chance I owe special gratitude to Mr. Fraser and the Indian Foreign Department.

Leaving the Kashmir valley on August 2, I travelled to Chilas on the Indus by the route crossing the high passes of Barai and Fasat. The bulk of our baggage was sent ahead with the second surveyor by the Gilgit road to await us in Hunza. It was a very useful precaution, for already on the first eight days the tracks followed proved in many places impracticable for laden animals. Apart from the appropriate Alpine training undergone here, I found an antiquarian interest in this route. There is good reason to assume that it was by this direct line of communication to the Indus that the Chinese obtained those supplies from Kashmir which, according to the record preserved in the T'ang dynasty's Annals, enabled them about the middle of the eighth century A.D. to maintain for a time imperial garrisons in the valleys south of the Hindu-Kush.

As soon as the hot and barren rock defile of the Indus was crossed, we found ourselves on ground offering ample scope for exploring work. Passing up the hitherto unsurveyed Hondur valley, with ruins of pre-Muhammadan times and plenty of abandoned cultivation, we reached the eastern border of Pakhtun Wali's latest conquests on the range overlooking the Khanbari river. Here we passed under the protection of the large and well-armed escort sent up by the Raja under his capable nephew, Shah Alim. Under a special stipulation no one from the Gilgit Agency was allowed to accompany us.

In order to avoid the excessive summer heat of the Indus gorges through which the usual route leads, I had asked to be taken to Darel by the mountains north-eastwards. It proved a difficult line of progress, but also one exceptionally suited for surveying operations. The great spurs descending from the Indus-Gilgit watershed, which we had to cross by a succession of high passes, furnished excellent plane-table stations. Extensive panoramic views were obtained towards the great snowy ranges across the Indus and on the headwaters of the Swat river, where trigonometrically fixed points could be sighted. Much hard climbing secured us similarly favourable conditions further on. It thus became possible, through R. B. Lal Singh's devoted exertions, to map within less

than a fortnight some 1200 square miles on ground which had never been surveyed or even seen by European eyes.

Work was facilitated by the excellent relations we were soon able to establish with Pakhtun Wali's trusted supporters forming our ever-watchful guard. Most of these alert fellows were outlaws from neighbouring territories, who had joined the chief's fortunes during the most adventurous period of his chequered career. They were themselves very interesting figures to study. There was also much to be learned among them about the time-honoured means and methods by which their capable leader, once a hapless refugee from Chitral, had carved out for himself this most recent of Hiudu-Kush kingdoms in true Condottiere fashion.

In the valleys drained by the Khanbari river splendid forests of pines and firs were found to clothe all the higher slopes. In places they had overrun the old cultivation terraces now abandoned, which could be traced everywhere in the wider portions of these valleys. Water for irrigation is abundant, and reoccupation is retarded only by the scantiness of population. In any case, it soon became clear that these mountain tracts enjoyed climatic advantages in the matter of adequate rainfall, conspicuously absent higher up on the Indus or elsewhere south of the Hindu-Kush.

The contrast with those denuded barren mountains to the north and east was even more striking when we reached the head of the main Darel valley. Among its magnificent pine forests and alpine meadows, I felt as if transported to Kashmir. But there was little chance to enjoy the fine alpine scenery while being constantly attacked by the fierce mosquitoes which infest all Darel and Tangir and cause bad sores even to local people. Even high up in the mountains we suffered severely from this plague.

On moving down to Mankial there revealed itself the openness of the main valley and the great extent of arable land. Much of the latter had passed out of cultivation long ago, and the great number of ruined sites fully accorded with this observation. The examination of these ruins kept me busy for several days. Most of them proved the remains of fortified settlements clearly of pre-Muhammadan date. By their construction on naturally strong rocky ridges bearing elaborately built terraces, and also by other features, they curiously recalled the extensive ruined settlements of the Buddhist period so numerous in the Swat and Peshawar valleys. It seemed like a distinct confirmation of the tradition preserved in the Chinese records as to the early historical connection between Darel and Swat. Near one of these ruins rapid excavation brought to light unmistakable remains of a Buddhist burial-ground in the shape of cinerary urns, metal ornaments, etc.

All archæological observations pointed to a much denser population than is now to be found in this territory. Yet even now Darel contains

a number of large crowded villages, and everywhere I came upon lingering traces of an inherited civilization a good deal superior to that of the neighbouring hill tracts. Thus the irrigation canals showed unusual skill in their carefully preserved solid stonework. On houses, mosques, and graves much fine wood-carving survives, showing decorative motifs which are directly derived from Graeco-Buddhist art as known to us from the ancient relievos of Gandhara.

The Darelis impressed me as a race weakened by centuries of internal disorder and needing a strong ruler. It was an interesting experience to meet Raja Pakhtun Wali in the castle he is building in the centre of his recently annexed territory and close to the site of its ancient capital. His human environment, like the methods by which he has established his rule, seemed to call up times long gone by. He showed every possible care to facilitate my journey, and I shall always think back with gratitude to the help and attention received, and with genuine interest to the ruler.

On my way down Darel, I was able to identify the site of an ancient Buddhist shrine where the Chinese pilgrims mention a miracle-working colossal image of Maitreya Buddha in wood. Continuity of local worship is attested here by a much-frequented Muhammadan saint's tomb. We then made our way westwards into Tangir by tracks difficult for load-carrying men. The trying climb was rewarded by the grand view opening from the Shardai pass, a truly ideal survey station. To the west it extended to the gap between precipitous snow-crowned spurs where the Indus makes its great bend southward. Independent tribal territory closes access to this famous defile; even from afar European eyes saw it now for the first time.

The Tangir valley, too, proved remarkably open and fertile. We visited there Jaglot, where Pakhtun Wali had established his original stronghold and withstood a memorable siege by the Gabarkhel tribesmen. Old animosities seemed to be still smouldering here, and special precautions were considered necessary to safeguard us from any fanatical attempt. In the great forest belt at the head of the valley hundreds of Pathans from Upper Swat and the Indus Kohistan were engaged in cutting the magnificent timber, a special source of revenue to the Raja. All arrangements worked smoothly to the end, and when on August 21 we had crossed the Sheobat pass, over 14,000 feet in height, I felt sorry to say farewell to Raja Pakhtun Wali's fascinating dominion and our hardy escort.

Our route now led due north through the mountain tracts of Gupis and Yasin. The former we entered by a pass, nearly 16,000 feet high, which had never been surveyed. The huge masses of rock *débris* left behind by ancient glaciers made it exceptionally trying, but it meant a short cut. In Yasin I found myself on the historically important route which forms the nearest connection between Oxus and Indus. There was

much to attest here Central-Asian influence. Besides interesting ruins of old forts, I traced Buddhist remains and much fine old wood-carving in houses, etc.

The glacier pass of Darkot, by which we crossed to the Yarkhan river headwaters, offered special historical interest as the gate by which a Chinese force despatched in 747 A.D. against the Tibetans effected its entry into Yasin and Gilgit. Considering the great natural obstacles, it was a remarkable military achievement, just as the successful passage of the Pamirs by a relatively Chinese army which preceded it. So it was a particularly gratifying find when I discovered a Tibetan inscription scratched into a large boulder on the track where it ascends a lateral moraine of the Darkot glacier from the south. It obviously is a relic of that Tibetan advance to the Oxus which the Chinese Annals record about the middle of the eighth century, and which the adventurous expedition just referred to was intended to stop.

Once beyond the Darkot our easiest route to the Chinese border would have led across the Baroghil saddle to the Oxus, and thence across the Afghan Pamirs. I had followed this route in 1906, and was, therefore, glad to move now by the parallel but little-known route which connects the headwaters of the Yarkhun and Karambar rivers with westernmost Hunza. On its south side it skirts an almost unexplored region of big glaciers and high ice-clad peaks. Other physical features, too, invest this route with special interest, but the obstacles encountered on this high ground are serious. So I had special reason to feel grateful for the effective help offered by Captain Stirling, commanding the Chitral Scouts, who joined me on the Darkot with fresh transport and accompanied me during four days' hard marching. Beyond we had a difficult task in getting across the Chillinji pass, *circ.* 17,400 feet above sea-level. The snow-slopes to be ascended were exceptionally steep, and had been rendered still more difficult by the snowy weather prevailing all through August. The great glacier over which the descent led proved fortunately less trying, and after thirteen hours' struggle over snow and ice we could bivouac in safety under the shelter of a moraine.

After this experience our progress though Hunza seemed easy. In the Chupursan valley the extensive areas of old cultivation furnished a feature of special interest. Neither want of water for irrigation nor climatic change seems to furnish an adequate explanation for their abandonment. Reoccupation is proceeding but slowly.

On September 6 we crossed the border of Chinese Turkestan by the Mintaka pass. I now found myself on ground familiar from two previous journeys. But the routes by which I had formerly reached it seemed quite "lady-like" compared with our recent tracks. During the five weeks since our start from Kashmir we had crossed altogether fifteen passes, between 10,000 and 17,400 feet in height, and nearly four-fifths of the total distance covered, over 500 miles, had to be done on foot.

Our descent along the Taghdumbash river to Tash-kurghan, the chief Sarikol settlement, was necessarily rapid. Yet I was able to use it, too, for fresh surveys of antiquarian interest. Thus I succeeded for a distance of over 40 miles in tracing an ancient canal of large size, long abandoned, but famous in local lore, which had once assured fertility to extensive areas along the right river-bank now almost entirely desert. It illustrates the great change which has come over Sarikol since the old Chinese pilgrims passed here.

After Tash-kurghan Kashgar was my immediate goal, and there I despatched my baggage by the usual caravan route through the mountains. I myself was anxious this time to reach the Turkestan plains by a new route, the valley of the Kara-tash river, which drains the great glacier-clad range of Muztagh-ata on the east. Owing to special difficulties this interesting ground has never been surveyed. The big floods from the melting glaciers make the narrow gorges of the Kara-tash river quite impassable in the spring and summer, and by the autumn heavy snow on the Merki pass equally closes the route to traffic. In the spring of 1906 my late surveyor, Ram Singh, had been completely baffled in his attempt to descend the valley. I was more favoured by chance now. An exceptional succession of early snowfalls had stopped the melting of the ice just in time to allow of my passage while the Merki Dawan was still open for laden yaks. But even thus the descent for two marches proved a distinctly difficult and in places risky business. The constant crossings of the river tossing between sheer rock walls could not have been effected without the opportunely secured Kirghiz camels, and none but these local camels could have negotiated such tracks as lead elsewhere along the foot of these precipices.

I was heartily glad when by September 19 we had emerged safely from the last of these gloomy rock gates, and a long ride two days later brought me back to Kashgar. There, under the hospitable roof of my old and ever-helpful friend, Sir George Macartney, K.C.I.E., now our Consul-Generel in Chinese Turkestan, I have been able to give my men a much-needed rest, and to complete the manifold preparations for our first winter campaign in the desert.

THE RECENT CROSSINGS OF GREENLAND.

THE years 1912–13 have been marked by an important advance in the exploration of the vast interior of Greenland, no fewer than three different traverses of the inland ice-sheet, one of them at almost its greatest extension in width, having been successfully accomplished ; * while the competence

* Four, if Rasmussen's outward and return routes are both counted.