

Mr. SAMUEL GURNEY, President for 18 years of the Anti-Slavery Society; Mr. WILLIAM H. HODGSON; Mr. JOHN HUNT; Mr. P. L. HENDERSON; Mr. J. W. HUGHES; Mr. JAMES TEBBUTT HALL; Mr. CHARLES HOCKIN, M.A.; Mr. MOUNTNEY JEPHSON; Mr. ANDREW JARDINE; Mr. JOHN LINDESAY KEIR; Mr. H. HAMILTON LINDSAY, M.P. for Sandwich in the years from 1841 to 1847; Captain C. H. LLOYD; Mr. CARLETON L'ESTRANGE; The Right Hon. Sir ROBERT LUSH, the eminent Judge; Mr. JOSEPH ISAAC COHEN DE LISSA; Mr. GEORGE LEEMAN; Mr. ALAN L. M'GAVIN; Mr. ELLIOTT MARTEN (Vice-Consul, Sarawak); Mr. A. H. MOUNSEY, British Minister to the United States of Colombia, who died at Bogota on the 10th of April last. He was the author of two works which entitle him to honourable distinction as an intelligent and observant traveller, viz. A 'Journey through the Caucasus,' published in 1872, and 'The Satsuma Rebellion,' published in 1879. Mr. JOHN WILLIAM PROUT, M.A.; Mr. WILLIAM PACKE; The Rev. JOHN V. POVAH, M.A.; Mr. R. H. C. PALLETT; Sir THOS. ERSKINE PERRY, the eminent Indian Judge and Member of the Council of India, and for 10 years President of the Indian Board of Education; Mr. DAVID GREIG RUTHERFORD, the naturalist traveller, who had explored various tracts on the West Coast of Africa, and died on Cameroons river; Colonel Sir W. A. ROSE, F.R.S.L., the well-known Alderman and Senior Magistrate for the City of London; Mr. WILLIAM N. RUDGE; Mr. M. B. RENNIE, C.E.; Dr. F. SYMONDS; Captain MARTIN STRATFORD; Mr. G. W. STOW; Mr. GEORGE SEATON; Mr. ALEXANDER STUART; Mr. EDMUND TRIMMER; Mr. HENRY W. WILLOUGHBY; Colonel JOHN WILLIAM WILLOUGHBY-OSBORNE (Madras Army), C.B., who had served throughout the Indian Mutiny, and was appointed Political Resident at Gwalior in 1880; he died at Dehra Doon on the 8th of October last; Mr. JAMES WATSON; the Rev. JOHN DUNDAS WATHERSTON; Captain J. B. WALKER.

Indian Surveys for the year 1880-81.

The year 1880-81 has witnessed the completion of the principal triangulation of all India by the bringing to a close of the last remaining gap in the northern section of the Eastern Sind Meridional series. The triangulation known as the Eastern Frontier Series belongs to a region outside the limits of India proper, and will probably be brought to a close on a base-line of verification in Mergui during the current year. The general outturn of triangulation in 1880-81 was a chain of principal triangles 50 miles in length, and a secondary chain 154 miles long, in Sind; while in Tenasserim observations were taken over a space of about 50 miles, but the triangles will not be completed till next year. The site for a base-line was found with difficulty in a hilly region, so thickly covered with forest growth as Tenasserim, but eventually a suitable one was hit upon in some flat alluvial land in the Mergui township, about three miles long and beyond the range both of the hills and of the creeks which run inland from the sea. In Siam the triangulation has been extended collaterally, and covers altogether an area of about 8000 square miles, including hill peaks on both sides of the head of the Gulf of Siam. The city of Bangkok has been also mapped as well as the chief rivers and canals within the limits of the triangulation, and a route survey was carried by Mr. M'Carthy while accompanying a Siamese telegraphic expedition, from Phra Pratom, the largest pagoda in Siam, up to Natyadoung, a pass on the British frontier. From January to October survey operations in this region are much hindered by a persistent atmospheric haze, but during the cold months it disappears, and due advantage will be taken of this phenomenon in future seasons. The principal triangulation has since entered the complicated system of islands forming the main part of the Mergui Archipelago, where navigation is sometimes tedious and requires care and watchfulness. The

principal inhabitants are the Selung, a small tribe of strange, timid, wild beings, without fixed abode. Out in the Archipelago fleets of their boats may often be seen, but they fly at the sight of strangers. They live almost entirely in their boats, though they make rude shelters ashore, in trees and on poles, during the rainy part of the year.

The Gwalior and Central India Survey, under Major C. Strahan, was occupied on an intricate tract of jungly country in Mewar and adjoining states. The Bhil tribes, who are a wild and uncivilised set, proved tolerably amenable on the whole, though on one occasion they threateningly surrounded a detachment of the surveyors and brandished their weapons in their faces. High cultivation is not practised, but the Bhils are decidedly skilful in laying out small irrigation channels, and the wheat they raise is of a remarkably fine quality. The Khandesh and Bombay Native States Survey party was engaged south of the river Tapti, while the Bhopal and Malwa Survey continued their operations in Partabgarh and Mandisaur. The latter party has surveyed an area of about 24,300 square miles since its first start in 1870, and an area of 4240 square miles remains to be surveyed. In Sylhet great difficulty was experienced from a variety of causes; the country plane-tabled consists of hills, forest, and swamp, with little open ground or clearing; the rivers, lakes, and streams are swollen abnormally during the rains as, for example, the Hakaluki Howhar, which though passable on foot in winter, assumes during the rainy season the dimensions of a lake about twenty miles by nine, where lives are yearly lost, and which is described by local native officials as "that dangerous stormy sea." A third cause of obstruction consisted in the difficulty of procuring coolies and supplies. On several occasions some persons of influence would induce the rice-sellers in the bazaars to refuse to sell to the surveyors' men at any price, and even incite them to riot and violence. Fortunately the principal offender in this way, who was a large land-owner in those parts, took occasion to pay off a spite against a neighbour by breaking into his house and half murdering him and his family, when the civil power took him into safe keeping, and the surveyors, Major W. F. Badgley and his party, had comparative peace. The Rajputana party was occupied partly in the western part of the Jodhpur State, a very desert-like region of Rajputana, and partly in surveying, on a large scale, various tracts in the immediate vicinity of Simla.

The Mysore Survey was commenced in 1875, but the famine seriously interrupted its progress. During the year under review both the triangulation and detail survey were carried on in rugged, jungly, and difficult country. Professional assistance was also rendered by the party to the Commissioners who were engaged in determining the boundary between Mysore and Kanara. Major Strahan believes the commonly received area (27,000 square miles) of Mysore to be considerably below the mark, and estimates the real area to be 30,500 square miles; of this about 17,800 still remain for survey. The southern edge of the country triangulated is skirted by the Bababuden hills and their flanks are a dense mass of impenetrable jungle, chiefly bamboo, inhabited by wild elephants and bison. Most of the country plane-tabled, too, presented equal difficulties. The forests are almost unexplored, and stretch in an unbroken line along the Ghats for scores of miles. Natives are loth to enter, partly from superstition, partly from dread of fever and wild beasts. Supplies are hard to procure, habitations few and far between, and communication difficult across wild and rugged mountains, rising in some places over 6000 feet above the sea. The few open spots met with are generally patches of wet cultivation, deep down in the valleys, from which no points can be seen, and along which it becomes necessary to drag a chain with the chainmen often half-way up to their thighs in mud. A few excellent roads, however, traverse the Ghats, and as long as one's camp remains

on these nothing can be pleasanter than travelling in this region, with a scenery which is probably not to be equalled anywhere in the world.

A useful piece of work was executed by Major Holdich and Messrs. Claudius and Mc'Nair towards making a standard topographical survey of the Kohat district and towards completing the gaps between the frontier line and the Kurram valley surveys. The Guzerat survey was carried on under Colonel Leach and Captain Hobday during the absence of Colonel Haig at Venice, where he was acting as one of the delegates on the part of the Indian Government to the Geographical Exhibition. Surveys on three different scales were here carried on, the largest scale being reserved for the Dangs Forest, a malaria-breeding tract, where a good deal of misadventure befell the party, owing to operations having been started in the wrong season, when the grass was dense and high and the country unhealthy.

In Cutch the operations covered firstly a portion of the "Great Runn" and the wide-spreading grass-land known as "Bani," together with the low, well-wooded ground lying to the south and south-east of the town of Lakhpat; secondly, a hilly country intersected by deep ravines and thickly wooded; and lastly the open, well-cultivated ground near the seaboard. The Runn is described as a tract of country without parallel in the whole world. During the dry season it is a sandy desert without a scrap of vegetation, with here and there dangerous bogs and extensive tracts of salt, and during the south-west monsoon an immense shallow inland sea. During the hot weather the hot winds blaze across the Runn like the blast of a furnace while clouds of dust render advance well-nigh impossible; the whole length of the road is marked out by the bones of cattle and camels which have died from exhaustion and thirst, or else from heavy rain-storms, as for instance in April 1881, when the tail end of a cyclone passed over the Runn and caused the death of over a thousand cattle. A curious feature of the Runn is the salt, which is in the form of pure white crystals, very hard and pungent in flavour, and covers many miles of country from two to twelve inches in depth. The mirage is seen to great advantage on the Runn, where it magnifies objects amazingly, so that a water-vessel at the distance of a mile looks like a tree, ten or fifteen feet in height, and the wild ass assumes the proportions of an elephant.

In the Thana and Colaba collectorates operations were impeded by high and difficult hills clothed with forest or by marshy tracts intersected by creeks running in from the sea, while the party suffered a good deal in health. A good outturn of work was rendered in the Sholapur, Kaladgi, and Satara collectorates, and an adjacent portion of the Nizam's dominions, of which no records were forthcoming with the old Hyderabad Survey.

Beyond the Sind frontier surveys were made in Beluchistan, Sewestan, and the Marri Hills. During the hot months of June, July, and August, it is difficult to survey accurately or rapidly on account of the thick muddy state of the atmosphere during the greater part of the time. An area of 3500 square miles was, however, completed, in more or less detail, on the $\frac{1}{2}$ -inch scale, between Quetta and Khelat, while in the north-east of Quetta, inhabited by the Dumar Pathans, which Major Beavan visited under the protection of the chief of the tribe, and in Sewestan, a further area of 2800 square miles was reconnoitred and mapped on the $\frac{1}{2}$ -inch scale. The name Sewestan formerly included a large tract of country, much of which is now in possession of the Marri, and of the Katch Gundava Plain, even as far as Jacobabad and Shikarpur. The Pathan have, however, been forced back by the encroachment of the Biluch tribes, till now Sibi, the capital of the old province, and from which it takes its name, is actually isolated from the remaining portions of its former territory. At the present time Sewestan may be defined in a geographical sense to include all the district drained by the Nari river and its affluents. The

tract is essentially one of rugged, broken ranges of hills, varying in height up to 10,000 feet; sandstone mostly near the plains, changing into limestone formations further back, and running in a general east and west direction. One of the most remarkable features of the country is the Zarghun mountain, the highest in Southern Afghanistan, the culminating point being 11,730 feet above sea-level. It is composed entirely of conglomerate rock, formed of rounded water-worn pebbles firmly cemented together. The upper portions of the hill slope gently inward, but are cracked and divided by the most frightful chasms and precipices that it is possible to conceive. Major Beavan adds that no description could give an idea of the place, but it would not be inaptly represented by some of Gustave Doré's illustrations to the 'Inferno.'

A *mauzawar* or village survey party was occupied in the Dera Ismail Khan and Bannu districts, and cadastral survey parties in Mirzapur, Jaunpur, Ghazipur, and Ballia, in the North-West Provinces, and in the Hanthawaddy, Bassein, and Tharrawaddy districts in British Burma. The work of the Burman surveyors proved to be as good as that of the Hindustanis, and Major Sandeman says it is now proved beyond a doubt that the former make excellent surveyors. Some interesting particulars are given regarding the Karens, who inhabit a portion of the Tharrawaddy district. Mr. Talbot says they generally inhabit lands in the vicinity of the forest which they have reclaimed by their own personal exertions, and that they are as industrious and far more trustworthy than the Burmans. The majority of the Karens met with were of the Christian religion—the Anabaptist persuasion—and the pure simple faith has educated their character far above the average Burman. Mr. Talbot adds that the larger villages boast of a church of their own, which on week-days is utilised as a school-room; the members of the congregation, young and old, assemble for divine service on Sundays, and every night for even-song. The service is conducted by one of the elders, and consists of prayers translated into their mother tongue, and hymns. Secular education is likewise cared for; in fact, in Mr. Talbot's opinion, the Karens are far more advanced than similar village communities in Upper India. Many English tunes are picked up, and passing through a village of an evening, the Karen women may not unfrequently be heard singing such familiar tunes as 'Auld Lang Syne' and the like.

The withdrawal of the British forces from Northern Afghanistan in September 1880 necessitated the return to India of the survey officers employed in that portion of Afghanistan. Thus no fresh information has been obtained in the region around Kabul. But in March 1881 an opportunity was offered of increasing our geographical knowledge of portions of Waziristan situated on the eastern confines of Afghanistan and close to the British districts of Bannu and Dera Ismail Khan, for two expeditionary columns were sent into that country for purposes of retribution and repression necessitated by recent acts of hostility, and survey officers were attached to both columns. One column, under General Gordon, c.b., advanced from Bannu up the Khairar Valley towards the Razmak plateau, along the northern confines of the Mahsud Waziris, returning through the Shikto Valley to the plains of Bannu. The other column, under Brigadier-General Kennedy, c.b., advanced from Tank into the southern and western Waziri valleys, and then proceeded viâ Kanignram to the Razmak plateau, and returned viâ Palosin to Tank. Major T. H. Holdich, b.e., and Lieutenant the Hon. M. G. Talbot accompanied the first column, and Captain G. W. Martin the second. Through the united exertions of these officers—aided by a native surveyor, Imam Bux, who was taken under tribal protection to tracts inaccessible to Europeans—an area of about 1200 square miles in and around Waziristan was surveyed in more or less detail, filling up blanks in parts of the country which had not been visited since Sir Neville Chamberlain's expedition of

1860, and reaching beyond to regions never yet visited by Europeans. Several mountains on the western frontier were ascended, including the celebrated peaks of Pirghal and Shuidar, 11,000 feet high, which command an extensive view of the region lying to the east, almost up to the Quetta to Ghazni road. Though the movements of the surveyors were hurried so as to keep up with the military forces, the atmospheric conditions were favourable, enabling points to be fixed by triangulation up to a distance of 200 miles. A great deal of information has been obtained which, when combined with a recent rough reconnaissance of the Zhob valley and the upper branches of the Gomul valley towards the Ab-i-Istada valley by a native explorer, will go far towards filling in the blanks in the maps of that region. The British forces were not withdrawn from Southern Afghanistan until April 1881. Meanwhile Colonel E. P. Leach and Lieutenants Talbot and Longe completed some triangulation around and to the north and west of Kandahar, and extended towards the Hazara country the survey of the Kakrez valley previously made by Captain Hobday, and also added to the survey of the Argandab valley. A survey of Kandahar and the surrounding country was also made by a native surveyor on the scale of six inches to the mile.

It is noteworthy that during the occupation of Afghanistan by British troops, from the invasion thereof in 1878 up to its evacuation last year, an area of 39,500 square miles has been surveyed in more or less detail in various parts, and a further area of about 7000 square miles has been explored by native agency. An important result of these surveys is to show that the position of Kabul, Ghazni, and Kandahar, as indicated on the maps completed after the first Afghan war, are correct in latitude, but erroneous in longitude by 10 to 14 miles, and that they all require to be shifted to the east, bringing them so much nearer to the British frontier. Also a large number of heights which are entered on those maps are considerably in excess of the truth. They appear to have been mainly derived from barometric observations taken by the well-known Asiatic traveller, Dr. William Griffiths, whose skill and accuracy as an observer were eminent and unquestionable, but who, unhappily, did not live to reduce his own observations, and did not take account, in his method of reduction, of the hourly, daily, and monthly variations of barometric pressure, the neglect of which is liable to affect the results very materially. The general result is, therefore, to lower previous estimates of the height of Afghanistan about Kabul, including some peaks of the Hindu Kush, by about 500 feet.

Although at the outset of the Afghan survey operations a well-connected series of triangles between India and Kabul was hardly thought of, either along the line of the Khyber or the Kurram, yet results show that it is only by the want of observations at a very few points that the final triangulation fails to realise this. A valuable point of connection between the two series has been the Sikaram peak of the Sufed Koh range, which is common to both, and which is also one of the most strongly fixed of all the Great Trigonometrical trans-frontier peaks in this neighbourhood. The connection of the two series was effected by Colonel Woodthorpe, who succeeded in reaching one of the peaks overlooking the Kabul plain, which had been fixed but not visited by Major Strahan.

The exploration referred to above by the native surveyor of the country between the Suliman range and lake Ab-i-Istada covers an area of about 7140 square miles. The account includes some noteworthy particulars of the tribes inhabiting that (hitherto) blank region on our maps lying between the country of the Waziris and Pishin. The Sherannis are a powerful tribe occupying a hilly tract of country south of Waziristan and west of the well-known peak Takht-i-Suliman. Their principal villages are Drajan, Pasta, and Karam, and most of the other inhabitants live in small square forts with towers at the angles. Hindu traders are found in the villages,

also blacksmiths, carpenters, durry makers, weavers, and barbers. The Takht-i-Suliman proper is a niche in a rock about 10 feet below the summit, looking as if it had been cut out by hand, and in front a small ledge, below which the mountain falls precipitously. The legend is that King Solomon used to cause himself to be transported by genii to this place and sit there to enjoy the cool air. There is a shrine on the summit, and many pilgrims visit the place, which is approached by a steep and difficult path.

Colonel H. C. B. Tanner's description of the operations about Gilgit shows that all the passes leading across the watershed between Gilgit and the Indus have been mapped, and the two most important ones which have been used of late years by Kashmir troops have been visited. A good deal of topography has been accomplished in other parts of this section of the Indus basin, and Colonel Tanner anticipates that the subsequent work of the current year will have furnished us with a reliable record of every pass marching with the boundary of British and Kashmir territory on the one side, and the country of the independent tribes of the Indus on the other, for a distance of over 200 miles, from Gilgit, in the extreme north-west, to Amb, in the Hazara district of the Punjab.

The work at the headquarters offices in Calcutta, where the various laborious operations of drawing, compiling, and examining go on, as well as the work of reproduction through lithography, copper-plate engraving, and the different photographic processes, displays the same unremitting activity that ever characterises this important branch of the Survey Department. The Mathematical Instrument Department, which is charged with the important function of supplying the wants of the Marine and Land Survey, the Public Works, Military, and other Government Departments, show a good record of work done, and the Great Trigonometrical Survey Office has been likewise indefatigable in its varied duties, which include the preparation of a fifth edition of Walker's Turkistan, by far the best map of Central Asia attainable in this or any other country. The two last matters calling for notice in connection with the Indian Survey are the establishment of various fresh stations for tidal observation, by which the number of these points along the Indian coast is now nineteen in all, and the kindred work of spirit-levelling by which the opposite localities of Madras and Bombay have been connected by lines of levels carried right across the peninsula of India.

Merv and its Surroundings. By EDMOND O'DONOVAN.

(A Lecture delivered at the Evening Meeting, March 27th, 1882.)

MR. O'DONOVAN spoke as follows:—

As the President has told you, the subject of my lecture this evening is Merv and its immediate surroundings. I have much to say about portions of the Caspian coast westward of Merv, but the time allotted to me will not permit entering into details on that part of my travels. I shall simply preface what I have to say about Merv by noticing the circumstances which brought me there. I had been detailed on an exploring expedition to Central Tibet, and while passing through the Trans-Caucasus I learned that an expedition was being fitted out against the Turkomans. It was deemed advisable that I should go with it. I was attached to the expedition under General Lazareff, and accom-