The Indian Surveys, 1894-95

Author(s): C. E. D. Black

Source: *The Geographical Journal*, Vol. 8, No. 1 (Jul., 1896), pp. 57-61

Published by: geographicalj

Stable URL: <http://www.jstor.org/stable/1773712>

Accessed: 27-06-2016 03:51 UTC

Your use of the JSTOR archive indicates your acceptance of the Terms & Conditions of Use, available at
<http://about.jstor.org/terms>

JSTOR is a not-for-profit service that helps scholars, researchers, and students discover, use, and build upon a wide range of content in a trusted digital archive. We use information technology and tools to increase productivity and facilitate new forms of scholarship. For more information about JSTOR, please contact support@jstor.org.

The Royal Geographical Society (with the Institute of British Geographers), Wiley are collaborating with JSTOR to digitize, preserve and extend access to *The Geographical Journal*

considerable extent, of sunken atoll character with a least depth of 12 fathoms over their rims, were discovered in the same vicinity.

From the Fiji group deep sea-soundings were obtained every 50 miles to Norfolk island, and from thence to Cape Byron on the Australian coast.

The detailed survey of the Inner route along the Queensland coast, inside the Great Barrier reef, was continued, and completed from Chapman island, near Cape Direction, to Night island.

In India, the survey of Palk strait, north of Ceylon, was continued and completed as far to the westward as Delft island. This survey demonstrated that no passage exists across the banks that skirt the northern shores of Ceylon deep enough for heavy-draught vessels to approach the passage leading to Adam's Bridge during the north-east monsoon in safety.

On the west coast, the survey in the vicinity of the mouths of the Indus was taken up at the Hajamro mouth, and completed to the southward and eastward as far as Kori river, off which the soundings were carried out to from 15 to 20 miles from the coast. Considerable alterations were found to have taken place since the last survey.

During the year the Hydrographic Department has published 114 new charts and plans, and improved 34 charts by the addition of 43 new plans; while 5463 corrections have been made to the chart plates. The number of charts printed for the requirements of the Royal navy, for Government Departments, and to meet the demand of the general public has, during 1895, amounted to 312,638.

THE INDIAN SURVEYS, 1894-95.

By C. E. D. BLACK.

THE aggregate area on all scales surveyed during the year by the various parties of this department amounted to 125,384 square miles, and the operations consisted, as usual, of triangulation, topography, forest surveys, cadastral surveys, traverse surveys, electro-telegraphic determinations of longitude, tidal observations and spirit-levelling, geographical surveys, and the normal work of the headquarters' offices.

The trigonometrical operations were rather interesting, as they consisted in part of measures for connecting the old Cachar triangles, which were left uncompleted in 1862, owing to the wildness of the country eastward, with the most northerly points of the new Mandalay series. This involved carrying the survey across the mountains east and west of Manipur, where the connecting series will consequently bear the name of the Manipur Longitudinal Series. The country proved exceedingly difficult to work in, owing to dense jungle, the want of suitable hills for Grand Trigonometrical stations, and the almost entire absence of villages. But unattractive though it may be, the region is one of importance, lying as it does intermediately between Cachar and Manipur on the one hand, and the Chindwin and Irawady valleys and the town of Bhamo on the other. The general opinion seems to be that the most feasible route for railway communication between Assam and Burma is further north, by way of the Patkoi pass; but nevertheless

the line taken by the present triangulation may prove of some commercial use in the future, and it is a pity we are not told more about it in this report. Surveyors often penetrate into regions closed to other people, and the narratives of the members of the Indian Survey Department have contained so much useful statistical and general information in the past, that we regret they should have been so trenchantly cut down on the present occasion. There is, however, a brief extract dealing with the other portion of the trigonometrical work, which consisted of fixing the positions of beacons along the Sind coast between Karachi and Kuch. The tract is designed by Mr. Prunty as an inhospitable waste of sea-water and pestilential mangrove swamp. Supplies were very difficult to procure, and sickness and fever were so rife, that had it not been for large daily doses of quinine not a man would have been fit for duty. It is satisfactory, therefore, to learn that this gruesome piece of work has at last been brought to a conclusion.

With regard to topography, a total area of 21,588 square miles was surveyed, the bulk of this out-turn being on the $\frac{1}{2}$ -inch scale. It is noticeable that the surveys in Upper Burma, previously classed as geographical, are now assigned a more appropriate place in the topographical section. Captain Renny-Tailyour rendered a fair out-turn of work in a mountainous tract of the Shan States north-west of Fort Stedman. In Baluchistan, Colonel Holdich's party was divided into nine detachments, three of which were detached for service with the Afghan Boundary Commission. The Asmar section, under Colonel Holdich himself, accompanied by Lieutenant Coldstream and three surveyors, mapped about 1200 square miles in the Kunar and Asmar valleys; the Baluch-Afghan section, under Captain Mackenzie, with five surveyors, continued its work throughout the winter; and the Kurram section, under Lieutenant Macaulay, completed its work by the end of December, 1894. Unfortunately, Lieutenant Macaulay, who during the progress of the operations had been ordered to join the Waziristan Delimitation Commission, was killed in the fight which occurred at Wano on November 3, 1894. In Southern Persia, between Bandar Abbas and Jask, about 19,000 square miles of new country were mapped on the $\frac{1}{8}$ -inch scale; and Jamaluddin surveyed the summit of the Ginas range, a plateau-like expanse which stands about 6000 feet above sea-level, and would answer admirably for a sanitarium in this exceptionally trying region. Yusuf Sharif was also successful in connecting the different triangulations executed during previous seasons at Charbar, Jask, and Bandar Abbas, and the whole of this work now forms a continuous series from Charbar to Jask. Khan Bahadur Imam Sharif, as our readers are aware, again accompanied Mr. Theodore Bent on an exploring tour in the Hadramaut country of Southern Arabia, where he managed to map about 3000 square miles in the Dhofar district. Another native surveyor, Sheik Mohiuddin, distinguished himself, not

for the first time, in mapping out 40,000 square miles in Western Baluchistan and Persia, and in revising about 5000 square miles of imperfectly surveyed ground in the neighbourhood of Kharan. For his various services he has been awarded the title of Khan Bahadur. A special examination of the Baluch triangulation in its entirety has been made by the Surveyor-General of India, and the conclusion arrived at is that it sorely needs a more reliable foundation, so as to admit of the detached portions being tied together on a firm basis. Early attention will be given to this requirement, and a first-class series is to be commenced this year, and carried through Mekran into Persia, by which means correct bases will be furnished for all Southern Baluchistan. In Upper Burma, Major F. B. Longe's party (No. 21) continued the 1-inch topographical survey of the Southern Shan States, and completed the geographical $\frac{1}{4}$ -inch survey of the Northern Shan States and the Upper Chindwin district. A native surveyor carried out, in concert with some Siamese commissioners, a good portion of the boundary survey between Amherst and Siam, while Major Longe himself and assistants accomplished a survey of the Kokang State, which was to be ceded to China under the Anglo-Chinese convention.

Passing by the electro-telegraphic determinations of the difference of longitude between Karachi and Greenwich, which were reviewed a few months ago in this *Journal*, we note that tidal observations for the compilation of tide-tables for navigation were carried on at thirteen stations on the coasts of India, and at Trincomali, Minicoy, Port Blair, Bushire, Maskat, and Aden. Spirit-levelling operations were also extended in various directions, especially along the east coast to Vizagapatam, where a junction was effected with the previous series brought up from the south in 1888, and the entire chain of levels between the tidal stations along the western shore of the Bay of Bengal are thus linked together.

A survey detachment was organized to accompany the Anglo-French mission of inquiry into the feasibility and limits of the proposed buffer state on the Mekong river. Colonel R. G. Woodthorpe, C.B., was in charge of the party, and Lieutenant Ryder, Mr. J. G. Scott, C.I.E., and Mr. G. C. Sterling were also attached thereto. Most of the French officers were met on January 1, 1895, and by the end of April the whole of the buffer state was covered with triangulated points, connected with those laid down in the previous season, while others were thrown out to the north and north-east, beyond Keng-Hung—an extension of the triangulation which will no doubt prove useful in the future. A very satisfactory junction was also made with Mr. McCarthy's elaborate triangulation in Siam. No special fair map is being prepared to illustrate the labours of the mission, but the results are being incorporated into the two sheets, 13 N.W. and 13 S.W., of the Burma Geographical Survey.

The very interesting operations of the Pamir Boundary Delimitation Commission have been already briefly referred to in these pages. Colonel Holdich and Major Wahab were the principal moving spirits in the survey, and they successfully achieved the objects sought in making topographical maps of the country adjoining the boundary, so as to assist the Commissioners in defining it, and in effecting such a junction with the Russian survey system as to ensure a common basis for the mapping on both sides. The weather was most inclement and unfavourable, but at last a sudden and fortunate break put an unexpected end to the difficulties. From a commanding peak near the Benderski pass Major Wahab obtained a magnificent view of the whole line of the Himalayas to the south, while at the same time he was enabled to gain a panoramic view northward to the Sarikul and Trans-Alai ranges, which stand within view of Osh in Ferghana. On two subsequent occasions he was equally fortunate, and it is certain thus that the basis of the geodetic measurements is sound and reliable. While Major Wahab carried on the triangulation, the topography was managed by Khan Sahib Abdul Ghafur with praiseworthy determination. His difficulties were largely due to the nature of the ranges which intersect the Pamirs and their approaches, partitioning the country into narrow valleys at most a mile or two wide, while they themselves form broad intervening flat-backed ridges of width varying from 10 to 30 miles, with a watershed obscured and well-nigh lost amidst eternal snows and glaciers, offering no marked and distinct peaks for recognition. The general results were found to be in close agreement, the difference in latitude being 20" at the starting point and 10" at the closing point, and in longitude only 4" and 6" respectively. As regards altitude also the difference was remarkably slight. Altogether about forty well-marked points and peaks have been fixed by triangulation, which will serve for junction with the Russian system. The area surveyed in detail on the $\frac{1}{4}$ -inch scale amounted to about 4800 square miles, and about 250 square miles were specially surveyed on the $\frac{1}{2}$ -inch scale to illustrate doubtful or disputed points.

In April, 1895, a small detachment was organized under Captain W. J. Bythell, R.E., to accompany the Chitral relief force. Large scale plans of the Malakand and Khar camps were made, and from the latter place Captain Bythell, assisted by Hira Singh, carried a $\frac{1}{4}$ -inch detail survey through Dir, which was continued as a theodolite traverse from the Laorai pass to Chitral. Early in August Captain Bythell continued the traverse along the Arnawai nullah, but was obliged to abandon it owing to the difficult nature of the country. The results of the reconnaissance were—

(1) Continuation of the Chitral river traverse from Mirkanni to Arnawai, thus completing an unbroken traverse from Mirkanni to Arnawai.

(2) An accurate traverse of the Arnawai nullah from $9\frac{1}{2}$ miles from its junction with the Chitral river; and

(3) Fairly accurate fixings of the following villages:—Arnawai, Lambabat, and Mirkanni on the Chitral river, Damer or Gud in the Gud Gol, and Ramram and Kamsai in the Arnawai stream. Also fixings of points on the Bashgol nullah watershed, mouth of Bashgol stream, and of points on both watersheds of the Arnawai stream.

Altogether a considerable topographical knowledge has been gained of some 3600 square miles of hitherto unknown country, and when we are in possession of the detailed maps and reports, light will no doubt be shed on the revision of the Anglo-Afghan boundary agreement which has attracted some attention in this country.

At the headquarters' offices a vast amount of geographical compilation and drawing, engraving and photographic and lithographic work, has been accomplished, the latter branch being under the very efficient superintendence of Colonel Waterhouse. As, however, the maps themselves are duly noticed in this *Journal*, it is perhaps unnecessary to mention them here again. From a British point of view the most important productions are the general maps illustrating whole provinces, such as Burma and Baluchistan; and if new compilations showing the latest surveys in these parts could be made available with greater promptitude, there is no doubt that they would excite considerable interest and command a ready sale in England. The work of actual survey is carried on with an energy that is deserving of all praise, but, so far as English geographers and others interested in India and adjacent countries are concerned, there appears to be a congestion of the material at headquarters which prevents some of the results of these remarkable surveys being utilized as promptly as could be wished.

A notable retirement during the year was that of Colonel Sir H. R. Thuillier, K.C.I.E., R.E., who quitted the department after a long and useful career of thirty-six years, nine of which had been passed as Surveyor-General. The name of Thuillier is one deservedly honoured in the annals of the Indian Survey, and it will be gratifying to our readers to learn that the Government of India have placed specially on record their appreciation of the excellent service rendered by this distinguished son of a distinguished father.

GEOGRAPHY AT THE UNIVERSITIES.

THE following report on geography during the past year at Oxford has been sent by Mr. H. J. Mackinder:—

“During the past academic year I have lectured, as usual, twice a week in each of the three terms. In Michaelmas Term I dealt with