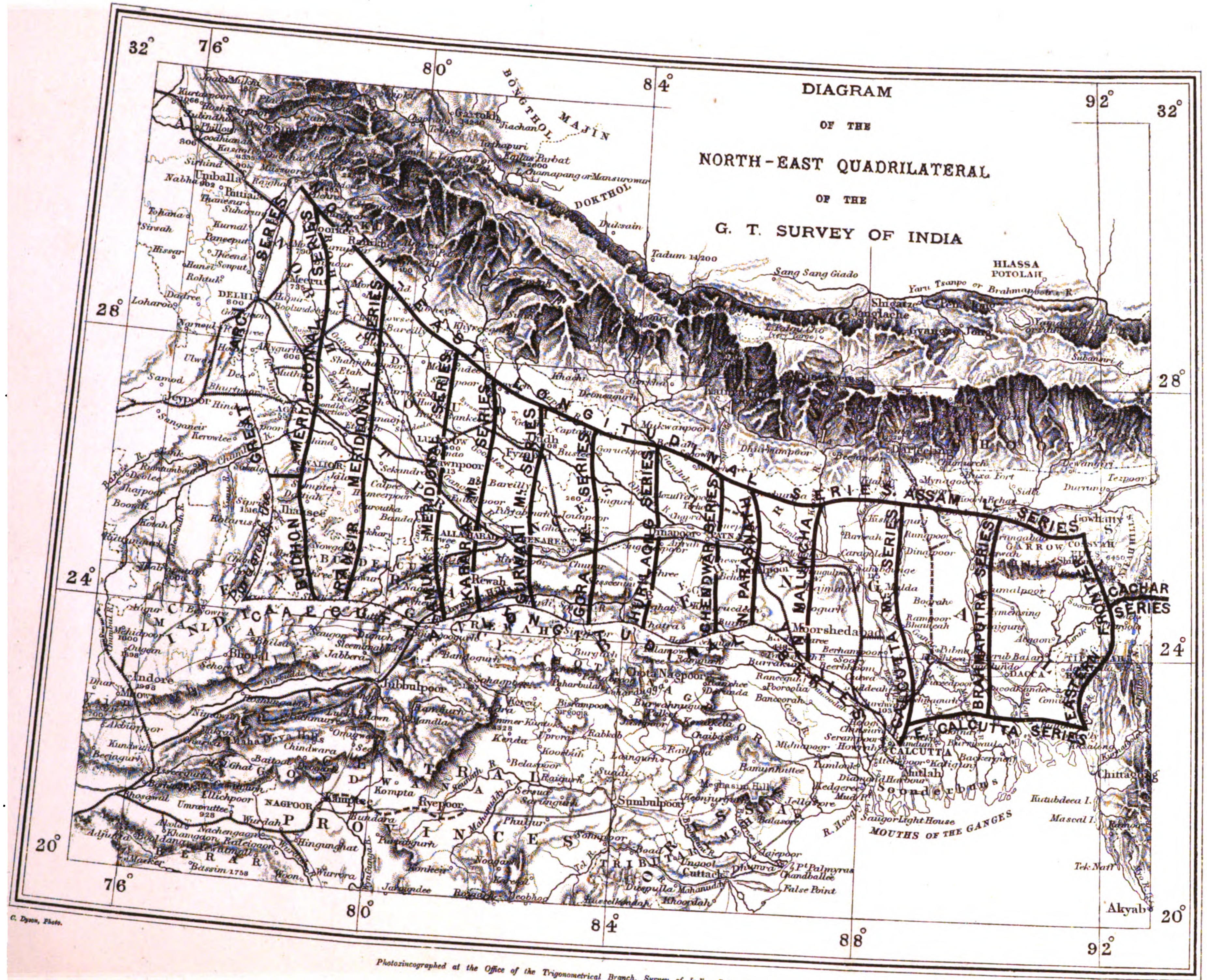

Photozincographed at the Office of the Trigonometrical Branch, Survey of India, Dehra Dún, December 1882

SYNOPSIS OF THE RESULTS OF THE OPERATIONS OF

THE GREAT TRIGONOMETRICAL SURVEY OF INDIA

VOLUME XV.

DESCRIPTIONS AND CO-ORDINATES

OF THE

PRINCIPAL AND SECONDARY STATIONS AND OTHER FIXED POINTS OF

THE RANGIR MERIDIONAL SERIES

OR SERIES K

OF THE

NORTH-EAST QUADRILATERAL.

BY LIEUT.-GENERAL J. T. WALKER, C.B., R.E., F.R.S., &c., &c.,
SURVEYOR GENERAL OF INDIA, AND SUPERINTENDENT OF THE TRIGONOMETRICAL SURVEY,
AND HIS ASSISTANTS.

Dehra Dun:
PRINTED AT THE OFFICE OF THE TRIGONOMETRICAL BRANCH, SURVEY OF INDIA.
B. V. HUGHES.

1883.

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ERRATA ET ADDENDA.

Page			
8—K.	line 27 from top	*for* (1794)	*read* (1774)
„	„ „ „	„ Naju	„ Háfiz Rahmat

Throughout the text the following points

Bádsháhpur	Muhammadabad
Chamári	Parbata
Gopálpur	Pola
Kálpi	Sháhabad
Kalra	Shamsabad
Maudo	

have been treated and printed as if they had been visited stations, and have the letters s. or h.s. affixed to them. In the table of Azimuths, commencing on page 26—K, azimuths *at* these points of surrounding stations are given; this should not have been done. On the Charts, however, these points are correctly exhibited as *intersected* points.

January, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

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REFERENCES.

The abbreviations employed in the text are as follows:—

h.s. denotes hill station secondary
s. „ station secondary
t.s. „ tower station secondary

These abbreviations are only placed after stations where a theodolite has been set up and observations taken to surrounding points.

The latitudes and longitudes of all points shown on the Charts at the end of this volume will be found in the text. The latter exhibits numerical values of triangles only to points of a superior class, to which alone, if exhibited on the Charts, lines are drawn: these lines are either continuous throughout, or dotted for half the length and continuous for the other half: the dots indicate that the bearing was not observed, and in such cases numerical values of azimuths are not given. For other points, difficult to identify or of comparatively less accuracy, numerical values of triangles or azimuths are not given.

January, 1883.

J. B. N. HENNESSEY,
In charge of Computing Office.

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PREFACE.

The Rangír Meridional Series is the second meridional series from the west of the sixteen chains of triangles included in the Section of the Principal Triangulation of the Survey of India which has been named the North-East Quadrilateral. This Section embraces the area within the Meridians of 78° and 92° and the Parallels of 23° and 30°; and for reasons explained in Section 7 of Chapter I of Volume II of the *Account of the Operations of the Great Trigonometrical Survey*, its general reduction was postponed till that of the neighbouring Quadrilaterals, *viz.*, the North-West and South-East, had been completed, whereby two of the Series, the Great Arc, Section 24° to 30°, and the Calcutta Longitudinal, entering the periphery of the North-East Quadrilateral, became finally fixed. The general principles of the Simultaneous Reduction, and the procedure followed in carrying it out, are the same as have been explained in Volume II of the *Account of the Operations, &c.*, and full details of the whole of the principal triangulation which is at present included in the Quadrilateral, will be found in Volumes VII and VIII of the *Account of the Operations, &c.*

As however the entire contents of the volumes of the principal triangulation are not needed by geographers and surveyors, and moreover as these volumes give no details of the secondary triangulation—which is of considerable value for local requirements—it is obviously desirable that synopses of the final results of the whole of the operations, including the secondary as well as the principal triangulations, should be published for general use, in such a form as to be most suitable for convenience of reference. This has already been done as follows;—For the several Series forming the North-West Quadrilateral,

I. Great Indus Series.
II. Great Arc, Section 24° to 30°.
III. Karáchi Longitudinal Series.
IV. Gurhágarh Meridional Series
V. Rahún Meridional Series.
VI. Jogí-Tíla and Sutlej Series.
VII. North-West Himalaya Series.

For those also of the South-East Quadrilateral, *viz.*,
VIII. Great Arc, Section 18° to 24°.
IX. Jabalpur Meridional Series.
X. Bider Longitudinal Series.
XI. Biláspur Meridional Series.
XII. Calcutta Longitudinal Series.
XIII. East Coast Series.

And for the following Series of the North-East Quadrilateral,
XIV. Budhon Meridional Series.

} Already published.

The present is the 15th Synoptical Volume and the second of those appertaining to the North-East Quadrilateral, and it gives the results of the whole of the triangulation, both the principal, which was executed with theodolites having azimuthal circles of 15 and 18 inches in diameter read by 3 micrometer microscopes, and the secondary, which was executed with smaller theodolites read by verniers.

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By the process of reduction which has been followed the principal triangulation has been rendered perfectly consistent, both internally and externally; internally, so that if in any one of the several polygonal figures of which the chains may be composed, calculations are carried from one station to another in every possible direction, the same results will be inevitably deduced; and externally, so that the values of the co-ordinates of any station, when computed from the given co-ordinates of any other station, with the final linear and angular data, will be the same, whether the calculation is carried directly through the series, or circuitously through any of the other chains of triangles comprising the North-East Quadrilateral. All secondary triangulations which emanate from one side of the principal series and close on another side thereof, or on a contiguous series, have also been made consistent throughout.

As regards the general arrangement of this volume, it is necessary to point out that the several sections have been prepared and printed at different times, and that the work has extended over several years. The Introduction and the Names and Descriptions of the Principal Stations were originally prepared for Volume VII of the *Account of the Operations, &c.*, and when a sufficient number of copies had been printed for that work, additional copies were struck off for the present Synopsis. The Alphabetical and Numerical Lists of Principal Stations, pages 1—K. and 2—K., were printed prior to the year 1868, when the general programme for the final reduction of the whole of the Triangulation of India was drawn up; there was then a long pause in the printing, while the Simultaneous Reductions of the North-West, South-East and North-East Quadrilaterals were being completed; this was done by the year 1877, when the secondary triangulation was adjusted in accordance with the principal, and then the printing of this volume was resumed.

The data given in this volume are the following:—

First (page 1—K.), an alphabetical list of the names of the principal stations, showing the numbers assigned to them, which were employed in the reductions as being more convenient to use than names.

Second (page 2—K.), a numerical list giving the names corresponding to the numbers.

Third (page 3—K.), descriptions of the principal stations—of their structure and positions—as taken from the original records of the observations, and supplemented by an Addendum, page 47*—K., giving the most recent information of their condition which has been received up to date.

Fourth (page 10—K.), the angles and sides of the principal triangles, numbered and arranged in order from south to north.

Fifth (page 13—K.), the angles and sides of certain secondary triangles. The numbering is here made consecutive to that of the principal triangles, in order to facilitate references which are made in other sections to the place where the length of a side is to be found.

Sixth (page 26—K.), the azimuths of surrounding stations and points, at principal, principal-auxiliary, and secondary stations, the latter arranged in alphabetical order.

Seventh (page 34—K.), the co-ordinates and descriptions of all stations and points arranged in alphabetical order.

The heights of the stations depend in the first instance on the finally determined values of the stations of Tinsmál and Rangír of the Calcutta Longitudinal Series (of the South-East Quadrilateral), and of Sísgarh and Atária of the North-East Longitudinal Series. In addition to these fixed heights, the heights of Stations XIX, XX and XXXI were determined by the Spirit-leveling Operations of this Branch of the Department, and that of Station VII by similar operations of the Revenue Branch. The manner in which the heights of the remaining stations have been made to accord with those above designated, is explained in Section 7 of Chapter II, Part I of Volume VII of the *Account of the Operations, &c.* The datum to which all heights have been referred is the mean sea level of Karáchi (Kurrachee). It may be here stated that all trigonometrically determined heights invariably refer to the upper surfaces of the central masonry pillars which are constructed for the instruments to stand on. Spirit-leveled values sometimes refer to the upper surface and sometimes to the basement of the pillar, whichever the leveling staff was set on; a description of the exact point referred to is given in each instance in footnotes to the pages of the Co-ordinate List, commencing on page 34—K.

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It has not been considered necessary to publish the whole of the details of the secondary triangulation, portions having been executed originally for preliminary geographical purposes, to facilitate the construction of a first map of India, and the objects observed having in many instances been flags and temporary marks which must long since have disappeared. The sides and angles of 320 triangles, which were selected as most likely to be still in existence and of future use, and the azimuths of all these sides, have been given; but for a number of other points the co-ordinates only have been given. With the aid of Nos. X, XI and XII of the *Auxiliary Tables to facilitate calculations of the Survey Department of India*, Dehra Doon 1868, local surveyors, working on a system of rectangular co-ordinates, can readily transform the spheroidal co-ordinates here given to suit their own requirements.

The Longitudes depend on an astronomically determined value of the longitude of the Madras Observatory, 80° 17′ 21″, which was deduced about the year 1815. There has long been reason to believe that this value was about 3′ too great; but, pending the final determination of the longitude of the Madras Observatory, it has not been considered desirable to alter the value, which has therefore been maintained up to the present time. An electro-telegraphic determination of the longitude of Madras from Greenwich, commencing with the difference between Suez and Greenwich—determined, in 1874, under the superintendence of the Astronomer Royal—was completed in 1877 by the determination of the difference between Suez and Madras, by Captains Campbell and Heaviside, as a part of the operations of this Survey. The combined result places the Observatory at Madras in Long. $5^h\ 20^m\ 59^s{\cdot}42 = 80°\ 14'\ 51''{\cdot}30$. Thus the following precept may be accepted with considerable confidence,—

All the values of longitude in this volume require a constant correction, probably of − 2′ 30″.

As regards the orthography of Indian names in the present volume. The Alphabetical and Numerical Lists of Principal Stations, at the commencement of the volume, were printed before the year 1868, in accordance with the rules introduced by Colonel Everest for use in the Survey Department. Subsequently, in 1874, several provincial lists of spellings, constructed under the immediate orders of the Government of India, were received; and thereafter the newly authorised spellings were adopted for all names and other words contained in these lists; but for words for which there was no specific authority, the spellings have been framed in accordance with the methods followed in the preparation of the published lists, reference being made in the present instance more particularly to the Gazetted List for the North-West Provinces. As a general rule the pronunciations of the vowels are as follows:—*a* has a variable sound as in wom*a*n, rur*a*l, p*a*ltry; *á* as in t*a*rtan; *i* as in b*i*t; *í* as in ravine; *u* as in b*u*ll; *ú* as in r*u*ral; *o* as in n*o*te; *e* as *a* in s*a*y; *au* as *ou* in cl*ou*d; *ai* as *i* in r*i*de.

The Charts accompanying this volume show the whole of the principal stations and triangulation, the positions of all the secondary points, and those portions of the secondary triangulations of which full details of the angles, sides and azimuths are given. With the aid of the Charts it is hoped that little difficulty will be met with in finding out any of the data which may be required. The descriptions of the secondary stations are in some cases not as full and clear as is to be desired: this arises from the inadequacy of the information entered on the spot by the surveyors in their field books; every effort has been made to supplement the field books, whenever it was found practicable to do so, in order to facilitate the future identification of the stations; all the information which is forthcoming has now been given.

The general arrangement of this volume and the preparation of the data which it contains have been the work, at different times, of Mr. Hennessey, M.A., F.R.S., Major Herschel, R.E., F.R.S., and Mr. Cole, M.A. Major Herschel moreover supervised the Simultaneous Reduction of the North-East Quadrilateral of which this Series forms a portion, while the Introduction to this volume was written by Mr. C. Wood, Surveyor 2nd Grade. Great pains have been taken to secure the utmost accuracy in preparing the data and passing them through the press.

CALCUTTA,
January, 1883.

J. T. WALKER, LIEUT.-GENERAL, R.E.,
Surveyor General, and Superintendent of the Great Trigonometrical Survey of India.

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RANGIR MERIDIONAL SERIES.

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RANGIR MERIDIONAL SERIES—(LONG. 79° 30′).

INTRODUCTION.

The Rangír Series is the second in order, reckoning eastwards from the Great Arc, of the meridional chains of triangles which are included in the North-East Quadrilateral. It is aligned, as closely as the nature of the country would allow, on the meridian of Rangír, *viz.*, 79½°. It emanates from the side Tinsmál-Rangír of the Calcutta Longitudinal Series, and extends over a meridional distance of about 4½°, up to the North-East Longitudinal Series. It was constructed throughout as a chain of single triangles, but with the introduction of a trigon around the station of Muhammadabad (XXII). For the first hundred miles of its length, it crosses the low hills which, generally speaking, may be said to form the northern outliers of the Great Vindhya range; and in this part of its course, it traverses portions of the modern districts of Saugor, Damoh, Jhánsi and Hamírpur and of the Native States which are affiliated with the Bundelkhand Agency. It then enters the great plains of the Gangetic valley, and after crossing portions of the modern districts of Jálaun, Etáwah, Farrukhabad, Sháhjahánpur, Budaun and Bareilly, terminates in the forests of the Tarái at the foot of the Himalayan mountains.

The execution of the Series was originally entrusted to Lieutenant A. S. Waugh of the Bengal Engineers—afterwards Surveyor General—Lieutenant T. Renny of the same Corps being chosen at the same time to conduct the adjoining chain of triangles to the east, *viz.*, the Amua Series. Both these officers had recently been appointed to the Great Trigonometrical Survey, on the recommendation of Major Everest, the Surveyor General, with a view to the early commencement of these chains of triangles. But as they had had no previous experience of principal trigonometrical operations which were designed to subserve the requirements of Geodesy as well as Geography, Major Everest recommended that they should be primarily employed as assistants in the operations which were then being carried out on the Great Arc, in order to gain a practical knowledge of duties such as those which they were eventually intended to undertake, observing that "although both these "gentlemen are highly talented as far as theory goes, they cannot be expected to conduct "duties of this sort intuitively".

At the time when their appointments to the Great Trigonometrical Survey were sanctioned by the Government they were both in Calcutta; and as in marching from Calcutta to the scene of their operations, in Central India, they would have to pass through or near

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certain localities of which "as little was known as of the heart of Africa", Major Everest proposed that they should carry a rapid route-survey (supplemented by suitable descriptive notes) through the tracts in question. He drew up instructions for their guidance, which are given below *in extenso**, as they are interesting for the evidence they afford of the necessity which existed in those days for combining surveys of the roughest description, which were wanted to satisfy immediate geographical requirements, with operations of extreme precision, which were intended to form a permanent basis for all future survey operations.

Even the primary operation of selecting suitable sites for the stations of the principal triangulation was made to subserve the geographical requirements of the moment; it furnished approximate values of the positions of the stations themselves and of the hill

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**Extract of Instructions communicated to Lieutenants Waugh and Renny, by the Surveyor General in November* 1832.

The first obvious blank in all our maps is the mass of mountain land on which Rotasgurh is situated.

The range called "Kula Phar" to the east of this which bounds the valley of the Soane may be generally laid down.

But as to the route over the mountain at the back of Rotasgurh, this gap in our knowledge may well be filled up more particularly. I took a route of the tract between Rotasgurh and Punnoogunge near Bijeygurh in 1817, which is perhaps as accurate as route surveys in general. It was plotted very carefully by me from my field book and I lent it to Colonel Blacker for the purpose of facilitating the operations of my own people under Mr. Olliver in 1825. In that plan there is a road from Weenee branching off to Chunar left incompleted, the last place on it being Bogheelah. There is also a road from Dhobaee branching off to Chaenpoor from the road between Bijeygurh and Sheergurh, the most advanced place on it being Peeprah. If these two roads could be explored they would connect the details of my sketch with the general map, and the details would be filled up more satisfactorily still if direct roads can be found leading from Sheergurh to Rotasgurh, from Bijeygurh to Chunar, and from Bijeygurh to Rotasgurh along the face of the mountains.

I leave it to your judgment to examine or not any portion of my route again. You may perhaps lay down the hills more accurately, which is an object, and as it was a very hasty performance, you may if you find any errors correct them, but I think you will find it as good as route surveys usually are.

Rough plans of Bijeygurh and Sheergurh will be of use as well as plans of any other hill forts on that range. Historical facts connected with Sheergurh may be instructive. The tract to the southward of Sonegurra or Songurh leading to Omurkuntuk is absolutely *terra incognita* and it is one of the most interesting parts of India both geologically and geographically. The route I wish to be explored is that leading to Omurkuntuk from Rajgurh on the Soane, but you may be compelled to adopt some other route and I must rely on your prudence to take that which will afford the most information. Rajgurh appears to lie in Latitude 24° 35′ and Longitude 82° 6′, Omurkuntuk in Latitude 22° 40′ and Longitude 81° 43′. Whatever route you take however, you must cross the southern face of the Kimoor range respecting which any particulars you can give will be interesting.

Your Latitudes and Longitudes will all be referred to the nearest principal stations of the Longitudinal Series of the Great Trigonometrical Survey, whenever you can manage to discover them.

Having explored the route to Omurkuntuk, you will proceed if possible along the northern bank of the Nerbuddah to Jubbulpore and from thence to Seronj, where you will fall in with the party under Mr. Rossenrode, and I wish you to take advantage of that opportunity to acquire a practical acquaintance with the method of conducting Trigonometrical operations in the field.

I need not point out to gentlemen of your good sense and talent how necessary it is to devote your whole energy to this object, and how manifest an advantage it is to you to enter on your career as geodesists with full liberty to use the splendid instruments of my department and try your hand at any part of the operations without apprehension of doing mischief. A course of regular operations could not hold out those advantages because business requiring the most scrupulous attention to accuracy is then to be performed; but in an approximate series, if you should make a wrong reading, it is but putting the pen through it, and the work will still be accurate enough for the object in view. I shall therefore trust to your own sense of propriety to lose no opportunity of qualifying yourselves to take charge of a party on one of the independent meridians; but when you can do so without injury to this principal object, I wish you to furnish as many data for the topography of the country within the Series as you can collect.

Data.

Barometer to be observed every day three times if possible at the same hour.

Two Barometers to be observed simultaneously when the depths of the beds of rivers or the heights of mountains are required.

Angles of elevations of any high peaks to be observed from two places whose distance is known, as well as the horizontal angles, so that the distances and heights of the main features of the country may be fixed.

Courses of rivers.—Where they emerge from the mountains to the plains. Their height at flood. Their minimum if perennial. Their period of drought if dried up. Locality of their sources. The strata they pass through, and the breadth of their beds. The depth of the channel as respects the surrounding country. Whether the banks are steep or cut into ravines or sloping.

Nature of the country passed through.—If a valley, how bounded, by high hills or low? The nature of those hills. Are they of primary or secondary formation? Do they contain mines of coal or marble or asphaltum or rock-salt, &c., or is there gold, lead, copper, &c.

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peaks, towns, villages or other prominent objects seen from them, by observations taken with small theodolites or sextants during the course of the general reconnaissance of the country. The preliminary triangulation thus executed came to be called the Approximate Series, for it was intended to serve as a *pis aller* until the principal observations with the great theodolites could be completed. It was invariably pushed on as rapidly as possible without regard to nicety, observations being taken sometimes from trees and lofty scaffolds in the plains, and sometimes to distant torches and blue-lights which could be seen with the aid of nocturnal refraction over intervening obstacles, before the 'rays' between the principal stations had been cleared for the final observations.

Lieutenants Waugh and Renny started from Calcutta early in the field season of 1832-33, with two assistants. After carrying out, as fully as was possible, the instructions they had received for making route-surveys and drawing up reports of the *terra incognita* through which they had to pass, they reached the camp of the party which was then employed on the Great Arc, at the principal station of Mao, in the Gwalior territory, about 18 miles from the town of Sipri. They devoted the remainder of the field season to acquiring an insight into the nature of the operations of the principal triangulation and some practical familiarity with the details.

Babu Radhanath Sikdhar, 3rd Class, Sub-Asst.
Mr. W. Martin, " "

The following recess was spent in Agra, where both officers were for some time occupied in bringing up their maps, plans, and reports on the route-surveys which they had recently accomplished, and afterwards in making preparations for commencing—in the next field season—the chains of triangles which had been respectively allotted to them.

Lieutenant Renny's subsequent operations being described in the Introductory Account of the Amua Series, we have here to deal only with those of Lieutenant Waugh, on the Rangír Series.

The party which was intended to break ground on this Series was constituted as shewn in the margin. It was furnished with an 18-inch theodolite by Cary for the principal observations*, with two 7-inch instruments for the secondary work, and with such other equipment as was deemed necessary. It started from Agra on the 30th of November 1833, and marching

Season 1833-34.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 2nd Assistant.
Mr. J. W. Armstrong, 3rd Class Sub-Assistant.
" W. R. Forster, " "

to be found in them? How far from water carriage? Mineral springs, hot or cold. The order of the strata shewn in the beds of rivers and the bare sides of mountains.

Manners and language of the people.—Are they Hindoos or Mahomedans, or what is their religion? Are they obliging or hostile to strangers? To what state of civilization have they attained? Their progress in agriculture, manufactures, &c. The weapons they use. The language they speak. Are they a truth-telling people or deceitful and prone to falsehood? If the inhabitants are wild, are the settlements formed by the natives of Hindoostan amongst them numerous?

Fertility of the country.—Are there means of irrigation? Does the country admit of such being constructed, as building dykes? Number of crops a year? Are the people generally comfortable or oppressed? Are they wandering tribes, or attached to their homes?

Is the country open or covered with forest? What kinds of trees are found in the forests? Enumerate the different kinds of building wood to be met with. Are ebony and other kinds of wood fit for cabinet work found there? Of building materials, what means of water carriage? Drawings of curious temples, and all objects tending to illustrate the manners, customs, history, geology, and natural and artificial features of the country will be acceptable.

* Known as Cary's 18-inch L; for a description of this instrument see page 69 of the Appendices to Volume II.

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vid Gwalior, Datia, Jhánsi and Saugor, arrived at Rangír about the 6th of January 1834.

Here Lieutenant Waugh commenced operations by taking a set of circumpolar star observations for determining a fundamental value of the azimuth, which was to be employed instead of the value that had been brought up through the Longitudinal Series from Kaliánpur. He then proceeded to lay out the triangulation, employing the side Rangír-Tikaria as his base, in conformity with the instructions he had received from Major Everest. But the ground immediately to the north of that side proved utterly impracticable for the extension of the triangulation therefrom; for the side was of considerable length—over 30 miles—and was confronted by a portion of the Vindhyáchal range which here developes itself into a mountainous table-land of considerable breadth, covered with high forest trees and dense underwood, and devoid of any commanding eminences. Thus the selection of symmetrically situated stations was a very difficult task to accomplish.

Lieutenant Waugh reported that after "having traversed the whole range and observed from nearly every high tree and rising ground", his endeavours had all been in vain to advance the Series in any other way than by constructing a tower station 35 feet high at Saipur on the hills to the north of Rangír to command the view. The tower was commenced, and it was being built of stones set in clay instead of mortar, and had attained a height of 10 feet, when the water supply failed; the remaining 25 feet was run up with dry stones, and it came tumbling down almost immediately after completion. This disaster, combined with the circumstance that it would be necessary not merely to rebuild the tower at Saipur, but to construct a tower 60 feet high on the Sonha hills, at a considerable cost, if the originally intended side of origin was to be maintained, eventually induced Lieutenant Waugh to adopt the side Tinsmál-Rangír as the origin of the Series. At first however he loyally endeavoured to carry out the instructions he had received, reporting progress constantly and soliciting further orders; but the postal arrangements in those regions were so defective that he frequently did not receive answers to his letters to the Surveyor General in less than two months. A change of base involved the rejection of the work of several months which a young officer might well shrink from doing on his own responsibility; but immediate action was necessary, and Major Everest when all the facts were reported to him, at once approved of the change, saying that it was quite sufficient "if one flank of the Series—it did not matter which—was kept close to the meridian of the operations", and giving as an illustration the Great Arc Series which "runs as often on one side of the meridian as the other" and follows the principle of "not fighting with a difficult tract when its flank can be turned". As regards the two towers which were required for the triangulation from the original base, Major Everest wrote that he preferred "vitiating the symmetry of the triangles to having towers of 60 feet in a hilly country to start with; the notion is startling and must be abandoned".

Thus after five months of harassing anxiety and failure, during the best time of the year for field operations, Lieutenant Waugh found himself compelled to commence work on a new base at the time when the field season was nearly ending. But he had resolved that, in spite of all the difficulties which had beset the work at the very outset, the Rangír Series should not be found "to have fallen in arrears or have lagged behind its neighbours".

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He remained in the field until the end of July, so as to avail himself of the clearing of the atmosphere which usually takes place when the rainy season commences; and he succeeded in observing the angles of the principal triangles up to the side Nágonáth-Phára, (VIII-IX) thereby completing the Series for a distance of 100 miles, and achieving an admirable out-turn of work in an unusually short space of time. Even the operations in the first five months of the field season, though a failure as regards the advancement of the principal triangulation, were fruitful in results of much value for immediate geographical requirements; as a large area of country had been reconnoitered, and the positions of several towns and forts of importance, lying mostly in Native States as yet unsurveyed, had been fixed from various secondary stations at which observations were taken with the small theodolites in the course of the search after suitable sites for the principal stations.

The latter 40 miles of the season's work on the Rangír Series lay in the Hamírpur District, which was suffering so terribly at the time from famine that Mr. Pidcock, the Settlement Officer of the district, reported that the season was one of unparalleled distress to the people and loss to Government,—the miseries of famine, pestilence, and exile having denuded the district of nearly one-half of its population.

In submitting from recess quarters the computations of the field season's operations, Lieutenant Waugh noticed with much regret the presence of *triangular errors* of over six seconds in the 5th and 6th principal triangles. He stated that he would have re-observed the angles had it not been for the impossibility of procuring further supplies of food for his people; being diffident of his skill as an observer he said that though not conscious of any remissness in this particular portion of the work, he could not but suppose that the errors "arose chiefly from bad observations". It is now however quite certain that the errors were due not to the observer but to the instrument employed, which was soon found to be of inferior value and was discarded.

Lieutenant Waugh's out-turn of work during the year consisted of a set of circumpolar star observations for azimuth; 8 principal triangles; 21 secondary triangles of the first class, and 43 of the third class; the elevations of all the principal and of 26 secondary stations, also a skeleton plan of the triangulation and a reconnaissance of the tract of country operated in. The latter included a part of Bundelkhand of which Lieutenant Waugh remarked that "it was peculiarly favourable for secondary work; "the detached granite ridges command "extensive views; forts and temples perched on eminences abound; indeed a complete map "might be made by triangles of the 1st, 2nd, and 3rd classes, and had it not been for the "difficulties which beset my *debût*, I should have formed such a map without at all delaying "the Principal Series".

The chain of triangles had now been carried into the plains of the Gangetic valley, only one more hill remaining to offer its friendly assistance in presenting a suitable site for a station of observation. One-third of the chain was complete, all of which—with the exception of the first triangle, measured in the course of the operations of the Calcutta Longitudinal Series—had been achieved by Lieutenant Waugh in a single year, under many and great difficulties as already set forth. Nevertheless the completion of the remaining two-thirds occupied nearly eight years to accomplish. The great retardation in the subsequent rate of

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progress was due to two causes. *First*, at every station in advance—with the single exception of the hill of Gokulphára—towers had to be constructed to furnish stations of observation, and on sites carefully selected so as to present the fewest possible obstacles on the lines between the stations; moreover all obstacles to mutual vision had to be removed before the final observations could be commenced. *Secondly*, in order to construct a chain of triangles composed of as few links as possible, the sides of the triangles in the plains were maintained throughout at so great a length that the rays between the stations grazed the surface of the ground for a distance of several miles, thus making distinct mutual visibility impossible, excepting under unusually favourable atmospheric conditions which were of very rare occurrence.

The building of towers required the co-operation of the Department of Public Works; the Surveyor General had therefore moved the Government to issue the necessary instructions to that Department. Although anticipating that some delay would occur before the arrangements for the construction of the towers could be matured and suitable designs prepared, he was nevertheless confident that the building of artificial elevations of some sort or other would eventually be sanctioned. He accordingly issued instructions that field operations should be resumed during the ensuing field season, but that they were to be restricted to the selection of suitable sites for future tower stations. At the same time he prescribed a method of 'ray-tracing', for site-selection, by carrying a traverse with a theodolite and perambulator over each ray, with a view to effecting a close examination of the ground in each instance, before the final adoption of the sites and the commencement of ray clearing. *Vide* Section 3 of Chapter II of Vol. II.

Season 1834-35.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 1st Asst.
Mr. J. W. Armstrong, 2nd Class Sub-Assistant.
„ W. R. Forster, 3rd „ „

In the following field season the party started from Cawnpore on the 10th of October. Lieutenant Waugh wrote a circular letter to the Civil Officers of the various districts through which his operations would have to pass, pointing out his dependence upon them for obtaining labour and supplies, and explaining the necessity for the removal of all obstructions on the lines between the principal stations; he said that great care would be exercised both by himself and his assistants not to inflict more injury in the removal of obstacles than was absolutely necessary, and due recompense would be readily made for all property destroyed; also that as he had no leisure nor inclination for entering into disputes with the owners regarding the cutting down of trees or removing of other obstacles, he trusted the Civil Officers would issue plain and positive orders for his support. This timely explanation of matters led to very happy results in the substantial assistance which was rendered to the surveyors throughout the field season.

Writing from Kanwa (XII), where the ray-tracing was begun on the line to Gura (XI), Lieutenant Waugh reported that the country thereabouts abounded with mud forts situated on the high lands. "Some of these", he said, "are uninhabited, with defences "ruined, and presenting a rude mass with steep sloping sides; they are solid, and a station "placed in the middle would be permanent even were the sides to crumble away to a slope "of 45° which is an event improbable, considering the tenacity of the material and its dis-

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"position in successive strata or layers, according to the usual habit of the natives in build-"ing earthwork". Other forts were partially tenanted, and had solid towers which could be used as stations. Again, eminences were met with which were crowned with old and untenanted brick buildings, and occasionally with domed temples. It was expected that many of these structures might serve as basements for the stations of the principal triangulation, and thus obviate the construction of towers of the great height which would otherwise be necessary in order to secure mutual visibility over the plains.

Having reconnoitred the country and given a good start to the operations, Lieutenant Waugh was summoned by Major Everest, towards the end of November, to assist in the measurement of the Dehra Dún Base-line, leaving the work on the Rangír Series under the supervision of Mr. Armstrong, the senior of his two assistants. On the completion of the base-line he returned to the charge of the Series, joining Mr. Armstrong in camp on the 20th May.

The party kept the field till the end of June. By this time all the rays had been cleared up to the side Chandanpur-Pothári (XXI-XXIII), and stations had been selected up to the side Janjíri-Gajnera (XXIX-XXX), thus furnishing as the out-turn of the season's work a symmetrical series of 20 triangles, of the first 13 of which the rays were all cleared. In reporting on the field season's operations, Lieutenant Waugh stated that "the chief portion "of this work having been done during my absence by Mr. J. W. Armstrong, any merit it "may possess, either quantitatively or qualitatively, is entirely owing to his zeal and abilities. "I have on former occasions borne testimony to the talents and good conduct of Mr. "Armstrong as well as Mr. Forster, and I may now add that their efficiency keeps pace with "their experience. Their labours during the last season, in the novel and arduous under-"taking of carrying a series across the plains without any resource but what their judgment "might suggest, so greatly surpass my expectations that it becomes a pleasing duty to me to "bring them to the particular notice of the Superintendent".

During the following recess season, Lieutenant Waugh supplied carefully prepared drawings and estimates of the masonry columns that would be required at the first ten of the tower stations in the plains. These were designed simply for the support of the large theodolites which would be employed in the measurement of the principal angles; they were further intended to mark the station permanently. The surrounding platform for the support of the observer, his attendants, and the observatory tent, was to be constructed as a portable scaffolding, which would be removable at pleasure, in order to be employed alike at all the stations; bamboo ladders were to be erected for the use of the signallers whenever the scaffolding was not available. The early construction of the masonry pillars was very desirable; therefore, in forwarding the designs for them to the Government, the Surveyor General pressed for an early decision, as otherwise the progress of the Series would be arrested. Thereupon the Military Board—to which the general construction of all public works was then entrusted—was directed to adopt the necessary measures for the construction of the required columns of masonry, in communication with Lieutenant Waugh.

The party had already (3rd October) taken the field when the orders of Government

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were received. As the erection of the masonry columns would take some time, no final observations were contemplated this season. The party was therefore to be occupied in clearing rays, selecting stations and also in measuring the angles approximately—with small theodolites—for immediate geographical requirements.

Season 1835-36.

PERSONNEL.

Lieut. A. S. Waugh, Bengal Engineers, 1st Asst.
Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ W. R. Forster, 2nd „ „

Early in this season the services of Lieutenant Waugh were again drawn off to assist Major Everest, whose health was in such an unsatisfactory condition that his medical advisers strongly recommended him to abjure all further active field work and proceed to sea. The Surveyor General was most anxious to finish the operations on the northern section of the Great Arc; and at the same time he wished to guard against any sudden emergency, by having with him an officer in whose hands he could confidently leave the conduct of those operations, the early completion of which was of great importance in the interests of geodesy. Accordingly, with the sanction of Government, he directed Lieutenant Waugh (on 8th December) to repair with as little delay as possible to the Head Quarters of the Great Arc party which was then at Kaliána—the northern astronomical extremity of the Arc. Thus the management of the Rangír Series was again left in the hands of Mr. Armstrong, an officer to whom it could be confidently entrusted.

The ray-clearing and approximate measurement of the angles was carried on without cessation, and under many difficulties, until the 22nd of June, when the rainy season set in with such violence as to prevent further operations in the field. Fourteen rays had been cleared and approximate angles measured between stations previously selected, thus bringing this part of the operations up to the side Janjíri-Gajnera (XXIX-XXX). Five stations were selected further north, by which the Series was extended to the outer Himalayas.

Meanwhile the Executive Engineer of the Cawnpore Division was proceeding with the construction of the ten masonry columns which were required to be erected at the principal stations, in accordance with the designs previously furnished by Lieutenant Waugh. At the station of Atsu (XVI), in the Etáwah District, the overseer was completely thwarted by the determined opposition of a zemindar, Zálim Sing, the owner of a fort where a column was to be erected, the site for which he had originally given over voluntarily for the purpose; but when the overseer appeared on the scene, just one year afterwards, Zálim Sing put forward the most frivolous pretexts for holding back from his concession, and even went the length of building around the very spot which had been chosen. The overseer was compelled to suspend his operations, and a lengthened correspondence with the Civil Authorities ensued. Lieutenant Waugh pointed out that any change made in the site of the station would involve a loss to Government of Rs. 1,700, which should be defrayed by the zemindar as it would be due solely to a breach of faith on his part. This argument produced more practical results than all former persuasion had done; and it was finally settled that Mr. Armstrong should proceed to the spot, early in the following field season, and set the overseer to work, after personally arranging matters with Zálim Sing.

During the recess—which was spent at Bareilly—Mr. Armstrong prepared designs and estimates for fourteen columns remaining to be erected, and of modifications to the column

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at Bisungarh (xx), which had been found to require an increase of 9 feet to its height, in order to be seen from the two forward stations.

Season 1836-37.
PERSONNEL.
Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ J. Mulheran, 2nd Class „

Mr. Armstrong marched, on the 26th September, from Bareilly to make the necessary arrangements regarding the construction of the column at Atsu (xvi). It was found that the zemindar still objected to give up the site which he had originally conceded; he was probably more influenced by the idea of preserving his dignity than any other reason; for he willingly gave another site, within a few feet of the first, but still at a sufficient distance to necessitate a partial reclearing of all the rays between Atsu and the surrounding principal stations, a work which occupied several days.

Mr. Armstrong then proceeded southwards to examine the columns which had been built by the Department of Public Works, and clear the rays of whatever vegetation had sprung up on them during the period of two years which had elapsed since they were first opened. He found the condition of some of the columns far from satisfactory. At Husapura (xiv) so much deflection had taken place, owing to insufficient foundation and bad workmanship, that the column was in a dangerous condition and had to be rebuilt; arrangements for this were immediately made, as the column would be soon wanted in the course of the measurement of the principal angles. The columns at other stations had also become deflected to an extent which rendered it impossible to suspend a plumb-line from the centre of the summit, through the hollow core, over the centered markstone on the ground-level at the base; but this defect was got over, partly by moving the markstone, and partly by adding a capital of larger diameter to the pillar, to increase its upper surface and thus permit of the theodolite being set up excentrically. Elsewhere the columns were found to be "correct and adapted for final work".

Mr. Armstrong then proceeded to Cawnpore to take over the portable scaffolding which was to be employed around the columns at each station; these had meanwhile been constructed by the Ordnance Department, from designs supplied by the Surveyor General. No description of the so-called portable scaffolding is now forthcoming; but some idea of its bulk may be formed from the circumstance that no less than 10 four-bullock carts were required for its transport.

By the end of November everything was ready at the first ten tower stations for the measurement of the principal angles, and arrangements had been made for constructing columns at fourteen stations in advance by the Bareilly Division of the Department of Public Works. Mr. Armstrong therefore proceeded to Gokulphára (x) to resume the final observations, taking with him an 18-inch theodolite—Cary's L, described at page 69 of the Appendices to Vol. II—to employ in the measurement of the principal angles. By the 10th April, the whole of the horizontal angles had been measured at stations viii to xvii inclusive. The measurement of the vertical angles had however terminated at stations ix and x, because satisfactory verticals could not be obtained; consequently this part of the work was postponed until arrangements could be made for taking simultaneous reciprocal observations, with the assistance of a second observer and instrument.

Observations were being taken at Birona (xviii), and two-thirds had been completed,

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when, on the night of the 10th April, the portable scaffolding was set on fire; being very inflammable it was completely destroyed in the course of a few minutes. When access to the summit of the station was obtained next morning by ladders, the instrument appeared at first "to have escaped the effects of the flames"; but eventually it was found to be so damaged as to have become practically useless. The origin of the fire remained a mystery, but is believed to have been purely accidental. This catastrophe, happening in the month of April, necessarily put a stop to all further measurements of the principal angles during this field season.

During the following recess Mr. Armstrong was furnished with another 18-inch theodolite—Cary's M.O., described at page 68 of the Appendices to Vol. II; he was also directed to proceed to Agra, to superintend the construction of another portable scaffolding, with such assistance as he might obtain from the Ordnance Magazine at that place.

Season 1837-38.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ J. Mulheran, 2nd „ „

Provided with a new scaffolding, Mr. Armstrong commenced the operations of the field season of 1837-38 by final observations at Bisungarh (XX). Though detained there for sixteen days—from 24th October to 9th November—he was unable to complete the horizontal angles, but succeeded in measuring the vertical angles simultaneously with Mr. Mulheran, who took the reciprocal angles at the surrounding stations. He then proceeded to Kalsán (XIX), where, though he again succeeded in executing his share of the reciprocal verticals, he was still unfortunate as regards the horizontal angles; the condition of the atmosphere was such as to prevent him from obtaining a sufficiently satisfactory view of the signals at the surrounding stations to enable him to measure the angles between them with the requisite degree of precision. Attributing the state of the atmosphere to unprecedentedly high winds, with concomitant clouds of dust, which then prevailed in the immediate vicinity of the River Ganges, he thought it advisable to lose no more time in that neighbourhood, and, passing over three stations—XXI, XXIII and XXIV—he set up his theodolite at Guri (XXV). Here he was detained a whole month, the out-turn of which was only two principal horizontal angles and simultaneous verticals on two rays, besides a set of experimental observations to circumpolar stars for azimuth. The next three weeks sufficed but to take the principal horizontal angles at Dháka (XXVI) and the verticals on the ray to Saipur (XXVII). It was now the 5th of February, and during the next month all that he was able to finish was the measurement of the angles, horizontal and vertical, at the stations of Saipur and Kasrak (XXVIII). In writing from the latter station on the 5th of March, Mr. Armstrong reported that owing to the reverses which he had experienced from the state of the atmosphere, he had "only completed two entire triangles on the south side of the Ganges and three triangles on the north side," besides of course the vertical observations which he had advanced *pari passú* with the horizontal measurements. It was his intention at the time to continue his progress as far north as he could proceed in the month of March, and then to return and finish the work below. He made comparatively good progress during the remainder of the month, completing the horizontal and vertical angles up to and including the side Gajnera-Fatehganj (XXX-XXXI), as well as a good number of secondary angles. He then retraced his steps to Guri (XXV), where between the 15th and 19th April he ob-

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served the principal angle between the side Pothári-Mau (XXIII-XXIV), the verticals on two rays, and some secondary angles. He next moved on to Mau where he remained until the 8th of May by which time he was able to finish the three principal angles, the verticals along the ray to Dháka, and the secondary angles to surrounding stations and points. But unfavourable weather again set in, and Mr. Armstrong moved into the station of Fatehgarh where he was to spend the recess; there he employed himself on the computations, at the same time holding himself in readiness to start for his next station Pothári (XXIII) whenever the weather might permit; but dust storms continued to prevail persistently and with unusual frequency and violence; thus he was unfortunately unable to take the field again this season in order to bridge over the gap in the triangulation in the immediate vicinity of the Ganges.

The pillars built by the Department Public Works this year in the Farrukhabad and the Bareilly districts, as far north as Fatehganj, were very favorably reported on by Mr. Armstrong who found them in general well built, steady and symmetrical.

Season 1838-39.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ J. Mulheran, „ „

The resumption of field operations in the season of 1838-39, was delayed, because the severity of the preceding rainy season had done considerable damage to the portable scaffolding. It had been left standing at the station of Pothári (XXIII), until the month of August when Mr. Armstrong brought it in to Fatehgarh, for protection against further injury and for subsequent repairs; he experienced considerable difficulty in so doing because of the state of the roads and the large number of carts required for its transport. The damage done to the scaffolding took some time to repair, which, with delays in obtaining carts, prevented Mr. Armstrong from taking the field earlier than 25th December 1838. By the 19th of the following month, he had only succeeded in measuring three principal horizontal angles at the station of Pothári and in taking verticals on the rays to Chandanpur (XXI) and Mau (XXIV). He then moved on to Chandanpur, and completed three angles at this station and the verticals on the ray to Mau, by the 3rd of February. Here he received information of the fall of the pillar at Bagwára (VII of N.E.L.S.); he therefore moved the Executive Engineer of the Bareilly Division to have the pillar rebuilt with all possible despatch, as it would be required for use by the end of March. The station next visited was Bisungarh (XX); the horizontal angles were completed by the 11th of the same month, but no verticals could be obtained. For some unexplained reason Mr. Armstrong was unable to go down southwards, and complete the angles which remained unmeasured at the stations of Birona (XVIII) and Kalsán (XIX). This deficiency was not made good for another season.

From Bisungarh Mr. Armstrong marched northwards to the station of Gajnera (XXX), where he arrived on the 12th of March; by the 18th he completed the horizontal angle between Fatehganj (XXXI) and Atária (XI of N.E.L.S.), and had taken verticals on the ray to the latter station. By the 23rd of March, the horizontal and vertical angles at Fatehganj were concluded, and the party was on its way to Atária. The pillars at this station and at Sísgarh (X of N.E.L.S) were found to be very much out of the perpendicular; the former moreover was in a somewhat dangerous condition, several cracks having taken place both

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in the shaft and the basement. Though somewhat apprehensive that the pillar at Atária might fall down, Mr. Armstrong set up his large theodolite on it, rather than postpone the observations until it could be rebuilt; it was so much deflected however that the instrument could not be plumbed over the mark-stone in the basement; four small pillars were therefore built round the station, with a mark on each, and these marks formed a quadrilateral figure the diagonals of which intersected in the normal of the point of observation. By the 16th of April, the horizontal and vertical angles at this station and at Sísgarh were disposed of; and by the 3rd of May the ray from Beheri (IX of N.E.L.S.) to Bagwára (VII of N.E.L.S.)—left uncleared in 1836—had been cleared, and the horizontal angles at Beheri had been measured. The work at Bagwára was concluded by the 19th idem, some delay having been occasioned by the necessity for further clearing on the ray to Sísgarh*. The party then proceeded to recess quarters at Bareilly.

Season 1839-40.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ J. Mulheran, „ „

At the commencement of the field season of 1839-40 Mr. Armstrong was required to proceed to the camp of the Great Arc party in the Meerut District, to receive instructions and exchange his large theodolite for Harris and Barrow's 15-inch theodolite—described at page 72 of the Appendices to Vol. II—which had recently been employed with very satisfactory results on the Budhon Series.

Returning to resume field operations, on the 11th November he reached Fatehgarh, where he found his assistant, Mr. Mulheran, on whom he was dependent for the reciprocal observations, completely prostrated with a malarious fever. For this and other reasons the party was detained at Fatehgarh until the 6th of January.

The progress made during the next two months was very small, comprising only the measurement of the two northern horizontal angles at Kalsán (XIX), and verticals on the rays Pothári–Guri (XXIII-XXV) and Seontára–Birona (XVII-XVIII). By the 21st of April, Mr. Armstrong completed the horizontal angle that had remained unobserved at Birona as well as the simultaneous verticals on the fifteen rays that had hitherto existed as a gap between the side Phára-Gokulphára (IX-X), and Seontára-Birona (XVII-XVIII). The party then returned to Fatehgarh. Here Mr. Armstrong found instructions awaiting him from the Surveyor General, directing him to proceed to the Head Quarters at Dehra Dún with the whole of the establishment and instruments under his charge, leaving the portable scaffolding and other heavy ordnance stores in deposit at the Gun Carriage Agency in Fatehgarh.

Season 1840-41.

PERSONNEL.

Mr. J. W. Armstrong, 1st Class Sub-Assistant.
„ J. Mulheran, „ „
„ W. C. Rossenrode, 3rd Class „

On the 1st of the following October, Mr. Armstrong started from the Head Quarters to commence the field operations of 1840-41, and proceeding *vid* Fatehgarh marched to Muhammadabad (XXII), where a new station was to be established for azimuth observations, which had also to be connected with the surrounding stations. A tower 16 feet high was erected on the bastion

* Mr. Armstrong reported that when he was observing at Sísgarh in April, the refraction was so great as to enable him to see the heliotrope at Bagwára over every obstruction. Unfortunately this was not the case during the reciprocal observations.

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of the fort at Muhammadabad, the construction of which was completed in time for the star observations to be commenced on the 25th December. The azimuth was determined by observations to δ Ursæ Minoris at both elongations. These observations, as well as the measurement of all the horizontal angles of the three triangles connecting XXII with the surrounding stations XX, XXI and XXIII, were completed by the 12th February.

Mr. Armstrong was then transferred to Lieutenant Waugh's party, which was operating near Hyderabad in the Nizam's dominions. Mr. C. Lane, 1st Class Sub-Assistant, was placed in charge of the Rangír party, which he assumed on the 1st of March. Mr. Mulheran extended the Approximate Series in advance into the outer Himalayan Mountains by four triangles, of which the northernmost station (Khánkra) was fixed beyond the 30th parallel of latitude. But these triangles were subsequently incorporated into the North-East Longitudinal Series, at the side of junction with which—Sísgarh–Atária—the Rangír Series is now considered to terminate. Anything that may have to be stated of the triangulation beyond, which was originally executed as a part of this series, will therefore appear in the Introduction to the North-East Longitudinal Series.

The remaining operations in connection with the principal triangulation of the Rangír Series, as at present constituted, were as follows. *First*, in the field season of 1841-42 the vertical angles at and between stations XX and XXI to XXIII, which had not been previously observed were measured reciprocally by Mr. Lane and Mr. Rossenrode, observing simultaneously. *Finally*, in the season 1863-64, when Mr. George Shelverton reached Rangír, during the course of the revision of the Calcutta Longitudinal Series*—the station was found to have been so much injured that there was every reason to believe that the markstone, which was forthcoming in the *débris*, must have been displaced. Happily the marks at the stations of Tinsmál and Kusmár—which, with Rangír, form the first triangle of the chain—were uninjured. Mr. Shelverton therefore constructed a new station at Rangír—in the centre of the *débris* of the first station—and measured the three angles of the triangle Rangír–Tinsmál–Kusmár, and thus connected the Rangír Series with the revised Calcutta Longitudinal Series.

The contrast between the rapid completion of the lower third part of this Series, which is situated in a hill country, with the slow execution of the upper two-thirds which is situated in the plains, has already been noticed at pages VII and VIII of this Introduction. The principal cause of the slow progress in the plains was that the sides of the triangles were made of a length which averaged from 18 to 19 miles, and occasionally exceeded 22 miles. Such sides are much too long for satisfactory observations between towers of even the considerable height of those which were erected for the principal triangulation. Thus the measurement of the horizontal angles proceeded very slowly; that of the vertical angles had frequently to be performed so long after the time of minimum refraction that simultaneous reciprocal

* See Vol. II, pages 19 and 71; also Vol. VI, page VII—B.

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verticals were often essential to secure even moderate accuracy; and this not only necessitated the employment of a second observer with a complete instrumental equipment, but greatly retarded the progress of the operations. The experience gained on the Rangír Series led to an immediate and very sensible reduction in the lengths of the sides of the triangles in the plains. And further experience showed the desirability of still further reductions in length, in order to obtain the great advantage of mutual visibility at the time of minimum refraction, between tower stations of moderate height; thus eventually an average of 11 miles—ranging from 9 to 13—has come to be recognized as the most suitable length for the sides of the principal triangles in the plains; see Chapter II of Vol. II.

The triangulation of the Rangír Series has been included in the Simultaneous Reduction of the North-East Quadrilateral. The errors actually dispersed on this Series between the origin, Tinsmál-Rangír, and the terminus, Sísgarh-Atária, are:—

In side	Logarithm	+ 0·000,0144,9
	giving a ratio of about $2\frac{1}{8}$ inches per mile.	
„	Latitude	+ 0″·433
„	Longitude	+ 0 ·796
„	Azimuth	+11 ·597

The dispersion of these errors by the Simultaneous Reduction of the North-East Quadrilateral was effected by the method of least squares, as described in Part I of Vol. VII.

The trigonometrical determinations of the heights of the stations of this Series above the mean sea level have been corrected by connecting the stations, wherever possible, with the lines of spirit levels which have been executed of late years in the course of operations in the Trigonometrical and Revenue branches of the Survey Department. A list of the stations which have been so connected will be found on page 43—K. [of Vol. VII]; a statement of the several sections into which the series is divided, as well as the method of adjustment employed is given in detail on page 38 of Part I of Vol. VII. It will here suffice to state that the spirit levels shew that occasional errors of a magnitude which reaches a maximum of 14·5 feet between contiguous stations were made in the trigonometrical determinations; and that the cumulative error in the entire Series, from origin to terminus, is about 52 feet. This large accumulation of error is unquestionably due to the great lengths of the sides of the triangles in the plains, which has already been shewn to have been a cause of great delay in the progress of the operations, and which frequently compelled the measurement of the vertical angles to be made at other times than that of minimum refraction. An inspection of the values of the refraction—in seconds, and in decimals of the 'contained' arc—which are given at pages 38—K. to 43—K. [of Vol. VII] will show many instances of greatly abnormal variations of refraction, such as are fatal to accuracy in the resulting determinations of height.

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Secondary Triangulation.

The secondary triangulation accomplished in connection with this Series was mainly executed by the measurement—with the large theodolites—of the angles at the principal stations, to the surrounding secondary stations and other prominent objects, and by the measurement—with smaller theodolites—of the angles at the secondary stations which were required for combination with the former, in order to complete the secondary and minor triangles. The whole is shown in the chart accompanying the Synoptical Volume for this Series, in which volume all the requisite numerical details of angles and side-lengths, and of latitudes, longitudes, azimuths and heights, are given, both for the secondary stations and for the 'intersected' but unvisited points.

Most of the angles at the secondary stations were measured by Mr. Mulheran, who was specially commended for the vigour with which he succeeded in laying down the very large number of points between the parallels of $25°\frac{3}{4}$ and $27°\frac{1}{4}$ in a single field season, 1836-37.

Compiled, with Addenda by the Surveyor General, by

C. WOOD,

Surveyor 2nd Grade.

MUSSOOREE:
August 1881.

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ALPHABETICAL LIST OF STATIONS.

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RANGIR MERIDIONAL SERIES.

NUMERICAL LIST OF STATIONS.

VII	Tinsmál. (of Calcutta Longitudinal Series).
X	Rangír. (of Calcutta Longitudinal Series).
I	Kusmár.
II	Dálípúr.
III	Chandla.
IV	Bhoraj.
V	Datiára.
VI	Thanela.
VII	Manang.
VIII	Nagonáth.
IX	Phára.
X	Gokalphára.
XI	Gura.
XII	Kanwa.
XIII	Nipenía.
XIV	Husápúra.
XV	Gandaspúr.
XVI	Atsu.
XVII	Seontára.
XVIII	Birona.
XIX	Kalsán.
XX	Bisungarh.
XXI	Chandanpúr.
XXII	Mamdábád.
XXIII	Pothári.
XXIV	Máo.
XXV	Guri.
XXVI	Dháka.
XXVII	Saipúr.
XXVIII	Kasrak.
XXIX	Janjíri.
XXX	Gajnera.
XXXI	Fateganj.
X	Sísgarh. (of North-East Longitudinal Series).
XI	Atária. (of North-East Longitudinal Series).

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RANGIR MERIDIONAL SERIES.

DESCRIPTION OF PRINCIPAL STATIONS.

Of the 31 Principal Stations composing this Series, the 10 southernmost are on hills, and are low solid platforms carrying a mark engraved either on the rock *in situ* or (presumably) on a stone imbedded at about the level of the ground: above this mark one or more other mark-stones, with the usual engraved circle and dot, are inserted in the platform, the uppermost being flush with the structure. When the Series entered the plains, artificial elevations had to be constructed. These special erections at the first 9 stations consisted of perforated columns of masonry of the following description;—*foundation* a foot or two in depth and having a mark-stone sunk flush with its surface; *plinth* either 4½ or 5½ feet square and 3½ feet high; *shaft* composed of two or more cylinders with diameters varying from 4 or 5 feet at base to 3 feet at summit; surmounted in nearly all instances with *capitals* 4 feet in diameter and about 3 feet in depth; an aperture about a foot across passed vertically through the column to admit of plumbing over the mark-stone to which access was obtained by means of a vaulted passage in the plinth. For the remainder of the Series the construction of these columns of masonry was slightly modified, and the structures, generally speaking, were built as follows;—*foundation* 3 feet in depth; *plinth* 9 feet square and 2 feet high having a mark-stone sunk flush with its surface; *basement* circular, 7 feet in diameter and 5 feet high; *shaft* starting in a curve from the edge of the basement and subsequently continued in the form of a truncated cone with a diameter of 3 feet at summit; surmounted with a *capital* and having an aperture as before described. For the accommodation of the observatory tent, temporary scaffolding platforms were erected around the columns: when the last 2 stations were subsequently visited in the course of the operations of the North-East Longitudinal Series, the columns were surrounded with a *kacha* tower about 14 feet in diameter at top. Exceptions to the general rules in point of construction of the towers will be found at the stations of Bisungarh and Muhammadabad, in the descriptions of which such details as are forthcoming have been embodied.

The following descriptions have been compiled from those given in the original MS. General Report and other original records of this Series, supplemented in respect to the neighboring villages by information obtained from the Revenue and Topographical Survey maps of the country traversed. The information as to the local sub-divisions in which the several stations occur has been derived where practicable from the latest Annual Reports received from the District officers to whose charge the stations have been committed.

VII.—(*Of the Calcutta Longitudinal Series*). Tinsmál Hill Station, lat. 24° 7′, long. 79° 2′—observed at in 1826, 1833, 1834 and 1864—is situated on the top of a very conspicuous hill about three-quarters of a

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mile S. by E. of the village of Tinsua from which it is approached: thána, tahsíl and pargana Banda, district Saugor.

The pillar is solid and has three marks, one engraved on the rock *in sitú* and the others at 3·5 and 8·5 feet above it respectively. The station of 1826 was revisited in 1833 for the purpose of originating the Budhon Meridional Series, when its height was increased by 8·5 feet. It was again visited in 1834 to originate the Rangír Meridional Series, but no further alteration in its construction appears to have been made. On visiting it in 1864, the upper mark being found displaced, a new mark was substituted in the normal of the lower mark. The distances and bearings of surrounding villages are:—Dalpatpur, from which a road leads up to the station, 1·5 miles N.E.; Lamnau 1·3 miles towards the W.; and the deserted village of Tinsi 0·8 mile S.S.E.

X.—(*Of the Calcutta Longitudinal Series*). Rangír Platform Station, lat. 24° 0′, long. 79° 28′—observed at in 1827, 1834 and 1864—is situated in a ploughed field about half a mile S.E. of the little village of Rangír: thána Narsinghgarh, tahsíl and district Damoh.

The pillar is solid and contains two marks, the upper being 5 feet above the lower. The station of 1827 was revisited in 1834 for the purpose of originating the Rangír Meridional Series, and was then raised 4 feet in height. On again visiting it in 1864 the station was found destroyed, and although a mark-stone was discovered amongst the debris it was impossible to say if this mark was in its original position. The new station established in 1864 is identical in height with the old station and it also agrees as closely in position with the latter, as this point could be conjectured. The distances and bearings of surrounding places are:—Narsinghgarh town 2¼ miles W. by S.; Murhiya village 1·4 miles S.E.; and the town of Sítanagar 3·1 miles N.N.E.

I. Kusmár Hill Station, lat. 24° 15′, long. 79° 23′—observed at in 1826, 1834 and 1864—is situated on a low range of hills which extend from Panna towards Saugor, and is named after the village of Kusmár which lies at the foot of the hill at a distance of about a mile N. by W. of the station: pargana Baxwáho of the Panna state.

The station consists of a platform enclosing a central solid pillar of masonry 7·2 feet high which has a mark-stone at its upper surface, another at 2·9 feet below this, and a third at the level of the ground. The station of 1826 was revisited in 1834 in the course of the operations of the Rangír Meridional Series, and again in 1864 in the prosecution of the Calcutta Longitudinal Series, but no alteration in its construction appears to have been made on either of the two latter occasions. The distances and bearings of surrounding places are:—Hírapur iron mine about 11 miles towards the N.W.; Baxwáho town 3 miles W.; Machandri village 1·4 miles N.; and Semra village 1·5 miles S.S.W.

II. Dálípur *(Dálípúr)* Hill Station, lat. 24° 27′, long. 79° 12′—observed at in 1834—is situated on the northern face of the Vindhyáchal range and is named after the small hill fort of Dálípur which stands at the base: pargana Bijáwar of the Bijáwar state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding places are:—Hírapur iron mine 6·6 miles S.E. by S.; Patera village 0·6 mile W. by S.; and Singhpur village 2·7 miles E.N.E.

III. Chandla Hill Station, lat. 24° 37′, long. 79° 30′—observed at in 1834—is situated on a hill so called, on the northern face of the Vindhyáchal range: pargana Bijáwar of the Bijáwar state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding places are:—Bijáwar town 2½ miles E.N.E.; Gulganj town on high road from Saugor to Cawnpore 8 miles N.W. by N.; and the villages of Andiáro and Pokhrelo at 3 miles and 2·5 miles to the S.S.W. and W. respectively.

IV. Bhoraj Hill Station, lat. 24° 50′, long. 79° 6′—observed at in 1834—is situated on a lofty range, on which stands a temple dedicated to the Hindu goddess Bhawáni: pargana Baldeogarh of the Orchha or Tehri state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in sitú*. The distances and bearings of surrounding villages are:—Serkunpur about 0·7 mile N. by E.; Dauhit-Singh-ka-pura 0·6 mile S.W.; and Khena 1·5 miles E.

V. Datiára Hill Station, lat. 25° 6′, long. 79° 25′—observed at in 1834—is situated on the highest point of a cluster of hills, along whose western base the Dhasán river winds: thána Ajnár, tahsíl and pargana Panwári, district Hamírpur.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in sitú*. The distances and bearings of surrounding villages are:—Narwara 0·5 mile N. by W.; Purainia 1·6 miles S.E. by S.; Daurea 1·7 miles E. by S.; and the town of Gerauli 2·1 miles S.W. by S.

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VI. Thanela Hill Station, lat. 24° 58′, long. 79° 47′—observed at in 1834—is situated on a detached hill, at the foot of which lies the village of Sela: pargana Chhatarpur of the Chattarpur state.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Mau 0·9 mile N.W.; Naddia 3·1 miles E. by S.; and Kotah 1·6 miles S.S.E.

VII. Manang Hill Station, lat. 25° 17′, long. 79° 46′—observed at in 1834—is situated on the summit of a hill so called, at the foot of which—and due south of the station—lies the village of Salat Malat: jagír Garhauli which adjoins thána Kulpahár, tahsíl and pargana Panwári of the Hamírpur district.

The station consists of a circular paka platform, 16 feet in diameter, enclosing a central solid pillar of masonry which has a mark-stone at its upper surface and a mark engraved on the rock *in sitú*. The distances and bearings of surrounding villages are:—Narari 1·8 miles S.E. by E.; Larpur 1·3 miles N.W. by N.; Kamálpur 1·5 miles W.; Supa 2·9 miles N.E.; and a Revenue Survey Bench-Mark fixed on a rock 1·04 chains S. by W.

VIII. Nágonáth *(Nagonáth)* Hill Station, lat. 25° 27′, long. 79° 23′—observed at in 1834 and 1836—is named after the Hindu deity Nágonáth whose temple stands on the same hill along the eastern side of which the river Dhasán winds: pargana Garotha, district Jhánsi.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of adjacent villages are:—Gura 1·1 miles S.W. by S.; and Karora about 1·2 miles N.W.

IX. Phára Hill Station, lat. 25° 41′, long. 79° 43′—observed at in 1834 and 1836—is situated on a hill, on which at the distance of a few yards S.S.E. of the station a temple—dedicated to the Hindu deity Mahádeo—is erected; it is named after the village of Phára or Pahra which lies at the foot of the hill and is due east of the station: thána Jariya, tahsíl and pargana Ráth, district Hamírpur.

The station consists of a platform enclosing a central solid pillar of masonry which has a mark-stone at its upper surface. The distances and bearings of surrounding villages are:—Umaría 2 miles W. by N.; Jarmauli 1·6 miles N.N.W.; Turnan 2 miles E.S.E.; and Chilli 1·4 miles S.W.

X. Gokulphára *(Gokalphára)* Hill Station, lat. 25° 46′, long. 79° 20′—observed at in 1836—is situated on the highest of several eminences clustered in this vicinity, and is named after the small village of Gokulphára which lies at the western foot of the hill: in the Gursarai state within pargana Garotha of the Jhánsi district.

The station consists of a platform enclosing a central solid pillar of masonry 12 feet high: it has a mark-stone at its upper surface and a mark engraved on the rock *in sitú*. The distances and bearings of surrounding villages are:—Gogul 0·6 mile N. by W.; Donri 2·6 miles W. by S.; Dhanora 2·1 miles S.S.E.; and Dhanori 2 miles E. by S.

XI. Gura Tower statian, lat. 25° 58′, long. 79° 36′—observed at in 1837—is situated on a slight eminence and is named after the ruined village of Gura: thána Orai, tahsíl Kálpi, district Jálaun.

The station consists of a perforated masonry column 5½ feet square to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 33·3 feet above the mark-stone imbedded at the level of the ground and into which a brass plug with the mark engraved thereon has been countersunk. The distances and bearings of surrounding villages are:—Kurmir 1·8 miles N.N.W.; Burdar 1 mile E. by N.; Kurwi Buzurg 1·6 miles S.S.W.; and Dhani Buzurg 2·5 miles W.

XII. Kanwa Tower Station, lat. 26° 4′, long. 79° 19′—observed at in 1837—is situated on the terreplein and close to the N.W. tower of the fort of Kanwa distant about 6 miles S.W. by S. of the town and station of Jálaun: thána, tahsíl, pargana and district Jálaun.

The station consists of a perforated masonry column 4½ feet square to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the colmun is 28·3 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Lachura 1·5 miles N.W.; Purwári 1·4 miles N.E.; Dunora 2·8 miles S.E.; and Bhair 2 miles W.S.W.

XIII. Nipania *(Nipenía)* Tower Station, lat. 26° 14′, long. 79° 38′—observed at in 1837—is situated on the right bank of the Jumna, and stands on the lands of the village of Pal Sarania at a distance of 1½ miles N. by W. of the village of Nipania: thána Nipania, tahsíl Kálpi, district Jálaun.

The station consists of a perforated masonry column 5½ feet square to a height of 3½ feet, and circular thereafter—the

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diameter at top of shaft being 3 feet: the summit of the column is 39 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Simra Shaikhpur 1 mile E.S.E.; Sikunni 1·9 miles S.; and Sunni Ser 1·5 miles W. by N.

XIV. Husapura (*Husápúra*) Tower Station, lat. 26° 22′, long. 79° 21′—observed at in 1837—is situated in an open field due S. of the village of Husapura, and distant about 2½ miles from the right bank of the Jumna: thána Gohan, tahsíl Mádhogarh, district Jálaun.

The station consists of a perforated masonry column 5½ feet square to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet: the summit of the column is 33·8 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Pánípur 0·6 mile S.W.; Magtoa 1·1 miles due W.; Shaikhpur Ahir 0·5 mile E.; and Nímgaon 1·3 miles S.E. by E.

XV. Gandaspur (*Gandaspúr*) Tower Station, lat. 26° 28′, long. 79° 38′—observed at in 1837—is situated on a low mound which stands on the west side of the village of Gandaspur, and is distant about three-quarters of a mile from the right bank of the Sengar nadi: thána and pargana Derapur, district Cawnpore.

The station consists of a perforated masonry column 4½ feet square to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 28 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of neighboring villages are:—Napallapur 1·3 miles E.; and Mahásinghpur 0·8 mile S.E.

XVI. Atsu Tower Station, lat. 26° 35′, long. 79° 24′—observed at in 1837—is situated on the elevated platform which surrounds the exterior of the N.E. tower of the fort of Atsu or Arsu: táluka Bhareh, thána Ajítmal, tahsíl and pargana Auraiya, district Etáwah.

The station consists of a perforated masonry column 4½ feet square at base to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 25·7 feet above the mark-stone imbedded at the level of the platform. The distances and bearings of surrounding villages are:—Mahíuddín 0·6 mile S.; Durhaspur 1·6 miles W.; Alamgírpur 0·9 mile N.N.W.; and Rasúlpur 1 mile N.E. by N.

XVII. Seontára Tower Station, lat. 26° 42′, long. 79° 38′—observed at in 1837—is situated on the western solid tower of a small brick fort which is built on an extensive elevated mound (about 50 feet in height) down the eastern slope of which lies the village of Seontára, the western declivity being washed by the Rind or Arind nadi: thána Bela, tahsíl and pargana Bidhúna, district Etáwah.

The station consists of a perforated masonry column 4½ feet square at base to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 4 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 16·8 feet above the mark-stone imbedded at the level of the tower. The distances and bearings of surrounding villages are:—Dunwamau 1 mile W.N.W.; Rámpur 1·1 miles N.E.; Baryáraimau 0·9 mile E.S.E.; and Ekghara 1·5 miles W.S.W.

XVIII. Birona Tower Station, lat. 26° 51′, long. 79° 25′—observed at in 1837 and 1840—is situated on the terreplein between the outer and inner walls of the fort in the village of Birona Kalán: thána Kudarkot, tahsíl and pargana Bidhúna, district Etáwah.

The station consists of a perforated masonry column 4½ feet square to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet: the summit of the column is 23·2 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Shaikhpur 1·6 miles N.W.; Morcha 1·3 miles N. by E.; Balpur 2·4 miles S.E.; and Ujuhruh 1·6 miles S.S.W.

XIX. Kalsán Tower Station, lat. 26° 57′, long. 79° 41′—observed at in 1837 and 1840—is situated on the S.W. corner of an elevated mound in the village of Kalsán: pargana Tirwa, district Farrukhabad.

The station consists of a perforated masonry column 4½ feet square at base to a height of 3½ feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 23·1 feet above the mark-stone imbedded at the level of the ground. The distances and bearings of surrounding villages are:—Mírpura 1·6 miles W.; Bagulhai 2·1 miles N.N.E.; Munkapur 2·7 miles E.; and Rámpur 1·3 miles S.

XX. Bisungarh Tower Station, lat. 27° 7′, long. 79° 27′—observed at in 1839 and 1841—is situated on a narrow mound to the south of the *bárádari* (summer-house) and outside the fort of Bisungarh or Binsia: pargana Chhibramau, district Farrukhabad.

The station consists of a perforated masonry column 5½ feet square to a height of 1 foot, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 24 feet above the

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mark-stone which is imbedded at 1 foot above the level of the ground. The distances and bearings of surrounding villages are:—Surdamai 0·9 mile N. by E.; Astutabad 1·2 miles E.; and Shaikhpur 2·3 miles S.E.

XXI. Chandanpur (*Chandanpúr*) Tower Station, lat. 27° 14′, long. 79° 41′—observed at in 1839 and 1841—is situated in an open field, and stands on the northern bank of a small tank at a distance of about 350 yards S.W. of the village of Chandanpur: pargana Bhojpur, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The Ganges flows about 1 mile N.E. of the station, and the high road from Farrukhabad to Cawnpore passes within a mile to the west of it; the distances and bearings of surrounding villages are:—Rájípur 0·6 mile W.; Singirámpur 0·9 mile N.E.; and Mukrandnagar 0·8 mile S. by E.

XXII. Muhammadabad (*Mamdábád*) Tower Station, lat. 27° 18′, long. 79° 28′—observed at in 1841—is situated on the east bastion of the fort of Muhammadabad, and is distant about 400 yards W.S.W. of the town of that name: thána and pargana Muhammadabad, district Farrukhabad.

The station consists of a tower of burnt bricks and mud cement 24 feet square at base and 18 feet square at top, enclosing a central isolated pier of masonry 3½ feet in diameter and 16·7 feet high—with a foundation of 4½ feet— which is marked in the usual manner. The high road from Agra to Fatehgarh passes about 600 yards E. of the station; and the distances and bearings of neighboring villages are:—Nandu Takípur 0·7 mile S.W.; and Kabírpur the same distance N.W. by N.

XXIII. Pothári Tower Station, lat. 27° 23′, long. 79° 27′—observed at in 1838, 1839 and 1841—is situated on an elevated mound in the village of Pothári: pargana Muhammadabad, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·6 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Karanpur 0·6 mile E. by N.; Chandtokh 1·4 miles S.E.; Buruh 2 miles S.W.; and Pithua 2·1 miles W. by S.

XXIV. Mau (*Máo*) Tower Station, lat. 27° 30′, long. 79° 43′—observed at in 1838—is situated on a high mound in the village of Mau which lies on the left bank of the Rámganga: pargana Imratpur, district Farrukhabad.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38·2 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Maulaganj 0·7 mile N.W.; Sháhjahánpur 1·1 miles E.; and Aligarh 0·9 mile S.S.W.

XXV. Guri Tower Station, lat. 27° 40′, long. 79° 29′—observed at in 1837 and 1838—is situated on a small mound in the village of Guri distant about 2 miles N. of the Ganges: pargana Meherabad, district Sháhjahánpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·9 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:— Usmánpur 0·4 mile S.W.; Lakhanpur 0·4 mile N. by E.; and Pítampur 1·7 miles S.E. by S.

XXVI. Dháka Tower Station, lat. 27° 45′, long. 79° 43′—observed at in 1838—is situated on a low sandy elevation in an open field to the west of the village of Dháka: pargana Meherabad, district Sháhjahánpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·7 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding places are:—Jalálabad town 2·2 miles S.S.W.; Malupur 0·9 mile W.; Jugnah 0·9 mile N.E. by N.; and Gularia 0·8 mile S.S.E.

XXVII. Saipur (*Saipúr*) Tower Station, lat. 27° 55′, long. 79° 27′—observed at in 1838— is situated on an elevated mound said to be the site of the ancient village of Saipur: thána and pargana Hazratpur, tahsíl Dátaganj, district Budaun.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages

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are:—Chungosi 0·9 mile N.W.; Chithri 0·8 mile S.E.; Sikutia about 1 mile S.W.; and Garhia 1·6 miles E.

XXVIII. Kasrak Tower Station, lat. 28° 3′, long. 79° 42′—observed at in 1838— is situated on the crest of an elevated mound 600 yards south of the village of Kasrak: pargana Míránpur Katra, district Sháhjahánpur.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The high road from Farrukhabad to Bareilly passes about half a mile west of the station; and the distances and bearings of surrounding places are:—the town of Míránpur Katra 1·6 miles S.; Kusak village 1·2 miles N. by W.; and Sahupur 0·5 mile N.E.

XXIX. Janjíri Tower Station, lat. 28° 11′, long. 79° 27′—observed at in 1838—is situated on a mound in the village of Janjíri, and is distant 2 miles from the right bank of the Rámganga: pargana Ballia, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·8 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding villages are:—Kíratpur 0·6 mile W. by N.; Turkuni 1·2 miles N.E.; and Himpatpur Beharípur 0·8 mile E.

XXX. Gajnera Tower Station, lat. 28° 20′, long. 79° 41′—observed at in 1838 and 1839— is situated on a mound about 350 yards south of the village of Gajnera the eastern extremity of which is washed by the Kailás nadi: pargana Faridpur, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 38 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. The distances and bearings of surrounding places are:—the town of Bhuta 2·2 miles W.; Suraur village 1·4 miles N.N.E.; and Khurduha 0·8 mile S.E.

XXXI. Fatehganj (*Fateganj*) Tower Station, lat. 28° 27′, long. 79° 21′—observed at in 1838 and 1839—is situated on a mound distant about 500 yards S.E. of the town of Fatehganj on the high road from Bareilly to Moradabad; this locality is memorable in the annals of Rohilkhand as the scene of the last struggle made (in 1794) by the Patháns under their leader Naju Khán against the power of the British: pargana Karor, district Bareilly.

The station consists of a perforated masonry column 9 feet square to a height of 2 feet, and circular thereafter—the diameter at top of shaft being 3 feet—surmounted by a capital of 4 feet diameter: the summit of the column is 37·9 feet above the mark-stone which is imbedded at 2 feet above the level of the ground. In a large enclosure about 200 yards E. of the station are the tombs of the Patháns who fell in the struggle, and a cenotaph erected on the spot by order of Government commemorates their heroism; the mausoleum of their brave leader stands at about 40 yards from the station: the distances and bearings of surrounding villages are:—Unási 0·9 mile W.; Ballia 2·5 miles E.; and Rukumpur 1·3 miles S.E.

X.—(*Of the North-East Longitudinal Series*). Sísgarh Tower Station, lat. 28° 44′, long. 79° 21′—observed at in 1839 and 1851—is situated on a platform in the centre of the fort which stands on a mound raised considerably above the general level of the surrounding country, and immediately south of the large village of Sísgarh: pargana Sirsáwán, district Bareilly.

The station consists of a tower of unburnt bricks and mud cement, 14 feet in diameter at top, enclosing a central perforated pillar of masonry whose summit is 38·0 feet above the mark-stone which * is 2 feet higher than the level of the ground. The station of 1839 was a column standing 38·3 feet above the mark-stone and similar in construction to the stations which precede; it was found, when revisited in the course of the operations of the North-East Longitudinal Series, to be so deflected as to necessitate the dismantling of a considerable portion of it; it was then rebuilt to its present height and enclosed in a *kacha* tower—the upper 5 feet of it being isolated therefrom: at the same time a second mark 1·8 inches N.W. by W. of the former one was cut on the original mark-stone. The road from Bareilly to Almora passes by the station; and the distances and bearings of surrounding villages are:—Ghulámganj 1·4 miles W.; Tigri 1·4 miles E.N.E.; and Girdhárpur 0·6 mile S.

XI.—(*Of the North-East Longitudinal Series*). Atária Tower Station, lat. 28° 38′, long. 79° 38′—observed at in 1839, 1843 and 1851—is situated on a mound near the east bank of the Baigul nadi, and distant about half a mile S.W. of the village of Atária: pargana Richha, district Bareilly.

The station consists of a tower of unburnt bricks and mud cement, about 14 feet in diameter at top, enclosing a central

* In the description of this station given in the North-East Longitudinal Series p. 7—*I*, the height of this mark-stone above ground level is stated at 0 feet as erroneously entered in the field records of that series.

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perforated pillar of masonry whose summit is 37·8 feet above the mark-stone which* is 2 feet higher than the level of the ground. The station of 1839 was a column 37·3 feet above the mark-stone and similar in manner of construction to the stations which precede; it was found greatly deflected when the observations on the Rangír Series came to be made so that the mark-stone in the basement could not be plumbed from the summit of the tower; the point of observation was indicated by the intersection of the diagonals of a quadrilateral each angular point of which was denoted by a dot engraved on an iron bolt imbedded in an external masonry pillar built in the adjacent fields. When the station was revisited in 1843 in the course of the operations of the North Connecting Series, the pillar was found still further deflected, and no trace of the four external pillars was forthcoming; the instrument was accordingly plumbed over a mark engraved on a new mark-stone let into the basement. On again visiting the station in 1851 in the course of the operations of the North-East Longitudinal Series, it was found necessary to dismantle a considerable portion of the pillar, which was then rebuilt to its present height and enclosed in a *kacha* tower: at the same time a second mark 3·5 inches W.N.W. of the mark of 1843 was engraved on the mark-stone of that year. The distances and bearings of surrounding villages are:—Ináyatpur 0·9 mile N.E.; Sayyidpur 1·2 miles E.; Uturia Mádhopur 0·5 mile S.S.W.; and Jumunián 0·8 mile N.W.

* In the description of this station given in the North-East Longitudinal Series p. 7—*I*, the height of this mark-stone above ground level is stated at 0 feet as erroneously entered in the field records of that series.

July 1877.

J. B. N. HENNESSEY,

In charge of Computing Office.

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RANGIR MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. TRIANGLES.

No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
		"	° ′ ″			
	Tinsmál, VII	·90	37 36 19·43	4·9667210	92623·5	17·542
1	Rangír, X	·90	54 24 15·62	5·0914027	123424·9	23·376
	Kusmár, I	·90	87 59 24·95	5·1809676	151693·7	28·730
	Tinsmál, VII	·89	44 20 35·26	4·9830826	96179·5	18·216
2	Kusmár, I	·90	71 53 48·36	5·1165854	130793·3	24·771
	Dálípur, II	·89	63 45 36·38	5·0914027	123424·9	23·376
	Kusmár, I	·86	55 51 12·69	5·0620943	115370·4	21·850
3	Dálípur, II	·87	80 31 15·94	5·1383004	137499·3	26·042
	Chandla, III	·86	43 37 31·37	4·9830826	96179·5	18·216
	Dálípur, II	1·28	73 16 38·22	5·1995153	158312·6	29·983
4	Chandla, III	1·28	62 27 41·37	5·1660588	146574·6	27·760
	Bhoraj, IV	1·27	44 15 40·41	5·0620943	115370·4	21·850
	Chandla, III	1·72	49 14 58·45	5·1575789	143740·4	27·224
5	Bhoraj, IV	1·73	74 12 4·19	5·2614378	182573·5	34·578
	Datiára, V	1·73	56 32 57·36	5·1995153	158312·6	29·983

NOTES.—1. The values of the side are given in the same line with the opposite angle.
2. Stations Tinsmál, VII, and Rangír, X appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral.

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No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
		"	° ′ ″			
	Chandla, III	1·67	45 37 4·34	5·1302726	134981·0	25·565
6	Datiára, V	1·67	59 12 50·20	5·2101903	162252·1	30·730
	Thanela, VI	1·67	75 10 5·46	5·2614378	182573·5	34·578
	Datiára, V	1·12	52 50 21·48	5·0756724	119034·4	22·544
7	Thanela, VI	1·12	62 30 38·94	5·1222160	132500·0	25·095
	Manang, VII	1·13	64 38 59·58	5·1302726	134981·0	25·565
	Datiára, V	1·19	64 59 46·94	5·1413570	138470·4	26·225
8	Manang, VII	1·18	54 52 5·33	5·0967571	124956·0	23·666
	Nágonáth, VIII	1·18	60 8 7·73	5·1222160	132500·0	25·095
	Manang, VII	1·36	59 42 20·81	5·1482905	140698·8	26·648
9	Nágonáth, VIII	1·36	62 6 26·85	5·1584222	144019·8	27·276
	Phára, IX	1·35	58 11 12·34	5·1413570	138470·4	26·225
	Nágonáth, VIII	1·10	60 8 12·15	5·1134245	129844·8	24·592
10	Phára, IX	1·10	49 51 38·08	5·0586622	114462·2	21·678
	Gokulphára, X	1·11	70 0 9·77	5·1482905	140698·8	26·648
	Phára, IX	·92	57 38 8·55	5·0640037	115878·7	21·947
11	Gokulphára, X	·92	51 11 50·56	5·0290307	106913·0	20·249
	Gura, XI	·93	71 10 0·89	5·1134245	129844·8	24·592
	Gokulphára, X	·82	53 8 37·10	5·0090505	102105·8	19·338
12	Gura, XI	·82	61 36 58·17	5·0502590	112268·8	21·263
	Kanwa, XII	·82	65 14 24·73	5·0640037	115878·7	21·947
	Gura, XI	·74	72 58 44·57	5·0721535	118073·8	22·362
13	Kanwa, XII	·74	51 14 27·45	4·9835810	96290·0	18·237
	Nipania, XIII	·74	55 46 47·98	5·0090505	102105·8	19·338
	Kanwa, XII	·80	53 40 13·44	5·0095020	102212·0	19·358
14	Nipania, XIII	·80	57 47 39·64	5·0308130	107352·7	20·332
	Husapura, XIV	·81	68 32 6·92	5·0721535	118073·8	22·362
	Nipania, XIII	·65	62 33 50·16	5·0028778	100664·8	19·065
15	Husapura, XIV	·65	53 7 27·32	4·9577537	90730·6	17·184
	Gandaspur, XV	·65	64 18 42·52	5·0095020	102212·0	19·358
	Husapura, XIV	·56	57 49 39·67	4·9550640	90170·4	17·078
16	Gandaspur, XV	·56	51 16 10·60	4·9196119	83102·1	15·739
	Atsu, XVI	·56	70 54 9·73	5·0028778	100664·8	19·065
	Gandaspur, XV	·53	61 21 24·19	4·9506117	89250·7	16·904
17	Atsu, XVI	·52	56 11 10·36	4·9268275	84494·3	16·003
	Seontára, XVII	·53	62 27 25·45	4·9550640	90170·4	17·078
	Atsu, XVI	·57	58 5 49·04	4·9537074	89889·2	17·024
18	Seontára, XVII	·57	64 27 14·19	4·9801501	95532·3	18·093
	Birona, XVIII	·57	57 26 56·77	4·9506117	89250·7	16·904
	Seontára, XVII	·59	65 16 18·08	4·9891122	97524·2	18·470
19	Birona, XVIII	·59	57 53 0·58	4·9587495	90938·9	17·223
	Kalsán, XIX	·58	56 50 41·34	4·9537074	89889·2	17·024
	Birona, XVIII	·62	58 33 56·52	4·9737188	94128·0	17·827
20	Kalsán, XIX	·62	59 18 9·59	4·9770840	94860·2	17·966
	Bisungarh, XX	·63	62 7 53·89	4·9891122	97524·2	18·470

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No. of Triangle	Station	Spherical Excess	Corrected Plane Angle	Distance		
				Log. feet	Feet	Miles
		"	° ′ ″			
21	Kalsán, XIX	·59	54 11 22·35	4·9456218	88231·1	16·710
	Bisungarh, XX	·60	65 54 35·52	4·9970493	99322·9	18·811
	Chandanpur, XXI	·60	59 54 2·13	4·9737188	94128·0	17·827
22	Bisungarh, XX	·42	57 15 4·68	4·8929037	78145·5	14·800
	Chandanpur, XXI	·42	51 1 0·74	4·8586874	72225·0	13·679
	Muhammadabad, XXII	·43	71 43 54·58	4·9456218	88231·1	16·710
23	Chandanpur, XXI	·16	15 31 41·51	4·4743603	29809·9	5·646
	Muhammadabad, XXII	·16	119 54 1·32	4·9846574	96528·9	18·282
	Pothári, XXIII	·16	44 34 17·17	4·8929037	78145·5	14·800
24	Bisungarh, XX	·03	3 23 29·59	4·4743605	29809·9	5·646
	Muhammadabad, XXII	·04	168 22 3·47	5·0068961	101600·6	19·243
	Pothári, XXIII	·03	8 14 26·94	4·8586874	72225·0	13·679
25	Chandanpur, XXI	·63	56 33 48·46	4·9699196	93308·2	17·672
	Pothári, XXIII	·64	63 44 50·06	5·0012155	100280·3	18·992
	Mau, XXIV	·64	59 41 21·48	4·9846574	96528·9	18·282
26	Pothári, XXIII	·65	59 36 30·78	4·9876364	97193·3	18·408
	Mau, XXIV	·65	64 29 11·49	5·0072719	101688·5	19·259
	Guri, XXV	·64	55 54 17·73	4·9699196	93308·2	17·672
27	Mau, XXIV	·55	53 37 20·37	4·9284610	84812·7	16·063
	Guri, XXV	·56	59 3 37·91	4·9559387	90352·2	17·112
	Dháka, XXVI	·56	67 19 1·72	4·9876364	97193·3	18·408
28	Guri, XXV	·59	74 42 22·44	5·0288749	106874·7	20·241
	Dháka, XXVI	·59	55 20 42·35	4·9597183	91141·9	17·262
	Saipur, XXVII	·58	49 56 55·21	4·9284610	84812·7	16·063
29	Dháka, XXVI	·74	51 57 55·46	4·9816288	95858·1	18·155
	Saipur, XXVII	·74	66 36 48·60	5·0480725	111705·0	21·156
	Kasrak, XXVIII	·74	61 25 15·94	5·0288749	106874·7	20·241
30	Saipur, XXVII	·62	59 5 50·17	4·9765174	94736·5	17·943
	Kasrak, XXVIII	·63	60 39 9·91	4·9833595	96240·9	18·227
	Janjíri, XXIX	·62	60 14 59·92	4·9816288	95858·1	18·155
31	Kasrak, XXVIII	·63	57 34 5·22	4·9753600	94484·4	17·895
	Janjíri, XXIX	·64	64 37 20·37	5·0049315	101142·0	19·156
	Gajnera, XXX	·64	57 48 34·41	4·9765174	94736·5	17·943
32	Janjíri, XXIX	·74	70 35 32·13	5·0630680	115629·3	21·899
	Gajnera, XXX	·74	58 59 27·31	5·0214986	105074·8	19·901
	Fatehganj, XXXI	·73	50 25 0·56	4·9753600	94484·4	17·895
33	Gajnera, XXX	·85	57 55 52·00	5·0410910	109923·6	20·819
	Fatehganj, XXXI	·86	59 1 10·84	5·0461524	111212·2	21·063
	Atária, XI	·86	63 2 57·16	5·0630680	115629·3	21·899
34	Fatehganj, XXXI	·68	53 17 53·32	4·9723578	93833·5	17·771
	Atária, XI	·68	56 46 40·45	4·9908090	97905·9	18·543
	Sísgarh, X	·68	69 55 26·23	5·0410910	109923·6	20·819

NOTE.—Stations Sísgarh, X, and Atária, XI appertain to the North-East Longitudinal Series.

March 1879.

J. B. N. HENNESSEY,
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RANGIR MERIDIONAL SERIES.

SECONDARY TRIANGULATION. TRIANGLES.

PRINCIPAL-AUXILIARY STATIONS AND INTERSECTED POINTS.

Differences between the common sides of two triangles to stations and intersected points, are shown by the small figures in the column for "Distance in Feet" between the data of the two triangles, the earlier of which in order has supplied the greater value: where the difference is small it has usually been apportioned between the triangles, but where it is large no adjustment has been made, as one or other of the two values must be erroneous.

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used	No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles					Log. feet	Feet	Miles	
		° ′ ″				Inch			° ′ ″				Inch
	Tinsmál, VII	91 52 8	5·015242	103572	19·616	18		Kusmár, I	17 46 54	3·764463	5814	1·101	18
35	Patharia h.s.	12 37 46	4·355212	22658	4·291	,,	40	Baksua h.s.	79 51 33	4·272769	18740	3·549	†
	Katora Tiled Building		5·001418	100327	19·001			Baksua Fort		4·275734	18868	3·574	
	Tinsmál, VII	24 49 40	4·922413	83640	15·841	,,		Kusmár, I	18 28 58	3·778714	6008	1·138	18
36	Kusmár, I	13 27 39	4·666222	46368	8·782	,,	41	Baksua h.s.	66 10 12	4·238930	17335	3·283	†
	Niwar Tiled Building		5·091403	123425	23·376			Baksua Temple		4·275734	18868	3·574	
	Kusmár, I	60 40 40	4·946855	88482	16·758	,,		Kusmár, I	20 55 48	3·990631	9787	1·854	18
37	Dálípur, II	10 42 54	4·275734	18868	3·574	,,	42	Baksua h.s.	115 32 26	4·393028	24719	4·682	†
	Baksua h.s.		4·983083	96180	18·216			Mangrai Building		4·275734	18868	3·574	
	Kusmár, I	42 38 1	4·181639	15193	2·877	18		Rangír, X	26 24 40	4·618603	41553	7·870	18
38	Baksua h.s.	14 37 47	3·753237	5665	1·073	†	43	Kusmár, I	71 3 59	4·946273	88364	16·736	,,
	Semra Fort		4·275734	18868	3·574			Bia Barari h.s.	82 31 21	4·966721	92623	17·542	†
	Tinsmál, VII		4·783744	60778	11·511			Kusmár, I	12 3 42	4·619183	41609	7·880	18
39	Kusmár, I	21 17 27	4·847242	70346	13·323	18	44	Dálípur, II	16 49 18	4·760600	57624	10·914	,,
	Bakarua h.s.	140 25 34	5·091403	123425	23·376	†		Hardua Tree		4·983083	96180	18·216	

NOTES.—1. Names followed by Roman numerals are those of Principal Stations. Station Tinsmál, VII appertains to the Calcutta Longitudinal Series of the South-East Quadrilateral.
2. The values of the side are given in the same line with the opposite angle. † Instrument not known.

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No. of Triangle	Station		Corrected Plane Angle	Distance			Theodolite used
				Log. feet	Feet	Miles	
			° ′ ″				Inch
	Kusmár, I		38 32 40	4·593202	39192	7·423	18
45	Bakarua	h.s.	66 22 15	4·760600	57624	10·914	†
	Hardua Tree			4·783744	60778	11·511	
	Dálípur, II		57 33 22	4·546155	35169	6·661	18
46	Hardua Tree			4·308914	20366	3·857	
	Hasri	h.s.	93 11 15	4·619183	41609	7·880	†
	Dálípur, II		24 41 13	4·670333	46809	8·865	18
47	Hasri	h.s.	144 50 35	4·809795	64535	12·223	†
	Sháhgarh Fort			4·308914	20366	3·857	
	Dálípur, II		40 0 4	4·117116	13095	2·480	18
48	Hasri	h.s.	48 37 44	4·184357	15288	2·895	†
	Bamnora Fort			4·308914	20366	3·857	
	Dálípur, II		24 49 9	4·750606	56313	10·665	18
49	Chandla, III		34 29 40	4·880676	75976	14·389	„
	Bila	h.s.	120 41 11	5·062094	115370	21·850	†
	Kusmár, I		49 37 35	4·880676	75976	14·389	18
50	Dálípur, II		55 42 8	4·915857	82387	15·604	„
	Bila	h.s.	74 40 17	4·983083	96180	18·216	†
	Kusmár, I		48 58 54	4·793629	62177	11·776	18
51	Bila	h.s.	39 42 35	4·721402	52650	9·972	†
	Gadákhár	„	91 18 31	4·915857	82387	15·604	†
	Kusmár, I		50 54 36	4·885519	76828	14·551	18
52	Bila	h.s.	72 45 10	4·975389	94534	17·904	†
	Bádsháhpur	„		4·915857	82387	15·604	
	Chandla, III		27 25 26	4·530540	33927	6·425	18
53	Bila	h.s.	102 42 58	4·856460	71855	13·609	†
	Gopálpur	„		4·750606	56313	10·665	
	Dálípur, II		24 10 23	4·724617	53042	10·046	18
54	Chandla, III		38 47 12	4·909236	81140	15·367	„
	Pola	h.s.		5·062094	115370	21·850	
	Kusmár, I		52 49 40	4·909236	81140	15·367	„
55	Dálípur, II		56 20 54	4·928218	84765	16·054	„
	Pola	h.s.		4·983083	96180	18·216	
	Dálípur, II		39 57 33	4·700728	50203	9·508	„
56	Bila	h.s.	36 26 23	4·666799	46430	8·794	†
	Sempa Temple			4·880676	75976	14·389	
	Dálípur, II		26 35 9	4·567442	36935	6·995	18
57	Bila	h.s.	86 24 9	4·915756	82367	15·600	†
	Khatoli Gateway			4·880676	75976	14·389	
	Dálípur, II		41 30 54	4·891546	77901	14·754	18
58	Chandla, III		59 29 18	5·005421	101256	19·177	„
	Dhasán River Temple			5·062094	115370	21·850	
	Chandla, III		29 23 9	4·998611	99681	18·879	„
59	Datiára, V		34 36 24	5·062107	115374	21·851	„
	Chhatarpur Temple			5·261438	182574	34·578	
	Datiára, V		24 36 28	4·783518	60746	11·505	„
60	Thanela, VI		43 6 6	4·998611	99681	18·879	„
	Chhatarpur Temple			5·130273	134981	25·565	
	Chandla, III		65 50 46	5·066984	116677	22·098	„
61	Chhatarpur Temple			4·989091	97519	18·470	
	Bánsparh	h.s.	64 27 25	5·062107	115374	21·851	†
	Chandla, III		49 36 49	5·092792	123820	23·451	18
62	Thanela, VI		36 51 46	4·989091	97519	18·470	„
	Bánsparh	h.s.		5·210190	162252	30·730	
	Chandla, III		46 44 54	4·886669	77032	14·589	„
63	Bánsparh	h.s.	66 1 17	4·985131	96634	18·302	†
	Sánra	„		4·989091	97519	18·470	
	Bánsparh	h.s.		4·814661	65262	12·360	
64	Sánra	„	31 6 20	4·599903	39802	7·538	†
	Sonha	„	90 59 55	4·886669	77032	14·589	†
	Bánsparh	h.s.	45 12 32	4·945589	88224	16·709	†
65	Sonha	„	116 7 5	5·047749	111622	21·140	†
	Tálgaon Hill Mark			4·599903	39802	7·538	
	Thanela, VI		34 6 37	4·843876	69803	13·220	18
66	Bánsparh	h.s.	61 45 48	5·040054	109661	20·769	
	Maniagarh	„	84 7 35	5·092792	123820	23·451	
	Chandla, III		39 20 7	5·040054	109661	20·769	„
67	Thanela, VI		70 58 23	5·213662	163554	30·976	„
	Maniagarh	h.s.		5·210190	162252	30·730	
	Chandla, III		15 3 51	4·882846	76356	14·461	„
68	Chhatarpur Temple			4·614758	41187	7·801	
	Nagroa	h.s.	156 52 37	5·062107	115374	21·851	†
	Chandla, III		66 32 43	4·858455	72186	13·672	18
69	Dhasán River Temple			4·614758	41187	7·801	
	Nagroa	h.s.	81 53 34	4·891546	77901	14·754	†
	Chandla, III		54 30 29	4·540544	34717	6·575	18
70	Nagroa	h.s.	20 29 32	4·173982	14927	2·827	†
	Bijáwar Temple			4·614758	41187	7·801	

† Instrument not known.

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No. of Triangle	Station		Corrected Plane Angle	Distance			Theodolite used
				Log. feet	Feet	Miles	
			° ′ ″				Inch
	Chandla, III		61 9 11	4·562738	36537	6·920	18
71	Nagroa	h.s.	19 43 54	4·148700	14083	2·667	†
	Bijáwar Palace			4·614758	41187	7·801	
	Chandla, III		51 16 32	4·578904	37923	7·182	18
72	Nagroa	h.s.	70 48 17	4·661876	45907	8·694	†
	Náráyanpur Fort			4·614758	41187	7·801	
	Chandla, III		44 46 42	4·498425	31508	5·967	18
73	Nagroa	h.s.	68 11 20	4·618368	41531	7·866	†
	Gulganj Fort			4·614758	41187	7·801	
	Chandla, III		18 27 39	4·253947	17945	3·399	18
74	Nagroa	h.s.	114 55 21	4·710908	51393	9·734	†
	Ragauli Fort			4·614758	41187	7·801	
	Bhoraj, IV		34 12 42	4·908830	81064	15·353	18
75	Datiára, V		60 15 15	5·097537	125180	23·708	„
	Sonár Hill Mark			5·157579	143740	27·224	
	Datiára, V		50 42 5	5·017624	104142	19·724	„
76	Manang, VII		49 22 23	5·009186	102138	19·344	„
	Seyah	h.s.		5·122216	132500	25·095	
					3		
	Thanela, VI		55 54 29	5·017624	104142	19·724	„
77	Manang, VII		15 16 38	4·520285	33135	6·276	„
	Seyah	h.s.		5·075672	119034	22·544	
	Thanela, VI		109 54 37	4·736621	54528	10·327	„
78	Seyah	h.s.	35 14 45	4·524629	33468	6·339	†
	Karri	„		4·520285	33135	6·276	
					6		
	Thanela, VI		60 12 20	4·722786	52818	10·003	18
79	Chhatarpur Temple			4·524629	33468	6·339	
	Karri	h.s.	86 26 8	4·783518	60746	11·505	†
	Thanela, VI		99 46 19	4·630459	42703	8·088	18
80	Karri	h.s.	29 39 41	4·331300	21444	4·061	†
	Putli Bakoára	„	50 34 0	4·524629	33468	6·339	†
	Karri	h.s.		4·695235	49572	9·389	
81	Putli Bakoára	„	32 15 10	4·422684	26466	5·012	†
	Gara Sandna	„	59 26 11	4·630459	42703	8·088	†
					11		
	Thanela, VI		72 46 33	4·695235	49572	9·389	18
82	Putli Bakoára	h.s.	82 49 10	4·711742	51492	9·752	†
	Gara Sandna	„	24 24 17	4·331300	21444	4·061	†
	Karri	h.s.	39 4 48	4·721697	52686	9·978	
83	Gara Sandna	„	122 27 30	4·848307	70519	13·356	†
	Mukána Hill Mark			4·422684	26466	5·012	
	Putli Bakoára	h.s.	52 59 45	4·605709	40338	7·640	†
84	Gara Sandna	„	48 4 10	4·574931	37578	7·117	†
	Pai Temple			4·695235	49572	9·389	
	Thanela, VI		6 34 20	4·150899	14155	2·681	†
85	Karri	h.s.	9 7 45	4·292732	19621	3·716	†
	Tilona Temple			4·524629	33468	6·339	
	Thanela, VI		57 43 45	4·287797	19400	3·674	†
86	Putli Bakoára	h.s.	53 6 15	4·263608	18349	3·475	†
	Mankahri House			4·331300	21444	4·061	
	Chandla, III		12 49 1	4·706505	50875	9·635	18
87	Datiára, V		39 56 32	5·168016	147237	27·886	„
	Mau Saria Temple			5·261438	182574	34·578	
	Chandla, III		18 29 58	4·768383	58666	11·111	„
88	Datiára, V		62 24 59	5·214518	163877	31·037	„
	Palera Temple			5·261438	182574	34·578	
	Datiára, V		12 46 32	4·828588	67389	12·763	„
89	Thanela, VI		13 30 56	4·852612	71222	13·489	„
	Lughási Fort			5·130273	134981	25·565	
	Thanela, VI		7 9 37	4·735455	54382	10·300	„
90	Manang, VII		8 40 21	4·818141	65787	12·460	„
	Malka Temple			5·075672	119034	22·544	
	Manang, VII		22 59 50	5·024827	105883	20·054	„
91	Phára, IX		9 6 11	4·632234	42878	8·121	„
	Charkhári Fort			5·158422	144020	27·276	
	Nágonáth, VIII		19 8 35	4·989279	97562	18·478	„
92	Phára, IX		9 4 52	4·671697	46957	8·893	„
	Túrah Shergarh	h.s.		5·148291	140699	26·648	
	Nágonáth, VIII		51 10 38	4·823095	66542	12·603	„
93	Túrah Shergarh	h.s.	95 28 15	4·929525	85021	16·102	†
	Churári Temple			4·671697	46957	8·893	
	Nágonáth, VIII		27 18 22	4·559712	36284	6·872	18
94	Túrah Shergarh	h.s.	116 16 30	4·850779	70922	13·432	†
	Gogora Temple			4·671697	46957	8·893	
	Nágonáth, VIII		39 36 6	4·530463	33921	6·424	18
95	Túrah Shergarh	h.s.	22 20 5	4·305822	20222	3·830	†
	Seonri Temple			4·671697	46957	8·893	
	Nágonáth, VIII		29 16 1	4·827061	67152	12·718	18
96	Gokulphára, X		27 10 21	4·797463	62728	11·880	„
	Rewábarti Temple			5·058662	114462	21·678	

† Instrument not known.

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No. of Triangle	Station		Corrected Plane Angle	Distance			Theodolite used
				Log. feet	Feet	Miles	
			° ′ ″		8		Inch
	Nágonáth, VIII		30 52 12	4·966745	92628	17·543	18
97	Phára, IX		20 19 57	4·797463	62728	11·880	„
	Rewábarti Temple			5·148291	140699	26·648	
	Nágonáth, VIII		8 7 46	4·809573	64502	12·216	„
98	Phára, IX		9 50 13	4·891695	77928	14·759	„
	Mardángaib Temple			5·148291	140699	26·648	
	Nágonáth, VIII		10 44 12	4·632325	42887	8·123	„
99	Gokulphára, X		19 4 44	4·876497	75248	14·252	„
	Kacher Hill Mark			5·058662	114462	21·678	
	Gokulphára, X		96 2 58	5·086564	122057	23·117	„
100	Kanwa, XII		17 47 24	4·574042	37501	7·102	„
	Badarwára	h.s.		5·050259	112269	21·263	
	Gokulphára, X		39 10 6	4·390036	24549	4·649	„
101	Badarwára	h.s.	66 4 25	4·550572	35528	6·729	†
	Garwai Fort			4·574042	37501	7·102	
	Gokulphára, X		14 58 24	4·447768	28039	5·310	18
102	Badarwára	h.s.	144 48 40	4·796156	62540	11·845	†
	Sagauli Temple			4·574042	37501	7·102	
	Gokulphára, X		32 33 29	4·369759	23429	4·437	18
103	Badarwára	h.s.	26 54 45	4·294595	19706	3·732	†
	Koratha Temple			4·574042	37501	7·102	
	Gokulphára, X		90 25 15	4·593999	39264	7·436	18
104	Badarwára	h.s.	16 49 17	4·055493	11363	2·152	†
	Dhanora Temple			4·574042	37501	7·102	
	Gokulphára, X		25 58 16	4·390265	24562	4·652	18
105	Badarwára	h.s.	112 4 10	4·715825	51979	9·844	†
	Dakoli Temple			4·574042	37501	7·102	
					23		
	Gokulphára, X		70 4 42	5·027101	106439	20·159	18
106	Kanwa, XII		27 19 49	4·715825	51979	9·844	„
	Dakoli Temple			5·050259	112269	21·263	
	Gokulphára, X		121 11 50	4·696168	49678	9·409	„
107	Badarwára	h.s.	18 35 2	4·267377	18509	3·505	†
	Kotra Temple			4·574042	37501	7·102	
	Gokulphára, X		79 31 17	4·597784	39608	7·502	18
108	Badarwára	h.s.	31 53 10	4·327913	21277	4·030	†
	Sayyidnagar Temple			4·574042	37501	7·102	
	Gokulphára, X		77 29 42	4·632070	42862	8·118	18
109	Badarwára	h.s.	43 50 12	4·482982	30408	5·759	†
	Chirauli Fort			4·574042	37501	7·102	
	Gokulphára, X		18 33 16	4·924284	84001	15·909	18
110	Kanwa, XII		6 36 52	4·482982	30408	5·759	„
	Chirauli Fort			5·050259	112269	21·263	
	Gokulphára, X		58 56 14	4·569010	37069	7·021	„
111	Badarwára	h.s.	60 59 55	4·578044	37848	7·168	†
	Kalra	„		4·574042	37501	7·102	
	Gokulphára, X		44 21 43	4·602367	40028	7·581	18
112	Badarwára	h.s.	94 42 55	4·756301	57056	10·806	†
	Perona Fort			4·574042	37501	7·102	
	Kanwa, XII		24 53 51	4·763554	58017	10·988	18
113	Nipania, XIII		34 3 41	4·887526	77184	14·618	„
	Atária	s.		5·072154	118074	22·362	
					7		
	Gura, XI		46 7 10	4·887526	77184	14·618	„
114	Kanwa, XII		26 20 37	4·676861	47518	9·000	„
	Atária	s.		5·009051	102106	19·338	
	Gokulphára, X			4·647116	44373	8·404	
115	Kanwa, XII		37 39 33	4·912572	81766	15·486	„
	Himilia	s.	122 58 39	5·050259	112269	21·263	†
					4		
	Gokulphára, X			4·819889	66052	12·510	
116	Gura, XI		43 29 40	4·912572	81766	15·486	18
	Himilia	s.	102 43 30	5·064004	115879	21·947	†
	Gura, XI		84 59 18	4·763175	57966	10·978	18
117	Atária	s.	40 15 48	4·575274	37607	7·123	†
	Muhammadabad	„		4·676861	47518	9·000	
					1		
	Atária	s.	32 11 14	4·526784	33634	6·370	†
118	Himilia	„	66 38 30	4·763175	57966	10·978	†
	Muhammadabad	„		4·795135	62393	11·817	
				*			
	Gura, XI		94 13 54	4·751133	56381	10·678	18
119	Muhammadabad	s.		4·594641	39322	7·447	
	Baukhar	„	41 41 53	4·575274	37607	7·123	†
	Kanwa, XII		22 23 40	4·365021	23175	4·389	18
120	Himilia	s.	110 45 54	4·754950	56879	10·772	†
	Girthan Fort			4·647116	44373	8·404	
	Gura, XI		74 13 39	4·589238	38836	7·355	18
121	Baukhar	s.	28 45 58	4·288263	19421	3·678	†
	Airo Fort			4·594641	39322	7·447	
	Gura, XI		58 2 44	4·602975	40084	7·592	18
122	Baukhar	s.	65 36 52	4·633756	43029	8·149	†
	Parásan Temple			4·594641	39322	7·447	

* Base deduced by two sides and included angle. † Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
123	Atária s.	10 38 2	4·062392	11545	2·187	†
	Himilia „	75 8 17	4·781541	60470	11·453	†
	Bargaon Building		4·795135	62393	11·817	
			*	22		
124	Gura, XI	70 25 12	4·781541	60470	11·455	18
	Atária s.	61 49 0	4·752603	56572	10·714	†
	Bargaon Building		4·676861	47518	9·000	
125	Atária s.	19 58 10	4·347333	22250	4·214	†
	Himilia „	53 18 2	4·717974	52237	9·893	†
	Rinia Building		4·795135	62393	11·817	
			*			
126	Kanwa, XII	33 14 33	4·688634	48824	9·247	18
	Atária s.	26 49 24	4·604116	40190	7·612	
	Garar Mound (lamp)		4·887526	77184	14·618	
				3		
127	Gura, XI	50 33 25	4·688634	48824	9·247	„
	Atária s.	80 42 49	4·795143	62394	11·817	†
	Garar Mound (lamp)		4·676861	47518	9·000	
128	Kanwa, XII	13 22 56	4·473085	29722	5·629	18
	Himilia s.	6 49 54	4·184010	15276	2·893	†
	Dantoli Temple		4·647116	44373	8·404	
129	Nipania, XIII	32 3 54	4·546960	35234	6·673	18
	Atária s.	86 59 22	4·821364	66277	12·552	
	Áta „	60 56 44	4·763554	58017	10·988	
				6		
130	Gura, XI	47 48 33	4·546960	35234	6·673	„
	Atária s.	44 25 57	4·522334	33292	6·305	†
	Áta „	87 45 30	4·676861	47518	9·000	†
131	Gura, XI	76 48 18	4·681936	48077	9·105	18
	Áta s.	60 48 15	4·634549	43107	8·164	†
	Parásan Fort		4·522334	33292	6·305	
132	Gura. XI	54 48 25	4·602969	40084	7·592	18
	Atária s.	49 32 46	4·571977	37323	7·069	†
	Orai Temple		4·676861	47518	9·000	
				8		
133	Atária s.	93 58 43	4·741731	55174	10·450	†
	Áta „	46 26 54	4·602969	40084	7·592	†
	Orai Temple		4·546960	35234	6·673	
134	Gura. XI	47 18 26	4·502801	31827	6·028	18
	Orai Temple		3·962330	9169	1·737	
	Karmer s.	120 28 5	4·571977	37323	7·069	†
				1		
135	Gura, XI	55 18 32	4·463410	29068	5·505	18
	Áta s.		3·962330	9169	1·737	
	Karmer „	109 39 31	4·522334	33292	6·305	†

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Gura, XI	64 21 44	4·288542	19433	3·681	18
136	Karmer s.	90 27 47	4·333539	21555	4·082	†
	Sandi Fort		3·962330	9169	1·737	
	Áta s.	111 35 26	4·687633	48712	9·226	
137	Karmer „	34 42 30	4·474643	29829	5·649	†
	Itaura Temple		4·463410	29068	5·505	
	Gura, XI	25 55 44	4·225164	16794	3·181	18
138	Áta s.	34 9 25	4·333749	21565	4·084	†
	Chamári „		4·522334	33292	6·305	
	Gura, XI	34 38 9	4·277539	18947	3·588	18
139	Áta s.	52 23 50	4·421784	26411	5·002	†
	Banha Fort		4·522334	33292	6·305	
	Kanwa, XII	47 12 21	4·533746	34178	6·473	18
140	Himilia s.	60 29 26	4·607825	40534	7·677	†
	Kukargaon Building		4·647116	44373	8·404	
	Gura, XI	39 17 0	4·793763	62196	11·780	18
141	Nipania, XIII	62 7 41	4·938702	86836	16·446	„
	Kálpi s.		4·983581	96290	18·237	
	Kanwa, XII	29 48 8	4·884238	76602	14·508	„
142	Nipania, XIII	20 12 6	4·726103	53223	10·080	„
	Gijnor s.		5·072154	118074	22·362	
				3		
	Nipania, XIII	37 35 34	4·795937	62508	11·839	„
143	Husapura, XIV	48 22 55	4·884238	76602	14·508	„
	Gijnor s.		5·009502	102212	19·358	
	Nipania, XIII	22 21 37	4·484184	30492	5·775	18
144	Gijnor s.		4·791468	61868	11·717	
	Parbatpur „	107 6 55	4·884238	76602	14·508	†
				5		
	Nipania, XIII	31 54 10	4·520542	33154	6·279	18
145	Atária s.		4·791468	61868	11·717	
	Parbatpur „	67 38 8	4·763554	58017	10·988	†
	Atária s.	23 15 50	4·212486	16311	3·089	†
146	Parbatpur „	30 8 10	4·316677	20734	3·927	†
	Siahari Mound		4·520542	33154	6·279	
	Nipania, XIII	32 0 29	4·528938	33802	6·402	18
147	Parbatpur s.	43 57 25	4·646063	44265	8·384	†
	Masmaria Fort		4·791468	61868	11·717	
				4		
	Atária s.	80 48 2	4·528938	33802	6·402	†
148	Parbatpur „	23 40 43	4·138360	13752	2·605	†
	Masmaria Fort		4·520542	33154	6·279	

* Base deduced by two sides and included angle. † Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Atária s.	11 59 3	4·167294	14699	2·784	†
149	Parbatpur „	15 56 33	4·288795	19444	3·683	†
	Banora Fort		4·520542	33154	6·279	
	Nipania, XIII	11 33 16	4·477866	30052	5·692	18
150	Áta s.	14 39 40	4·579482	37974	7·192	
	Mahewa Building		4·821364	66277	12·552	
	Atária s.	65 29 20	4·769160	58771	11·131	†
151	Himilia „	39 30 12	4·613717	41088	7·782	†
	Urgaon Temple		4·795135	62393	11·817	
			*	8		
	Kanwa, XII	80 24 8	4·769160	58771	11·131	18
152	Himilia s.	51 29 10	4·668742	46638	8·833	†
	Urgaon Temple		4·647116	44373	8·404	
	Kanwa, XII	6 7 20	4·300338	19968	3·782	18
153	Gijnor s.	10 23 34	4·528603	33776	6·397	„
	Jálaun Temple No. 1		4·726103	53223	10·080	
				5		
	Gijnor s.	69 4 44	4·475583	29894	5·662	„
154	Parbatpur „	38 36 13	4·300338	19968	3·782	†
	Jálaun Temple No. 1		4·484184	30492	5·775	
	Kanwa, XII	5 38 54	4·292018	19589	3·710	18
155	Gijnor s.	9 51 43	4·532617	34089	6·456	„
	Jálaun Palace		4·726103	53223	10·080	
	Atária s.	18 24 0	4·024657	10584	2·005	†
156	Parbatpur „	63 0 0	4·475334	29877	5·658	†
	Degaon Fort		4·520542	33154	6·279	
	Atária s.	61 44 5	4·484935	30545	5·785	†
157	Parbatpur „	45 19 15	4·391978	24659	4·670	†
	Churki Fort		4·520542	33154	6·279	
	Atária s.	28 14 50	4·231730	17050	3·229	†
158	Parbatpur „	84 47 0	4·554812	35877	6·795	†
	Babai Fort		4·520542	33154	6·279	
	Atária s.	20 8 25	4·175338	14974	2·836	†
159	Parbatpur „	110 11 10	4·610846	40817	7·731	†
	Charsoni Fort		4·520542	33154	6·279	
	Atária s.	42 50 15	4·402271	25251	4·782	†
160	Parbatpur „	73 56 30	4·552527	35688	6·759	†
	Sarsai Fort		4·520542	33154	6·279	
	Kanwa, XII	21 9 31	4·312079	20515	3·885	18
161	Gijnor s.	48 18 3	4·627747	42437	8·037	„
	Orekhi Fort		4·726103	53223	10·080	

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Kanwa, XII	31 32 14	4·446665	27968	5·297	18
162	Gijnor s.	63 58 49	4·681707	48052	9·101	„
	Cháki Fort		4·726103	53223	10·080	
	Kanwa, XII	13 50 39	4·114622	13020	2·466	„
163	Gijnor s.	88 9 51	4·735489	54386	10·300	„
	Sahu Building		4·726103	53223	10·080	
	Nipania, XIII	14 57 20	4·664018	46134	8·737	„
164	Kálpi s.		4·226287	16838	3·189	
	Duhelkhand „	159 38 23	4·793763	62196	11·780	†
	Nipania, XIII	23 20 9	4·660428	45754	8·666	18
165	Duhelkhand s.	148 16 55	4·783372	60726	11·501	†
	Kálpi, Chaurási Temple		4·226287	16838	3·189	
	Nipania, XIII	84 25 12	4·862160	72805	13·789	18
166	Áta s.	30 37 5	4·571207	37257	7·056	
	Katri Temple		4·821364	66277	12·552	
	Nipania, XIII	34 34 17	4·122045	13245	2·508	„
167	Duhelkhand s.	99 15 40	4·362432	23037	4·363	†
	Pichora Building		4·226287	16838	3·189	
	Nipania, XIII	75 4 21	4·230169	16989	3·218	18
168	Duhelkhand s.	31 39 40	3·965150	9229	1·748	†
	Pál House		4·226287	16838	3·189	
	Gijnor s.	56 9 13	4·404158	25360	4·803	18
169	Parbatpur „	36 54 0	4·263256	18334	3·472	†
	Gurgaon Fort		4·484184	30492	5·775	
	Atária s.	74 1 55	4·732544	54019	10·231	†
170	Parbatpur „	69 48 20	4·722080	52733	9·987	†
	Samárhu Fort		4·520542	33154	6·279	
	Kanwa, XII	58 58 4	4·773835	59407	11·251	18
171	Parbatpur s.	66 44 14	4·804092	63693	12·063	†
	Saráwan Fort		4·750490	56298	10·662	
			*	5		
	Kanwa, XII	26 47 36	4·461496	28940	5·481	18
172	Gijnor s.	97 12 30	4·804092	63693	12·063	„
	Saráwan Fort		4·726103	53223	10·080	
	Nipania, XIII	24 10 10	4·521220	33206	6·289	„
173	Gijnor s.	46 39 10	4·770692	58978	11·170	
	Tarsor Fort		4·884238	76602	14·508	
				3		
	Husapura, XIV	31 24 15	4·521220	33206	6·289	„
174	Gijnor s.	47 22 21	4·671066	46888	8·880	
	Tarsor Fort		4·795937	62508	11·839	

* Base deduced by two sides and included angle. † Instrument not known.

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No. of Triangle	Station		Corrected Plane Angle	Distance			Theodolite used
				Log. feet	Feet	Miles	
			° ′ ″				Inch
	Kanwa, XII		10 20 58	4·484558	30518	5·780	18
175	Gijnor	s.	151 23 30	4·910300	81339	15·405	,,
	Kaitwa Fort			4·726103	53223	10·080	
	Nipania, XIII		11 26 45	4·498937	31545	5·975	,,
176	Husapura, XIV		28 34 7	4·880924	76019	14·398	,,
	Kuthaund Temple			5·009502	102212	19·358	
	Nipania, XIII		12 9 36	4·499472	31584	5·982	,,
177	Husapura, XIV		30 48 52	4·885416	76810	14·547	,,
	Kuthaund Fort			5·009502	102212	19·358	
	Nipania, XIII		12 40 19	4·611576	40886	7·744	,,
178	Gandaspur, XV		16 27 31	4·722683	52806	10·001	,,
	Sikandra	s.		4·957754	90731	17·184	
	Nipania, XIII		82 16 22	4·813501	65088	12·327	,,
179	Sikandra	s.	44 13 11	4·660952	45809	8·676	†
	Jatoli Tower			4·722683	52806	10·001	
					6		
	Nipania, XIII		52 54 59	4·699691	50083	9·485	18
180	Parbatpur	s.	46 51 34	4·660952	45809	8·676	†
	Jatoli Tower			4·791468	61868	11·717	
	Nipania, XIII		72 50 42	4·779851	60235	11·408	18
181	Sikandra	s.	50 15 40	4·685522	48476	9·181	†
	Jakha Fort			4·722683	52806	10·001	
	Nipania, XIII		72 20 2	4·796684	62616	11·859	18
182	Sikandra	s.	54 11 40	4·726688	53295	10·094	†
	Chháni Fort			4·722683	52806	10·001	
	Nipania, XIII		24 32 59	4·389242	24504	4·641	18
183	Sikandra	s.	39 0 15	4·569600	37119	7·030	†
	Kasboro Fort			4·722683	52806	10·001	
	Nipania, XIII		10 49 27	4·013728	10321	1·955	18
184	Sikandra	s.	95 16 5	4·738204	54727	10·365	†
	Rasdhán Fort			4·722683	52806	10·001	
	Gandaspur, XV		98 23 53	4·729010	53581	10·148	18
185	Sikandra	s.		4·464932	29170	5·525	
	Auraiya	,,	49 0 57	4·611576	40886	7·744	†
	Sikandra	s.	14 26 17	4·129322	13469	2·551	
186	Auraiya	,,	68 15 53	4·700513	50178	9·503	†
	Deokali Temple			4·729010	53581	10·148	
	Sikandra	s.	39 39 19	4·538208	34531	6·540	
187	Auraiya	,,	58 21 37	4·663389	46067	8·725	†
	Bhadek	,,	81 59 4	4·729010	53581	10·148	
	Sikandra	s.	25 13 2	4·330189	21389	4·051	†
188	Deokali Temple			4·663389	46067	8·725	
	Bhadek	,,	88 12 9	4·700513	50178	9·503	†
	Sikandra	s.	61 36 35	4·610305	40767	7·721	†
189	Bhadek	,,	22 10 0	4·242645	17484	3·311	†
	Pinarthu Temple			4·663389	46067	8·725	
	Gandaspur, XV		74 51 57	4·475834	29911	5·665	18
190	Auraiya	s.	34 50 55	4·248112	17706	3·353	†
	Baradána Fort			4·464932	29170	5·525	
	Husapura, XIV		32 50 38	4·679180	47773	9·048	18
191	Atsu, XVI		37 47 35	4·732226	53979	10·223	,,
	Bareh Temple			4·919612	83102	15·739	
	Husapura, XIV		38 59 19	4·535485	34315	6·499	,,
192	Bareh Temple			4·568735	37045	7·016	
	Yani	s.	98 13 41	4·732226	53979	10·223	†
					0		
	Atsu, XVI		42 41 29	4·535485	34315	6·499	18
193	Bareh Temple			4·666883	46439	8·795	
	Yani	s.	70 43 44	4·679180	47773	9·048	†
	Husapura, XIV		79 4 2	4·672720	47067	8·914	18
194	Yani	s.	50 19 40	4·567001	36898	6·988	†
	Jagamanpur Fort			4·568735	37045	7·016	
	Husapura, XIV		16 51 11	4·080601	12039	2·280	18
195	Yani	s.	100 0 35	4·611664	40894	7·745	†
	Bason Fort			4·568735	37045	7·016	
	Husapura, XIV		11 43 52	3·927897	8470	1·604	18
196	Yani	s.	105 29 30	4·603647	40146	7·603	†
	Tiar Fort			4·568735	37045	7·016	
	Husapura, XIV		6 24 37	3·920055	8319	1·576	18
197	Yani	s.	143 46 30	4·643763	44031	8·339	†
	Nabáda Fort			4·568735	37045	7·016	
	Husapura, XIV		38 10 48	4·539598	34642	6·561	18
198	Yani	s.	100 26 30	4·741263	55114	10·438	†
	Bareh Fort			4·568735	37045	7·016	
	Atsu, XVI		25 3 50	4·598211	39647	7·509	18
199	Seontára, XVII		47 25 20	4·838315	68915	13·052	,,
	Seod	s.		4·950612	89251	16·904	
					0		
	Gandaspur, XV		48 48 28	4·838315	68915	13·052	,,
200	Atsu, XVI		31 7 21	4·675187	47336	8·965	,,
	Seod	s.		4·955064	90170	17·078	

† Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Gandaspur, XV	66 39 1	4·638421	43493	8·237	18
201	Seod s.	25 37 29	4·311490	20488	3·880	†
	Kakoto Temple		4·675187	47336	8·965	
	Gandaspur, XV	15 47 59	4·040558	10979	2·079	18
202	Auraiya s.	30 32 12	4·311490	20488	3·880	†
	Kakoto Temple		4·464932	29170	5·525	
	Gandaspur, XV	61 21 38	4·642654	43919	8·318	18
203	Seod s.	47 34 5	4·567434	36935	6·995	†
	Parín Fort Mark (lamp)		4·675187	47336	8·965	
	Atsu, XVI	23 35 44	4·762671	57899	10·966	18
204	Seontára, XVII	14 30 13	4·559015	36226	6·861	„
	Phaphúnd Building		4·950612	89251	16·904	
	Seontára, XVII	59 4 7	4·532061	34046	6·448	„
205	Seod s.	33 36 15	4·341764	21967	4·160	†
	Nandu Saháil Fort		4·598211	39647	7·509	
	Seontára, XVII	79 24 35	4·593113	39184	7·421	18
206	Seod s.	16 33 45	4·055512	11364	2·152	
	Ponti Fort		4·598211	39647	7·509	
	Birona, XVIII	41 45 58	4·833121	68096	12·897	„
207	Kalsán, XIX	30 46 41	4·718615	52314	9·908	„
	Bidhúna s.		4·989112	97524	18·470	
				2		
	Seontára, XVII	45 8 49	4·833121	68096	12·897	„
208	Kalsán, XIX	26 4 1	4·625405	42209	7·994	„
	Bidhúna s.		4·958750	90939	17·223	
	Seod s.		4·629045	42564	8·061	
209	Bidhúna „	66 24 14	4·843155	69688	13·198	†
	Guári t.s.	79 33 35	4·873825	74787	14·164	†
			*	3		
	Birona, XVIII	51 33 29	4·629045	42564	8·061	18
210	Bidhúna s.	54 9 11	4·643949	44050	8·343	†
	Guári t.s.	74 17 20	4·718615	52314	9·908	†
	Atsu, XVI	55 54 45	4·676839	47516	8·999	18
211	Guári t.s.	28 47 48	4·441492	27637	5·234	
	Barsan s.	95 17 27	4·756858	57129	10·820	
			*			
	Atsu, XVI	8 56 36	4·293147	19640	3·720	„
212	Guári t.s.	17 56 28	4·590141	38917	7·371	
	Chachhúnd Fort		4·756858	57129	10·820	
			*			
	Seontára, XVII	59 37 19	4·562060	36480	6·909	„
213	Bidhúna s.	33 50 4	4·371892	23545	4·459	†
	Harchandpur Fort		4·625405	42209	7·994	
	Birona, XVIII	25 36 4	4·329693	21365	4·046	18
214	Guári t.s.	91 24 31	4·693975	49428	9·361	†
	Gasáro Fort		4·643949	44050	8·343	
				6		
	Atsu, XVI	20 37 50	4·329693	21365	4·046	18
215	Guári t.s.	49 47 18	4·665633	46306	8·770	
	Gasáro Fort		4·756858	57129	10·820	
			*			
	Seontára, XVII	24 14 1	4·455528	28545	5·406	„
216	Bidhúna s.	13 8 6	4·198756	15804	2·993	†
	Lakna Fort		4·625405	42209	7·994	
	Seod s.	55 7 19	4·777967	59974	11·359	†
217	Guári t.s.	52 28 12	4·763248	57976	10·980	†
	Sahár Fort		4·843155	69688	13·198	
				2		
	Bidhúna s.	111 37 53	4·777967	59974	11·359	†
218	Guári t.s.	27 5 23	4·468061	29381	5·565	†
	Sahár Fort		4·629045	42564	8·061	
	Birona, XVIII	23 18 33	4·267068	18496	3·503	18
219	Guári t.s.	86 13 51	4·668770	46641	8·834	†
	Ruru (Bara) Fort		4·643949	44050	8·343	
	Birona, XVIII	16 24 9	4·115648	13051	2·472	18
220	Guári, t.s.	55 58 52	4·583286	38308	7·255	†
	Ruru (Chhota) Old Fort		4·643949	44050	8·343	
	Birona, XVIII	14 36 58	4·445432	27889	5·282	18
221	Guári t.s.	8 52 22	4·231643	17047	3·229	†
	Kudarkot Temple		4·643949	44050	8·343	
	Bidhúna s.	64 10 43	4·616993	41399	7·841	†
222	Guári t.s.	48 4 46	4·534290	34221	6·481	†
	Sumáin Fort		4·629045	42564	8·061	
				0		
	Birona, XVIII	69 18 15	4·616993	41399	7·841	18
223	Guári t.s.	26 12 34	4·291045	19545	3·702	†
	Sumáin Fort		4·643949	44050	8·343	
	Birona, XVIII	23 24 28	4·334174	21586	4·088	18
224	Bidhúna s.	82 16 20	4·731123	53842	10·197	†
	Sabhad Fort		4·718615	52314	9·908	
				1		
	Kalsán, XIX	10 42 39	4·334174	21586	4·088	18
225	Bidhúna s.	25 11 1	4·693926	49423	9·360	„
	Sabhad Fort		4·833121	68096	12·897	
	Birona, XVIII	88 3 57	4·761577	57753	10·938	18
226	Guári t.s.	42 16 1	4·589572	38866	7·361	†
	Barhind Fort		4·643949	44050	8·343	

* Base deduced by two sides and included angle. † Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Birona, XVIII	36 30 28	4·495340	31285·5	5·925	18
227	Bidhúna S.	47 39 15	4·589572	38866	7·361	†
	Barhind Fort		4·718615	52314	9·908	
	Birona, XVIII	34 28 26	4·484182	30492	5·775	18
228	Bidhúna S.	69 19 47	4·702445	50402	9·546	†
	Airo „		4·718615	52314	9·908	
	Kalsán, XIX	23 6 44	4·484182	30492·1	5·775	18
229	Bidhúna S.		4·680868	47959	9·083	
	Airo „	118 45 42	4·833121	68096	12·897	†
	Bidhúna S.	48 53 48	4·483417	30438	5·765	†
230	Airo „	82 5 27	4·602169	40010	7·578	†
	Jaraun Fort		4·484182	30492·6	5·775	
	Kalsán, XIX	37 40 13	4·483417	30438	5·765	18
231	Airo S.	36 40 15	4·473425	29746	5·634	†
	Jaraun Fort		4·680868	47959	9·083	
	Bidhúna S.	24 18 36	4·382327	24117	4·568	†
232	Airo „	124 19 31	4·684675	48381	9·163	†
	Haseran Fort		4·484182	30492·1	5·775	
	Kalsán, XIX	28 41 13	4·684675	48381	9·163	18
233	Bidhúna S.	13 48 58	4·381459	24069	4·559	
	Haseran Fort		4·833121	68096	12·897	
	Seontára, XVII	52 59 8	4·866361	73513	13·923	„
234	Kalsán, XIX	28 2 35	4·636318	43283	8·198	„
	Akupú S.	98 58 17	4·958750	90939	17·223	†
	Seontára, XVII	19 37 49	4·387114	24384	4·618	18
235	Akupu S.	123 45 47	4·780620	60342	11·428	†
	Khánpur Fort		4·636318	43283·0	8·198	
	Seontára, XVII	33 21 19	4·719190	52383	9·921	18
236	Kalsán, XIX	39 17 57	4·780620	60342	11·428	„
	Khánpur Fort		4·958750	90939	17·223	
	Kalsán, XIX	35 13 56	4·628076	42469	8·043	„
237	Akupu S.	51 42 25	4·761769	57779	10·943	†
	Kúrsi „	93 3 39	4·866361	73513·0	13·923	†
	Kalsán, XIX	46 29 18	4·641049	43757	8·287	18
238	Khánpur Fort		4·761769	57779	10·943	
	Kúrsi S.	60 15 0	4·719190	52383	9·921	†
	Seontára, XVII	12 12 11	4·445834	27915	5·287	18
239	Akupu S.	6 55 45	4·202275	15932	3·017	†
	Jiwa Sirsaini Fort		4·636318	43283	8·198	
	Seontára, XVII	10 11 50	4·120874	13209	2·502	18
240	Akupu S.	25 15 39	4·502973	31840	6·030	†
	Dabkari Temple		4·636318	43283·7	8·198	
	Seontára, XVII	108 19 47	4·780591	60338	11·428	18
241	Bidhúna S.	30 3 39	4·502973	31840	6·030	†
	Dabkari Temple		4·625405	42209	7·994	
	Seontára, XVII	77 55 13	4·653182	44997	8·522	18
242	Bidhúna S.	35 32 56	4·427379	26753	5·067	†
	Aneso Fort		4·625405	42209·11	7·994	
	Seontára, XVII	20 12 44	4·309466	20392	3·862	18
243	Akupu S.	26 57 14	4·427379	26753	5·067	†
	Aneso Fort		4·636318	43283	8·198	
	Kalsán, XIX	27 25 46	4·436998	27353	5·180	18
244	Kúrsi S.	75 53 44	4·760327	57587	10·907	†
	Malhausi „		4·761769	57779·1	10·943	
	Akupu S.	26 17 52	4·436998	27353	5·180	†
245	Kúrsi „	17 9 55	4·260571	18221	3·451	†
	Malhausi „	136 32 13	4·628076	42469	8·043	†
	Akupu S.	84 34 28	4·302321	20060	3·799	†
246	Malhausi „	30 42 0	4·012304	10287	1·948	†
	Oroláki Fort		4·260571	18221	3·451	
	Seontára, XVII	23 56 49	4·686480	48583	9·201	18
247	Kalsán, XIX	25 29 47	4·711998	51523	9·758	„
	Bela Fort Mark		4·958750	90939·2	17·223	
	Seontára, XVII	29 2 19	4·399173	25071	4·748	„
248	Akupu S.	94 1 55	4·711998	51523	9·758	†
	Bela Fort Mark		4·636318	43283	8·198	
	Kalsán, XIX	20 15 38	4·428963	26851	5·085	18
249	Akupu S.	51 11 34	4·781205	60423	11·444	†
	Sirsai Fort		4·866361	73513	13·923	
	Kalsán, XIX	53 25 36	4·608086	40559	7·682	18
250	Airo S.	54 50 17	4·615821	41288	7·820	†
	Siriáo Fort		4·680868	47959·13	9·083	
	Kalsán, XIX	11 26 12	4·282149	19149	3·627	18
251	Kúrsi S.	25 18 38	4·615821	41288	7·820	†
	Siriáo Fort		4·761769	57779	10·943	
	Kúrsi S.	36 49 35	4·275078	18840	3·568	†
252	Malhausi „	82 41 20	4·493822	31176	5·905	†
	Bhadaura Fort		4·436998	27353	5·180	

† Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Kalsán, XIX	50 59 58	4·655721	45261	8·572	18
253	Kúrsi s.	46 12 58	4·623732	42047	7·963	†
	Abath Mound		4·761769	57779	10·943	
				10		
	Akupu s.	70 46 42	4·655721	45261	8·572	†
254	Kúrsi „	46 50 41	4·543661	34967	6·623	†
	Abath Mound		4·628076	42469	8·043	
	Akupu s.	34 1 0	4·393894	24768	4·691	†
255	Kúrsi „	72 23 49	4·625318	42201	7·993	†
	Gaili Fort		4·628076	42469	8·043	
				0		
	Kalsán, XIX	21 3 25	4·625318	42201	7·993	18
256	Akupu s.	17 41 25	4·552556	35691	6·760	†
	Gaili Fort		4·866361	73513	13·923	
	Kúrsi s.	61 2 38	4·499923	31617	5·988	†
257	Malhausi „	69 45 30	4·530234	33903	6·421	†
	Mau Building		4·436998	27353	5·180	
	Kalsán, XIX	33 47 40	4·789534	61593	11·665	18
258	Akupu s.	7 47 59	4·176906	15028	2·846	†
	Indargarh Fort		4·866361	73513	13·923	
	Kalsán, XIX	48 57 33	4·605644	40331	7·639	18
259	Bela Fort Mark		4·687965	48749	9·233	
	Benora s.	65 18 19	4·686480	48583	9·201	†
				1		
	Kalsán, XIX	46 24 45	4·726580	53282	10·091	18
260	Akupu s.	41 30 22	4·687965	48749	9·233	†
	Benora „	92 4 53	4·866361	73513	13·923	†
	Akupu s.	53 35 48	4·644902	44147	8·361	†
261	Benora „	50 8 22	4·624321	42104	7·974	†
	Naili Fort		4·726580	53282	10·091	
	Akupu s.	35 40 27	4·518008	32962	6·243	†
262	Benora „	34 50 5	4·509006	32285	6·115	†
	Auser Fort		4·726580	53282	10·091	
				1		
	Akupu s.	128 53 14	4·829842	67584	12·800	†
263	Kúrsi „	21 49 45	4·509006	32285	6·115	†
	Auser Fort		4·628076	42469	8·043	
	Kalsán, XIX	38 1 16	4·494812	31247	5·918	18
264	Benora s.	68 2 39	4·672567	47051	8·911	†
	Bhadaura Temple		4·687965	48749	9·233	
				1		
	Akupu s.	27 13 13	4·494812	31247	5·918	†
265	Benora „	24 2 14	4·444450	27826	5·270	†
	Bhadaura Temple		4·726580	53282	10·091	

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Akupu s.	27 32 12	4·391652	24641	4·667	†
266	Benora „	63 52 55	4·679936	47856	9·064	†
	Aman Fort		4·726580	53282	10·091	
	Akupu s.	29 26 20	4·472338	29671	5·620	†
267	Benora „	88 36 15	4·780690	60352	11·430	†
	Jankath Fort		4·726580	53282	10·091	
	Akupu s.	11 9 12	4·014409	10337	1·958	†
268	Benora „	74 25 38	4·711630	51479	9·750	†
	Khairnagar Fort		4·726580	53282	10·091	
	Akupu s.	10 33 7	4·098200	12537	2·374	†
269	Benora „	40 33 3	4·648443	44508	8·430	†
	Sukhi Fort		4·726580	53282	10·091	
	Akupu s.	11 35 52	4·077977	11967	2·266	†
270	Benora „	104 52 38	4·759886	57529	10·896	†
	Khairnagar Temple		4·726580	53282	10·091	
	Akupu s.	33 8 19	4·488750	30814	5·836	†
271	Benora „	75 54 23	4·737754	54671	10·354	†
	Majelo Fort		4·726580	53282	10·091	
				2		
	Kalsán, XIX	24 8 21	4·488750	30814	5·836	18
272	Benora s.	16 10 30	4·322013	20990	3·975	†
	Majelo Fort		4·687965	48749	9·233	
	Kalsán, XIX	44 20 26	4·820283	66112	12·521	18
273	Bisungarh, XX	39 58 57	4·783764	60780	11·511	„
	Rauli s.		4·973719	94128	17·827	
				3		
	Bisungarh, XX	25 55 39	4·610509	40786	7·725	„
274	Chandanpur, XXI	45 7 57	4·820283	66112	12·521	„
	Rauli s.		4·945622	88231	16·710	
	Kalsán, XIX	79 57 44	4·737355	54620	10·345	„
275	Benora s.	38 32 5	4·538534	34557	6·545	†
	Amolar „	61 30 11	4·687965	48749	9·233	†
				14		
	Kalsán, XIX	45 5 38	4·641981	43851	8·305	18
276	Rauli s.		4·538534	34557	6·545	
	Amolar „	100 58 42	4·783764	60780	11·511	†
	Benora s.	33 21 57	4·558805	36208	6·858	†
277	Amolar „	22 41 52	4·404897	25404	4·811	†
	Tirwa Palace		4·737355	54620	10·345	
	Kalsán, XIX	76 53 15	4·898827	79219	15·004	18
278	Akupu s.	38 27 13	4·704008	50583	9·580	†
	Tirwa Temple		4·866361	73513	13·923	

† Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″		8		Inch
	Kalsán, XIX	49 29 14	4·585393	38494	7·291	18
279	Amolar S.	87 28 24	4·704008	50583	9·580	†
	Tirwa Temple		4·538534	34557	6·545	
	Kalsán, XIX	13 25 34	4·794031	62234	11·787	18
280	Bisungarh, XX	7 8 1	4·522249	33285	6·304	„
	Rausen Fort (lamp)		4·973719	94128	17·827	
				10		
	Kalsán, XIX	53 32 33	4·589603	38869	7·362	„
281	Airo S.	43 31 53	4·522249	33285	6·304	†
	Rausen Fort (lamp)		4·680868	47959	9·083	
	Bisungarh, XX	19 58 44	4·458038	28710	5·438	18
282	Rauli S.	31 54 26	4·647509	44413	8·412	
	Kasáve Building (lamp)		4·820283	66112	12·521	
	Bisungarh, XX	45 54 23	4·817333	65665	12·437	18
283	Chandanpur, XXI	28 53 41	4·645213	44179	8·367	„
	Kasáve Fort		4·945622	88231	16·710	
	Birona, XVIII	51 13 28	4·893854	78317	14·833	„
284	Bisungarh, XX	57 59 27	4·930356	85184	16·133	„
	Sámán S.	70 47 5	4·977084	94860	17·966	†
	Birona, XVIII	58 48 42	4·864349	73173	13·858	18
285	Sámán S.		4·705340	50739	9·610	
	Sakráwa „	84 48 16	4·930356	85184	16·133	†
				6		
	Bisungarh, XX	66 32 23	4·864349	73173	13·858	18
286	Sámán S.	34 24 3	4·653852	45066	8·535	
	Sakráwa „	79 3 34	4·893854	78317	14·833	
	Birona, XVIII	28 55 23	4·417458	26149	4·952	„
287	Sakráwa S.	40 51 57	4·548710	35376	6·700	†
	Dorona „	110 12 40	4·705340	50739	9·610	†
				4		
	Sámán S.	18 27 49	4·417458	26149	4·952	
288	Sakráwa „	43 56 19	4·758095	57292	10·851	†
	Dorona „	117 35 52	4·864349	73173	13·858	
	Birona, XVIII	36 9 8	4·463441	29070	5·506	18
289	Dorona S.	97 57 55	4·688428	48801	9·243	†
	Kuita „	45 52 57	4·548710	35376	6·700	†
				0		
	Sámán S.	26 10 51	4·463441	29070	5·506	†
290	Dorona „		4·568888	37059	7·019	
	Kuita „	119 35 36	4·758095	57292	10·851	†
	Birona, XVIII	62 21 8	4·889777	77585	14·694	18
291	Sámán S.	41 5 50	4·760222	57573	10·904	†
	Ber „		4·930356	85184	16·133	

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Sámán S.	32 21 2	4·795922	62506	11·838	†
292	Ber „	106 1 47	5·050266	112271	21·263	†
	Etáwah Fort (lamp)		4·889777	77585	14·694	
				12		
	Sámán S.	65 11 14	5·010305	102401	19·394	†
293	Kuita „	95 38 9	5·050266	112271	21·263	†
	Etáwah Fort (lamp)		4·568888	37059	7·019	
	Birona, XVIII	58 24 57	4·619685	41657	7·890	18
294	Kuita S.	27 55 51	4·359933	22905	4·338	†
	Sarhau Fort		4·688428	48801	9·243	
				4		
	Birona, XVIII	94 34 5	4·639969	43648	8·267	18
295	Dorona S.	31 32 25	4·359933	22905	4·338	†
	Sarhau Fort		4·548710	35376	6·700	
	Dorona S.	50 5 14	4·436348	27312	5·173	†
296	Kuita „	75 11 14	4·536862	34424	6·520	†
	Maman Fort		4·463441	29070	5·506	
				11		
	Birona, XVIII	64 18 4	4·536862	34424	6·520	18
297	Dorona S.	47 52 41	4·452335	28336	5·367	†
	Maman Fort		4·548710	35376	6·700	
	Birona, XVIII	44 36 15	4·421014	26364	4·993	18
298	Dorona S.	25 49 36	4·213688	16356	3·098	†
	Táka Fort		4·548710	35376	6·700	
				2		
	Dorona S.	72 8 19	4·514689	32711	6·195	†
299	Kuita „	50 5 50	4·421014	26364	4·993	†
	Táka Fort		4·463441	29070	5·506	
	Dorona S.	35 24 30	4·231356	17036	3·226	†
300	Kuita „	63 12 52	4·419083	26247	4·971	†
	Agani Fort		4·463441	29070	5·506	
	Dorona S.	20 38 53	4·413696	25924	4·910	†
301	Kuita „	136 3 35	4·707683	51013	9·662	†
	Punja Fort		4·463441	29070	5·506	
	Sámán S.	46 58 53	4·544606	35043	6·637	†
302	Kuita „	82 22 40	4·676750	47506	8·997	†
	Munj Building		4·568888	37059	7·019	
	Birona, XVIII	15 26 14	4·113831	12997	2·461	18
303	Kuita S.	72 43 20	4·668599	46623	8·830	†
	Díg Fort		4·688428	48801	9·243	
	Birona, XVIII	24 54 45	4·222724	16700	3·163	18
304	Dorona S.	38 15 3	4·389965	24545	4·649	†
	Kudrail Fort		4·548710	35376	6·700	

† Instrument not known.

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No. of Triangle	Station		Corrected Plane Angle	Distance			Theodolite used
				Log. feet	Feet	Miles	
			° ′ ″				Inch
	Dorona	S.	59 42 52	4·401144	25185	4·770	†
305	Kuita	,,	34 55 55	4·222724	16700	3·163	†
	Kudrail Fort			4·463441	29070	5·506	
	Birona, XVIII		32 12 50	4·342818	22020	4·170	18
306	Dorona	S.	88 52 10	4·615940	41299	7·822	†
	Seonthana Fort			4·548710	35376	6·700	
	Sámán	S.	42 51 55	4·429939	26912	5·097	†
307	Kuita	,,	67 37 5	4·563238	36580	6·928	†
	Baro Fort			4·568888	37059	7·019	
	Sámán	S.	87 42 55	4·707885	51037	9·666	†
308	Kuita	,,	45 46 17	4·563484	36600	6·932	†
	Parasna Fort			4·568888	37059	7·019	
	Dorona	S.	62 25 57	4·411213	25776	4·882	†
309	Kuita	,,	26 16 43	4·109696	12873	2·438	†
	Laigaon Fort			4·463441	29070	5·506	
	Dorona	S.	34 11 22	4·216964	16480	3·121	†
310	Kuita	,,	63 25 8	4·418765	26228	4·967	†
	Basait Fort			4·463441	29070	5·506	
	Sámán	S.	67 10 3	4·543803	34979	6·625	†
311	Kuita	,,	35 17 35	4·340987	21927	4·153	†
	Bina Building			4·568888	37059	7·019	
	Sámán	S.	92 25 25	4·662126	45933	8·699	†
312	Kuita	,,	33 51 45	4·408527	25617	4·852	†
	Mangáwan Building			4·568888	37059	7·019	
	Sámán	S.	20 8 15	4·350127	22394	4·241	†
313	Kuita	,,	14 35 37	4·214557	16389	3·104	†
	Pharenji Fort			4·568888	37059	7·019	
	Dorona	S.	81 4 12	4·523321	33367	6·320	†
314	Kuita	,,	39 32 28	4·332506	21503	4·073	†
	Shamsherganj Fort			4·463441	29070	5·506	
	Sámán	S.	56 29 47	4·491762	31029	5·877	†
315	Kuita	,,	38 41 42	4·366675	23263	4·406	†
	Kishni Fort			4·568888	37059	7·019	
	Sámán	S.	124 0 45	4·674637	47276	8·954	†
316	Kuita	,,	15 27 47	4·182015	15206	2·880	†
	Sauj Building			4·568888	37059	7·019	
	Sámán	S.	100 20 10	4·620801	41764	7·910	†
317	Kuita	,,	18 51 45	4·137510	13725	2·599	†
	Atsara Fort			4·568888	37059	7·019	
	Sámán	S.	78 34 27	4·668151	46575	8·821	†
318	Kuita	,,	50 10 25	4·562199	36492	6·911	†
	Saunási Fort			4·568888	37059	7·019	
	Sámán	S.	101 4 5	4·796801	62633	11·862	†
319	Kuita	,,	45 26 2	4·642238	43877	8·310	†
	Kusmara Fort			4·568888	37059	7·019	
	Bisungarh, XX		54 48 49	4·814695	65267	12·361	†
320	Sámán	S.	46 27 54	4·762634	57894	10·965	†
	Gangawára	,,		4·893854	78317	14·833	
	Sámán	S.	51 25 27	4·840411	69249	13·115	†
321	Gangawára	,,	81 6 48	4·942080	87514	16·575	†
	Mainpuri, Court House			4·814695	65267	12·361	
	Bisungarh, XX		34 28 32	4·760250	57577	10·905	18
322	Pothári, XXIII		52 47 14	4·908521	81007	15·342	,,
	Barkhera	S.		5·006896	101601	19·243	
	Bisungarh, XX		26 10 3	4·590531	38952	7·377	,,
323	Chandanpur, XXI		66 30 30	4·908521	81007	15·342	,,
	Barkhera	S.		4·945622	88231	16·710	
	Chandanpur, XXI		66 30 30	4·743355	55380	10·489	
324	Barkhera	S.	73 19 17	4·762264	57845	10·955	
	Chhibramau Thána			4·590531	38952	7·377	
	Bisungarh, XX		26 10 3	4·743355	55380	10·489	,,
325	Barkhera	S.	14 0 10	4·482679	30386	5·755	
	Chhibramau Thána			4·908521	81007	15·342	
	Chandanpur, XXI		17 47 19	4·624313	42103	7·974	,,
326	Pothári, XXIII		26 40 22	4·791438	61864	11·717	,,
	Maudo	S.		4·984657	96529	18·282	
	Bisungarh, XX		44 25 58	4·791438	61864	11·717	,,
327	Chandanpur, XXI		48 45 24	4·822465	66445	12·584	,,
	Maudo	S.		4·945622	88231	16·710	
	Pothári, XXIII		31 8 34	4·559284	36248	6·865	,,
328	Barkhera	S.	93 37 23	4·844779	69949	13·248	,,
	Fatehgarh Church			4·760250	57577	10·905	
	Pothári, XXIII		32 37 47	4·707977	51048	9·668	,,
329	Mau, XXIV		47 38 2	4·844779	69949	13·248	,,
	Fatehgarh Church			4·969920	93308	17·672	
	Pothári, XXIII		42 3 23	4·587503	38681	7·326	,,
330	Barkhera	S.	52 19 7	4·659926	45701	8·655	,,
	Farrukhabad Temple			4·760250	57577	10·905	

† Instrument not known.

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No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″		8		Inch
	Pothári, XXIII	21 42 58	4·729072	53588	10·149	18
331	Mau, XXIV	18 23 38	4·659926	45701	8·655	„
	Farrukhabad Temple		4·969920	93308	17·672	
	Pothári, XXIII	41 22 34	4·590671	38965	7·380	„
332	Barkhera s.	61 0 19	4·712312	51560	9·765	„
	Farrukhabad Palace		4·760250	57577	10·905	
				3		
	Pothári, XXIII	22 23 47	4·696235	49686	9·410	„
333	Mau, XXIV	23 17 23	4·712312	51560	9·765	„
	Farrukhabad Palace		4·969920	93308	17·672	
	Pothári, XXIII	96 6 41	4·705675	50778	9·617	„
334	Farrukhabad Temple		4·250296	17795	3·370	
	Nawábganj s.	63 29 45	4·659926	45701	8·655	†
	Pothári, XXIII	39 15 33	4·818965	65912	12·483	18
335	Mau, XXIV	24 21 39	4·633081	42962	8·137	„
	Roshanabad House		4·969920	93308	17·672	
				6		
	Mau, XXIV	40 7 33	4·800713	63199	11·970	„
336	Guri, XXV	42 13 53	4·818963	65912	12·483	„
	Roshanabad House		4·987636	97193	18·408	
	Mau, XXIV	28 28 50	4·672747	47070	8·915	„
337	Guri, XXV	51 27 59	4·887698	77214	14·624	„
	Shamsabad s.		4·987636	97193	18·408	
	Mau, XXIV	47 58 28	4·868648	73901	13·996	„
338	Guri, XXV	54 20 31	4·907578	80831	15·309	„
	Jalálabad s.		4·987636	97193	18·408	
				7		
	Mau, XXIV	5 38 53	4·104174	12711	2·407	„
339	Dháka, XXVI	38 44 43	4·907578	80831	15·309	†
	Jalálabad s.		4·955939	90352	17·112	
	Dháka, XXVI	13 19 19	4·757526	57217	10·837	
340	Saipur, XXVII	12 10 16	4·718937	52352	9·915	
	Bodona s.	154 30 25	5·028875	106875	20·241	†
	Jalálabad s.	55 33 42	4·716479	52057	9·859	†
341	Bodona „	63 3 25	4·750264	56268	10·657	†
	Ekri House (lamp)		4·743573	55408	10·494	
			*			
	Dháka, XXVI	43 11 46	4·570811	37223	7·050	
342	Bodona s.	62 29 55	4·683362	48235	9·135	†
	Bari Matána Mound		4·718937	52352	9·915	

No. of Triangle	Station	Corrected Plane Angle	Distance			Theodolite used
			Log. feet	Feet	Miles	
		° ′ ″				Inch
	Kasrak, XXVIII	44 8 13	4·857340	72001	13·637	18
343	Janjíri, XXIX	22 14 57	4·592717	39149	7·415	„
	Khera Bajhera s.	113 36 50	4·976517	94737	17·943	†
	Kasrak, XXVIII	31 51 2	4·414134	25950	4·915	18
344	Khera Bajhera s.	95 23 20	4·689818	48957	9·272	†
	Sháhabad „		4·592717	39149	7·415	
	Kasrak, XXVIII	31 6 13	4·689781	48953	9·271	18
345	Janjíri, XXIX	60 14 34	4·915225	82267	15·581	„
	Dilwári Mound		4·976517	94737	17·943	
	Kasrak, XXVIII	32 37 56	4·758362	57327	10·857	„
346	Gajnera, XXX	39 25 42	4·829427	67519	12·788	„
	Faridpur Thána		5·004932	101142	19·156	
				9		
	Kasrak, XXVIII	24 56 10	4·643158	43970	8·328	„
347	Janjíri, XXIX	40 20 47	4·829427	67519	12·788	„
	Faridpur Thána		4·976517	94737	17·943	
	Janjíri, XXIX	31 41 21	4·759055	57419	10·875	„
348	Fatehganj, XXXI	42 19 10	4·866823	73591	13·938	„
	Ismailpur House (lamp)		5·021499	105075	19·901	
	Fatehganj, XXXI	51 1 47	4·661681	45886	8·691	„
349	Ismailpur House (lamp)		4·669559	46726	8·850	
	Unchagaon s.	76 37 31	4·759055	57419	10·875	†
				2		
	Janjíri, XXIX	38 32 28	4·661681	45886	8·691	18
350	Ismailpur House (lamp)		4·773138	59311	11·233	
	Unchagaon s.	87 48 45	4·866823	73591	13·938	†
	Janjíri, XXIX	48 52 38	4·660111	45721	8·659	18
351	Unchagaon s.	28 52 18	4·466954	29306	5·550	†
	Parbata „		4·773138	59311	11·233	
	Janjíri, XXIX	23 50 33	4·763115	57958	10·977	18
352	Fatehganj, XXXI	23 16 55	4·753372	56672	10·733	„
	Bareilly Kachahri		5·021499	105075	19·901	
	Janjíri, XXIX	16 16 34	4·638953	43546	8·247	„
353	Fatehganj, XXXI	26 16 35	4·837493	68785	13·027	„
	Bareilly House		5·021499	105075	19·901	
	Janjíri, XXIX	23 18 28	4·668463	46608	8·827	„
354	Fatehganj, XXXI	39 49 8	4·877556	75432	14·286	„
	Aliganj Building		5·021499	105075	19·901	

* Base deduced by two sides and included angle. † Instrument not known.

June 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

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RANGIR MERIDIONAL SERIES.

AZIMUTHS OF SURROUNDING STATIONS AND POINTS, AT PRINCIPAL, PRINCIPAL-AUXILIARY, AND SECONDARY STATIONS.

The following table contains, in the first column, the name of each Principal, Principal-Auxiliary, or Secondary Station, at which azimuths of surrounding Points have been measured; immediately followed by those azimuths. The second column contains the number of the triangle which gives the distance between the Station and the Point.

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
AIRO S.			
Birona, XVIII		74 54 17	228
Rausen Fort (lamp)		196 24 55	281
Haseran Fort		234 22 59	232
Kalsán, XIX		239 56 48	229
Jaraun Fort		276 37 3	230
Siriáo Fort		294 47 5	250
Bidhúna	S.	358 42 30	228
AKUPU S.			
Dabkari Temple		38 34 49	240
Seontára, XVII		63 50 28	234
Jiwa Sirsaini Fort		70 46 13	239
Aneso Fort		90 47 42	243
Kúrsi	S.	111 6 20	237
Malhausi	„	137 24 12	245
Gaili Fort		145 7 20	255
Bela Fort Mark		157 52 23	248
Kalsán, XIX		162 48 45	234
Indargarh Fort		170 36 44	258
Majelo Fort		171 10 48	271

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
AKUPU S.			
Bhadaura Temple		177 5 54	265
Abath Mound		181 53 2	254
Khánpur Fort		187 36 15	235
Sukhi Fort		193 46 0	269
Tirwa Temple		201 15 58	278
Benora	S.	204 19 7	260
Sirsai Fort		214 0 19	249
Khairnagar Fort		215 28 19	268
Khairnagar Temple		215 54 59	270
Oroláki Fort		221 58 40	246
Aman Fort		231 51 19	266
Jankath Fort		233 45 27	267
Auser Fort		239 59 34	262
Naili Fort		257 54 55	261
AMOLAR S.			
Kalsán, XIX		36 26 11	275
Rauli	S.	137 24 53	276
Tirwa Temple		308 57 47	279

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
AMOLAR S.			
Tirwa Palace		312 14 8	277
Benora	S.	334 56 0	275
ÁTA S.			
Gura, XI		26 29 49	130
Karmer	S.	41 31 46	135
Chamári	„	60 39 14	138
Orai Temple		67 48 25	133
Banha Fort		78 53 39	139
Atária	„	114 15 19	129
Nipania, XIII		175 12 3	129
Mahewa Building		189 51 43	150
Katri Temple		205 49 8	166
Itaura Temple		289 56 20	137
Parásan Fort		325 41 34	131
ATARIA, XI*			
Fatehganj, XXXI		53 59 45·68	33
Sísgarh, X*		110 46 26·81	34
Gajnera, XXX		350 56 47.66	33

* Of the North-East Longitudinal Series.

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Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Ataria s.			
Muhammadabad	s.	18 54 30	117
Orai Temple		28 11 28	132
Rinia Building		31 7 34	125
Bargaon Building		40 27 42	123
Himilia	,,	51 5 44	118
Garar Mound (lamp)		59 21 31	126
Kanwa, XII		86 10 55	113
Siahari Mound		103 29 51	146
Urgaon Temple		116 35 4	151
Parbatpur	s.	126 45 41	145
Banora Fort		138 44 44	149
Degaon Fort		145 9 41	156
Charsoni Fort		146 54 6	159
Babai Fort		155 0 31	158
Sarsai Fort		169 35 56	160
Churki Fort		188 29 46	157
Samárhu Fort		200 47 36	170
Nipania, XIII		207 13 23	113
Masmaria Fort		207 33 43	148
Áta	s.	294 12 45	129
Gura, XI		338 38 42	114
Atsu, XVI			
Yani	s.	3 9 34	193
Husapura, XIV		8 3 28·30	16
Bareh Temple		45 51 3	191
Barsan	,,	143 45 15	211
Gasáro Fort		179 2 10	215
Birona, XVIII		182 52 17·52	18
Chachhúnd Fort		190 43 24	212
Guári	t.s.	199 40 0	211
Seontára, XVII		240 58 7·13	17
Phaphúnd Building		264 33 51	204
Seod	s.	266 1 57	199
Gandaspur, XV		297 9 18·01	16
Auraiya s.			
Bhadek	s.	10 57 32	187
Deokali Temple		20 51 48	186
Baradána Fort		228 44 3	190
Kakoto Temple		233 2 46	202
Gandaspur, XV		263 34 58	185
Sikandra	s.	312 35 55	185
Badarwara h.s.			
Sagauli Temple		46 22 55	102
Dakoli Temple		149 30 5	105
Perona Fort		166 51 20	112
Kanwa, XII		195 24 37	100
Kalra	h.s.	200 34 20	111
Chirauli Fort		217 44 3	109
Sayyidnagar Temple		229 41 5	108

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Badarwara h.s.			
Kotra Temple		242 59 13	107
Gokulphára, X		261 34 15	100
Dhanora Temple		278 23 32	104
Koratha Temple		288 29 0	103
Garwai Fort		327 38 40	101
Badshahpur h.s.			
Kusmár, I		60 54 59	52
Bila	h.s.	117 15 13	52
Bakarua h.s.			
Tinsmál, VII†		50 1 19	39
Hardua Tree		203 13 30	45
Kusmár, I		269 35 45	39
Baksua h.s.			
Mangrai Building		144 2 9	42
Dálípur, II		150 58 9	37
Baksua Fort		179 43 2	40
Baksua Temple		193 24 23	41
Kusmár, I		259 34 35	37
Semra Fort		274 12 22	38
Bansparh h.s.			
Sánra	h.s.	20 50 55	63
Chandla, III		86 52 12	61
Chhatarpur Temple		151 19 37	61
Thanela, VI		180 23 37	62
Maniagarh	,,	242 9 25	66
Tálgaon Hill Mark		277 44 38	65
Sonha	,,	322 57 10	64
Barkhera s.			
Chhibramau Thána		20 51 10	324
Bisungarh, XX		34 51 20	322
Pothári, XXIII		127 35 34	322
Farrukhabad Temple		179 54 41	330
Farrukhabad Palace		188 35 53	332
Fatehgarh Church		221 12 57	328
Chandanpur, XXI		307 31 53	323
Barsan s.			
Guári	t.s.	228 26 27	211
Atsu, XVI		323 43 54	211
Baukhar s.			
Muhammadabad	s.	117 46 6	119
Airo Fort		130 42 1	121
Gura, XI		159 27 59	119
Parásan Temple		225 4 51	122

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Benora s.			
Akupu	s.	24 20 57	260
Bhadaura Temple		48 23 11	264
Bela Fort		51 7 31	259
Sukhi Fort		64 54 0	269
Majelo Fort		100 15 20	271
Kalsán, XIX		116 25 50	259
Amolar	s.	154 57 55	275
Tirwa Palace		188 19 52	277
Khairnagar Temple		279 28 19	270
Jankath Fort		295 44 42	267
Khairnagar Fort		309 55 19	268
Aman Fort		320 28 2	266
Naili Fort		334 12 35	261
Auser Fort		349 30 52	262
Ber s.			
Etáwah Fort (lamp)		72 44 43	292
Sámán	s.	178 46 30	291
Birona, XVIII		255 19 32	291
Bhadek s.			
Deokali Temple		184 43 55	188
Auraiya	s.	190 57 0	187
Pinarthu Temple		250 46 4	189
Sikandra	,,	272 56 4	187
Bhoraj, IV			
Datiára, V		227 53 42·76	5
Sonár Hill Mark		262 6 25	75
Chandla, III		302 5 48·68	4
Dálípur, II		346 21 30·36	4
Bia Barari h.s.			
Rangír, X†		6 51 6	43
Kusmár, I		89 22 27	43
Bidhuna s.			
Guári	t.s.	55 13 36	209
Birona, XVIII		109 22 47	207
Sumáin Fort		119 24 19	222
Barhind Fort		157 2 2	227
Airo	s.	178 42 34	228
Sabhad Fort		191 39 7	224
Haseran Fort		203 1 10	232
Kalsán, XIX		216 50 8	207
Jaraun Fort		227 36 22	230
Aneso Fort		290 4 22	242
Dabkari Temple		295 33 39	241
Sahár Fort		303 35 43	218
Seontára, XVII		325 37 18	208

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

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Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Bidhuña s.			
Lakna Fort		338 45 24	216
Seod	s.	348 49 22	209
Harchandpur Fort		359 27 22	213
Bila h.s.			
Kusmár, I		9 55 17	50
Dálípur, II		84 35 34	49
Senpa Temple		121 1 57	56
Khatoli Gateway		170 59 43	57
Chandla, III		205 16 45	49
Bádsháhpur	h.s.	297 10 7	52
Gopálpur	„	307 59 43	53
Gadákhár	„	330 12 42	51
Birona, XVIII			
Atsu, XVI		2 52 41·33	18
Gasáro Fort		6 28 14	214
Sarhau Fort		73 4 32	294
Ber	s.	75 24 10	291
Maman Fort		103 20 33	297
Díg Fort		116 3 15	303
Táka Fort		123 2 22	298
Kuita	„	131 29 29	289
Seonthana Fort		135 25 47	306
Sámán	„	137 45 18	284
Kudrail Fort		142 43 52	304
Dorona	„	167 38 37	287
Bisungarh, XX		188 58 45·68	20
Sakráwa	„	196 34 0	285
Kalsán, XIX		247 32 42·82	19
Barhind Fort		252 48 13	226
Airo	„	254 50 15	228
Sabhad Fort		265 54 13	224
Sumáin Fort		271 33 55	223
Bidhúna	„	289 18 41	207
Seontára, XVII		305 25 43·99	18
Ruru (Bara) Fort		317 33 37	219
Ruru (Chhota) Old Fort		324 28 1	220
Kudarkot Temple		326 15 12	221
Guári	t.s.	340 52 10	210
Bisungarh, XX			
Sakráwa	s.	0 27 4	286
Birona, XVIII		9 0 0·02	20
Sámán	„	66 59 27	284
Gangawára	„	121 48 16	320
Pothári, XXIII		180 18 54·66	24
Muhammadabad, XXII		183 42 24·28	22
Maudo	„	196 31 31	327
Barkhera	„	214 47 27	322
Chandanpur, XXI		240 57 29·38	21
Chhibramau Tháña		240 57 30	325

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Bisungarh, XX			
Rauli	s.	266 53 9	273
Kasáve Fort		286 51 52	283
Kasáve Building (lamp)		286 51 53	282
Kalsán, XIX		306 52 5·50	20
Rausen Fort (lamp)		314 0 7	280
Bodona s.			
Ekri House (lamp)		34 8 3	341
Saipur, XXVII		112 25 47	340
Bari Matána Mound		255 25 27	342
Dháka, XXVI		317 55 22	340
Jalálabad	s.	331 4 38	341
Chamari s.			
Gura, XI		0 32 55	138
Áta	s.	240 38 4	138
Chandanpur, XXI			
Kalsán, XIX		1 9 56·79	21
Rauli	s.	15 56 3	274
Kasáve Fort		32 10 19	283
Bisungarh, XX		61 3 59·52	21
Chhibramau Tháña		61 4 0	324
Maudo	„	109 49 24	326
Muhammadabad, XXII		112 5 0·68	22
Barkhera	„	127 34 30	323
Pothári, XXIII		127 36 42·35	23
Mau, XXIV		184 10 31·44	25
Chandla, III			
Kusmár, I		16 10 41·72	3
Pola	h.s.	21 1 2	54
Bila	„	25 18 34	49
Dálípur, II		59 48 13·95	3
Dhasán River Temple		119 17 32	58
Bhoraj, IV		122 15 56·60	4
Gulganj Fort		141 3 33	73
Palera Temple		153 0 59	88
Datiára, V		171 30 56·77	5
Mau Saria Temple		184 19 58	87
Nagroa	h.s.	185 50 15	68
Chhatarpur Temple		200 54 6	59
Ragauli Fort		204 17 54	74
Thanela, VI		217 8 2·78	6
Náráyanpur Fort		237 6 47	72
Bijáwar Temple		240 20 44	70
Bijáwar Palace		246 59 26	71
Maniagarh	h.s.	256 28 10	67
Bánsparh	„	266 44 52	61
Sánra	„	313 29 46	63
Gopálpur	„	357 53 8	53

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Dalipur, II			
Sháhgarh Fort		9 53 30	47
Tinsmál, VII†		23 57 39·96	2
Hasri	h.s.	34 34 43	46
Bamnora Fort		74 34 47	48
Bhoraj, IV		166 24 6·38	4
Dhasán River Temple		198 9 52	58
Senpa Temple		224 32 22	56
Khatoli Gateway		237 54 46	57
Chandla, III		239 40 45·88	3
Pola	h.s.	263 51 9	54
Bila	„	264 29 55	49
Kusmár, I		320 12 2·69	2
Baksua	„	330 54 57	37
Hardua Tree		337 1 21	44
Datiara, V			
Bhoraj, IV		48 1 52·66	5
Palera Temple		53 53 53	88
Nágonáth, VIII		174 25 50·97	8
Manang, VII		239 25 39·10	7
Lughasi Fort,		279 29 30	89
Seyah	h.s.	290 7 44	76
Thanela, VI		292 16 1·70	6
Mau Saria Temple		311 32 22	87
Chhatarpur Temple		316 52 30	59
Sonár Hill Mark		347 46 38	75
Chandla, III		351 28 53·57	5
Dháka, XXVI			
Mau, XXIV		1 59 20·04	27
Jalálabad	s.	40 44 3	339
Guri, XXV		69 18 22·32	27
Saipur, XXVII		124 39 5·26	28
Bodona	„	137 58 24	340
Kasrak, XXVIII		176 37 1·46	29
Bari Matána Mound		181 10 10	342
Dorona s.			
Táka Fort		13 27 35	298
Sarhau Fort		19 10 24	295
Kudrail Fort		25 53 2	304
Maman Fort		35 30 40	296
Agani Fort		50 11 24	300
Punja Fort		64 57 1	301
Seonthana Fort		76 30 9	306
Kuita	s.	85 35 54	289
Basait Fort		119 47 16	310
Sámán	„	119 49 27	288
Laigaon Fort		148 1 51	309
Shamsherganj Fort		166 40 6	314
Sakráwa	„	237 25 19	287
Birona, XVIII		347 37 59	287

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

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Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Duhelkhand s.			
Nipania, XIII		108 28 41	164
Pál House		140 8 21	168
Pichora Building		207 44 21	167
Kálpi	s.	308 50 18	164
Kálpi, Chaurási Temple		320 11 46	165
Fatehganj, XXXI			
Aliganj Building		23 7 11	354
Ismailpur House (lamp)		25 37 13	348
Sísgarh, X*		180 33 55·60	34
Atária, XI*		233 51 49·60	33
Gajnera, XXX		292 53 1·30	32
Bareilly House		317 1 28	353
Bareilly Kachahri		320 1 8	352
Unchagaon	s.	334 35 26	349
Janjíri, XXIX		343 18 2·59	32
Gadakhar h.s.			
Kusmár, I		58 56 26	51
Bila	h.s.	150 14 57	51
Gajnera, XXX			
Faridpur Thána		35 40 7	346
Janjíri, XXIX		54 3 0·17	31
Fatehganj, XXXI		113 2 28·22	32
Atária, XI*		170 58 21·07	33
Kasrak, XXVIII		356 14 25·12	31
Gandaspur, XV			
Nipania, XIII		1 40 58·11	15
Husapura, XIV		65 59 41·28	15
Auraiya	s.	83 37 20	185
Kakoto Temple		99 25 19	201
Parín Fort Mark (lamp)		104 42 42	203
Atsu, XVI		117 15 52·44	16
Baradána Fort		158 29 17	190
Seod	s.	166 4 20	200
Seontára, XVII		178 37 17·16	17
Sikandra	,,	345 13 27	178
Gangawara s.			
Sámán	s.	20 27 24	320
Mainpuri, Court House		101 34 12	321
Bisungarh, XX		301 44 7	320
Gara Sandna h.s.			
Mukána Hill Mark		4 39 12	83
Karri	h.s.	127 6 42	81
Thanela, VI		162 8 36	82
Putli Bakoára	,,	186 32 53	81
Pai Temple		234 37 3	84

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Gijnor s.			
Jálaun Temple No. 1		21 1 23	153
Jálaun Palace		21 33 14	155
Kanwa, XII		31 24 57	142
Orekhi Fort		79 43 0	161
Cháki Fort		95 23 46	162
Sahu Building		119 34 48	163
Saráwan Fort		128 37 27	172
Husapura, XIV		167 23 40	143
Kaitwa Fort		182 48 27	175
Tarsor Fort		214 46 1	173
Gurgaon Fort		255 47 26	169
Nipania, XIII		261 25 11	142
Parbatpur	s.	311 56 39	144
Gokulphara, X			
Garwai Fort		42 27 5	101
Koratha Temple		49 3 42	103
Sagauli Temple		66 38 47	102
Badarwára	h.s.	81 37 11	100
Dakoli Temple		107 35 27	105
Perona Fort		125 58 54	112
Kalra	,,	140 33 25	111
Chirauli Fort		159 6 53	109
Sayyidnagar Temple		161 8 28	108
Kanwa, XII		177 40 8·83	12
Himilia	s.	197 1 57	115
Kotra Temple		202 49 1	107
Gura, XI		230 48 46·75	11
Phára, IX		282 0 38·23	10
Rewábarti Temple		324 50 28	96
Kacher Hill Mark		332 56 5	99
Dhanora Temple		351 11 56	104
Nágonáth, VIII		352 0 49·11	10
Gopalpur h.s.			
Bila	h.s.	128 1 43	53
Chandla, III		177 53 19	53
Guari t.s.			
Atsu, XVI		19 41 33	211
Chachhúnd Fort		37 38 1	212
Barsan	s.	48 29 21	211
Gasáro Fort		69 28 51	214
Birona, XVIII		160 53 22	210
Kudarkot Temple		169 45 44	221
Sumáin Fort		187 5 56	222
Barhind Fort		203 9 23	226
Ruru (Chhota) Old Fort		216 52 14	220
Bidhúna	s.	235 10 42	209
Ruru (Bara) Fort		247 7 13	219
Sahár Fort		262 16 5	217
Seod	,,	314 44 17	209

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Gura, XI			
Gokulphára, X		50 55 56·05	11
Airo Fort		53 40 32	121
Muhammadabad	s.	73 40 47	117
Bargaon Building		88 14 53	124
Himilia	,,	94 25 36	116
Orai Temple		103 51 40	132
Garar Mound (lamp)		108 6 40	127
Kanwa, XII		112 32 55·04	12
Karmer	,,	151 10 6	134
Atária	,,	158 40 5	114
Banha Fort		171 50 29	139
Chamári	,,	180 32 54	138
Nipania, XIII		185 31 40·35	13
Áta	,,	206 28 38	130
Sandi Fort		215 31 50	136
Kálpi	,,	224 48 40	141
Parásan Temple		281 24 9	122
Parásan Fort		283 16 56	131
Baukhar	,,	339 26 53	119
Phára, IX		339 45 54·23	11
Guri, XXV			
Pothári, XXIII		4 9 28·88	26
Saipur, XXVII		174 29 9·01	28
Dháka, XXVI		249 11 32·04	27
Jalálabad	s.	253 54 40	338
Mau, XXIV		308 15 10·51	26
Roshanabad House		350 29 4	336
Shamsabad	,,	359 43 10	337
Hasri h.s.			
Bamnora Fort		165 56 7	48
Dálípur, II		214 33 51	46
Hardua Tree		307 45 6	46
Sháhgarh Fort		359 24 26	47
Himilia s.			
Gokulphára, X		17 3 52	115
Girthan Fort		29 16 37	120
Dantoli Temple		133 12 37	128
Kanwa, XII		140 2 31	115
Urgaon Temple		191 31 41	151
Kukargaon Building		200 31 57	140
Atária	s.	231 1 53	118
Gura, XI		274 20 22	116
Rinia Building		284 19 55	125
Muhammadabad	,,	297 40 23	118
Bargaon Building		306 10 10	123
Husapura, XIV			
Kanwa, XII		7 31 47·13	14
Jagamanpur Fort		115 7 10	194

* Of the North-East Longitudinal Series.

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Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Husapura, XIV			
Bareh Temple		155 11 53	191
Bareh Fort		156 0 24	198
Tiar Fort		182 27 20	196
Atsu, XVI		188 2 31·20	16
Yani	s.	194 11 12	192
Nabáda Fort		200 35 49	197
Bason Fort		211 2 23	195
Gandaspur, XV		245 52 11·43	15
Kuthaund Fort		268 10 47	177
Kuthaund Temple		270 25 32	176
Nipania, XIII		298 59 39·40	14
Tarsor Fort		315 58 19	174
Gijnor	s.	347 22 34	143
Jalalabad s.			
Guri, XXV		74 0 47	338
Ekri House (lamp)		95 33 17	341
Bodona	s.	151 6 59	341
Dháka, XXVI		220 43 22	339
Mau, XXIV		356 19 46	338
Janjiri, XXIX			
Ismailpur House (lamp)		131 39 22	348
Aliganj Building		140 2 15	354
Fatehganj, XXXI		163 20 42·67	32
Unchagaon	s.	170 11 50	350
Bareilly House		179 37 17	353
Bareilly Kachahri		187 11 16	352
Parbata	,,	219 4 28	351
Gajnera, XXX		233 56 15·54	31
Faridpur Thána		258 12 50	347
Kasrak, XXVIII		298 33 36·55	30
Khera Bajhera	,,	320 48 34	343
Dilwári Mound		358 48 11	345
Saipur, XXVII		358 48 37·09	30
Kalpi s.			
Gura, XI		44 53 36	141
Nipania, XIII		123 28 55	141
Duhelkhand	s.	128 53 12	164
Kalra h.s.			
Badarwára	h.s.	20 35 22	111
Gokulphára, X		320 31 31	111
Kalsan, XIX			
Gaili Fort		3 50 22	256
Siriáo Fort		6 34 40	250
Seontára, XVII		10 49 31·55	19
Kúrsi	s.	18 0 53	237
Jaraun Fort		22 20 3	231
Bidhúna	,,	36 53 32	207

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Kalsan, XIX			
Sabhad Fort		47 36 11	225
Airo	s.	60 0 16	229
Haseran Fort		65 34 45	233
Birona, XVIII		67 40 13·47	19
Rausen Fort (lamp)		113 32 50	280
Bisungarh, XX		126 58 23·68	20
Rauli	s.	171 18 50	273
Chandanpur, XXI		181 9 46·62	21
Amolar	,,	216 24 28	275
Tirwa Temple		265 53 42	278
Benora	,,	296 22 12	259
Indargarh Fort		308 59 17	258
Majelo Fort		320 30 33	272
Sirsai Fort		322 31 19	249
Abath Mound		327 0 55	253
Khánpur Fort		331 31 35	236
Bhadaura Temple		334 23 28	264
Akupu	s.	342 46 57	234
Bela Fort Mark		345 19 45	247
Malhausi	,,	350 35 7	244
Kanwa, XII			
Chirauli Fort		4 16 39	110
Badarwára	h.s.	15 27 11	100
Dakoli Temple		24 59 36	106
Cháki Fort		179 50 31	162
Saráwan Fort		184 35 9	171
Husapura, XIV		187 30 38·97	14
Orekhi Fort		190 13 14	161
Sahu Building		197 32 6	163
Kaitwa Fort		201 1 47	175
Gijnor	s.	211 22 45	142
Jálaun Palace		217 1 39	155
Jálaun Temple No. 1		217 30 5	153
Urgaon Temple		239 36 6	152
Nipania, XIII		241 10 53·21	13
Parbatpur	s.	243 33 13	171
Atária	,,	266 4 44	113
Kukargaon Building		272 47 53	140
Gura, XI		292 25 21·40	12
Garar Mound (lamp)		299 19 17	126
Himilia	,,	320 0 14	115
Dantoli Temple		333 23 10	128
Girthan Fort		342 23 54	120
Gokulphára, X		357 39 46·95	12
Karmer s.			
Orai Temple		91 37 50	134
Áta	s.	221 30 14	135
Sandi Fort		240 41 58	136
Itaura Temple		256 12 44	137
Gura, XI		331 9 45	134

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
Karri h.s.			
Chhatarpur Temple		102 40 38	79
Seyah	h.s.	154 16 8	78
Tilona Temple		179 59 1	85
Thanela, VI		189 6 46	78
Putli Bakoára	,,	218 46 27	80
Gara Sandna		307 5 6	81
Mukána Hill Mark		346 9 54	83
Kasrak, XXVIII			
Sháhabad	s.	42 41 39	344
Saipur, XXVII		58 1 43·71	29
Khera Bajhera	,,	74 32 41	343
Dilwári Mound		87 34 41	345
Janjíri, XXIX		118 40 54·25	30
Faridpur Thána		143 37 4	346
Gajnera, XXX		176 15 0·10	31
Dháka, XXVI		356 36 27·03	29
Khera Bajhera s.			
Janjíri, XXIX		140 52 33	343
Kasrak, XXVIII		254 29 23	343
Sháhabad	s.	349 52 43	344
Kuita s.			
Díg Fort		24 9 46	303
Punja Fort		41 37 4	301
Etáwah Fort (lamp)		50 19 44	293
Munj Building		63 35 13	302
Baro Fort		78 20 48	307
Parasna Fort		100 11 36	308
Bina Building		110 40 18	311
Mangáwan Building		112 6 8	312
Sauj Building		130 30 6	316
Sámán	s.	145 57 53	290
Pharenji Fort		160 33 30	313
Atsara Fort		164 49 38	317
Kishni Fort		184 39 35	315
Kusmara Fort		189 23 55	319
Saunási Fort		196 8 18	318
Basait Fort		202 8 21	310
Shamsherganj Fort		226 1 1	314
Laigaon Fort		239 16 46	309
Dorona	s.	265 33 29	289
Kudrail Fort		300 29 24	305
Birona, XVIII		311 26 26	289
Táka Fort		315 39 19	299
Agani Fort		328 46 21	300
Sarhau Fort		339 22 17	294
Maman Fort		340 44 43	296

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Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
KURSI s.			
Kalsán, XIX		197 59 24	237
Mau Building		212 50 30	257
Gaili Fort		218 39 14	255
Siriáo Fort		223 18 2	251
Bhadaura Fort		237 3 33	252
Abath Mound		244 12 22	253
Khánpur Fort		258 14 24	238
Auser Fort		269 13 18	263
Malhausi	s.	273 53 8	244
Akupu	,,	291 3 3	237
KUSMAR, I			
Semra Fort		36 57 56	38
Tinsmál, VII†		68 22 47·71	1
Baksua	h.s.	79 35 57	37
Niwar Tiled Building		81 50 27	36
Bakarua	,,	89 40 15	39
Baksua Fort		97 22 51	40
Baksua Temple		98 4 55	41
Mangrai Building		100 31 45	42
Hardua Tree		128 12 55	44
Dálípur, II		140 16 36·97	2
Bila	h.s.	189 54 12	50
Pola	,,	193 6 17	55
Chandla, III		196 7 50·52	3
Gadákhár	,,	238 53 6	51
Bádsháhpur	,,	240 48 48	52
Bia Barari	,,	269 19 23	43
Rangír, X†		340 23 21·86	1
MALHAUSI s.			
Kúrsi	s.	93 55 24	244
Mau Building		163 40 54	257
Kalsán, XIX		170 35 54	244
Bhadaura Fort		176 36 44	252
Oroláki Fort		286 41 11	246
Akupu	s.	317 23 11	245
MANANG, VII			
Seyah	h.s.	10 12 5	76
Datiára, V		59 34 28·37	7
Nágonáth, VIII		114 26 34·88	8
Phára, IX		174 8 57·05	9
Charkhári Fort		197 8 47	91
Malka Temple		346 15 7	90
Thanela, VI		354 55 27·66	7
MANIAGARH h.s.			
Bánsparh	h.s.	62 14 8	66
Chandla, III		76 40 13	67
Thanela, VI		146 21 43	66

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
MAU, XXIV			
Chandanpur, XXI		4 11 8·72	25
Fatehgarh Church		16 14 29	329
Farrukhabad Palace		40 35 8	333
Farrukhabad Temple		45 28 53	331
Pothári, XXIII		63 52 30·84	25
Roshanabad House		88 14 10	335
Shamsabad	s.	99 52 53	357
Guri, XXV		128 21 42·98	26
Jalálabad	,,	176 20 11	338
Dháka, XXVI		181 59 3·90	27
MAUDO s.			
Bisungarh, XX		16 33 7	327
Pothári, XXIII		154 12 10	326
Chandanpur, XXI		289 44 29	326
MUHAMMADABAD, XXII			
Bisungarh, XX		3 42 47·89	22
Pothári, XXIII		172 4 51·40	23
Chandanpur, XXI		291 58 52·88	22
MUHAMMADABAD s.			
Himilia	s.	117 42 44	118
Atária	,,	198 53 0	117
Gura, XI		253 37 54	117
Baukhar	,,	297 42 7	119
NAGONATH, VIII			
Gokulphára, X		172 2 4·10	10
Kacher Hill Mark		182 46 16	99
Rewábarti Temple		201 18 5	96
Seonri Temple		211 42 46	95
Mardángaib Temple		224 2 31	98
Phára, IX		232 10 17·35	9
Túrah Shergarh	h.s.	251 18 52	92
Gogora Temple		278 37 14	94
Manang, VII		294 16 45·56	8
Churári Temple		302 29 30	93
Datiára, V		354 24 54·47	8
NAGROA h.s.			
Chandla, III		5 50 34	68
Gulganj Fort		74 1 54	73
Dhusán River Temple		87 44 8	69
Chhatarpur Temple		203 57 57	68
Ragauli Fort		250 55 13	74
Náráyanpur Fort		295 2 17	72
Bijáwar Temple		345 21 2	70
Bijáwar Palace		346 6 40	71

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
NAWABGANJ s.			
Farrukhabad Temple		285 51 38	334
Pothári, XXIII		349 21 23	334
NIPANIA, XIII			
Gura, XI		5 32 25·15	13
Masmaria Fort		27 9 14	147
Atária	s.	27 15 33	113
Parbatpur	,,	59 9 43	144
Kanwa, XII		61 19 13·87	13
Gijnor	,,	81 31 20	142
Tarsor Fort		105 41 30	173
Jatoli Tower		112 4 42	179
Husapura, XIV		119 6 54·31	14
Jakha Fort		121 30 22	181
Chháni Fort		122 1 2	182
Kuthaund Temple		130 33 39	176
Kuthaund Fort		131 16 30	177
Gandaspur, XV		181 40 45·12	15
Sikandra	s.	194 21 4	178
Rasdhán Fort		205 10 31	184
Pál House		213 23 3	168
Kasboro Fort		218 54 3	183
Pichora Building		253 53 7	167
Katri Temple		270 46 27	166
Duhelkhand	s.	288 27 24	164
Kálpi	,,	303 24 44	141
Kálpi, Chaurási Temple		311 47 33	165
Mahewa Building		343 38 23	150
Áta	,,	355 11 39	129
PARBATA s.			
Janjíri, XXIX		39 6 6	351
Unchagaon	s.	141 21 10	351
PARBATPUR s.			
Kanwa, XII		63 37 17	171
Jálaun Temple No. 1		93 22 18	154
Saráwan Fort		130 21 31	171
Gijnor	s.	131 58 31	144
Gurgaon Fort		168 52 31	169
Jatoli Tower		192 13 52	180
Charsoni Fort		196 32 24	159
Babai Fort		221 56 34	158
Sarsai Fort		232 47 4	160
Samárhu Fort		236 55 14	170
Nipania, XIII		239 5 26	144
Degaon Fort		243 43 34	156
Churki Fort		261 24 19	157
Masmaria Fort		283 2 51	147
Banora Fort		290 47 1	149
Atária	s.	306 43 34	145
Siahari Mound		336 51 44	146

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

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Name of station with azimuths of surrounding points			No. of triangle giving distance
Patharia h.s.		° ′ ″	
Tinsmál, VII†		144 24 25	35
Katora Tiled Building		157 2 11 .	35
Phara, IX			
Túrah Shergarh	h.s.	43 14 10	92
Nágonáth, VIII		52 19 1·67	9
Mardángaib Temple		62 9 15	98
Rewábarti Temple		72 38 59	97
Gokulphára, X		102 10 40·85	10
Gura, XI		159 48 50·32	11
Charkhári Fort		345 1 37	91
Manang, VII		354 7 47·98	9
Pola h.s.			
Kusmár, I		13 7 45	55
Dálípur, II		83 57 11	54
Chandla, III		200 59 36	54
Pothari, XXIII			
Bisungarh, XX		0 18 57·50	24
Nawábganj	s.	169 21 40	334
Guri, XXV		184 8 51·07	26
Roshanabad House		204 29 50	335
Mau, XXIV		243 45 22·50	25
Farrukhabad Temple		265 28 21	330
Farrukhabad Palace		266 9 10	332
Fatehgarh Church		276 23 10	328
Chandanpur, XXI		307 30 13·20	23
Barkhera	s.	307 31 44	322
Maudo	„	334 10 35	326
Muhammadabad, XXII		352 4 30·53	23
Putli Bakoara h.s.			
Gara Sandna	h.s.	6 33 19	81
Karri	„	38 48 29	80
Thanela, VI		89 22 29	80
Mankahri House		142 28 44	86
Pai Temple		313 33 34	84
Rangir, X†			
Tinsmál, VII†		106 1 22·39	1
Kusmár, I		160 25 38·91	1
Bia Barari	h.s.	186 50 19	43
Rauli s.			
Kasáve Building (lamp)		55 4 15	282
Bisungarh, XX		86 58 41	273
Chandanpur, XXI		195 55 5	274
Amolar	s.	317 22 24	276
Kalsán, XIX		351 18 4	273

Name of station with azimuths of surrounding points			No. of triangle giving distance
Saipur, XXVII		° ′ ″	
Janjíri, XXIX		178 48 47·56	30
Kasrak, XXVIII		237 54 38·35	29
Bodona	s.	292 21 12	340
Dháka, XXVI		304 31 27·69	28
Guri, XXV		354 28 23·48	28
Sakrawa s.			
Birona, XVIII		16 35 12	285
Dorona	s.	57 27 9	287
Sámán	„	101 23 28	285
Bisungarh, XX		180 27 2	286
Saman s.			
Baro Fort		8 48 2	307
Munj Building		12 55 0	302
Etáwah Fort (lamp)		31 7 21	292
Bina Building		33 6 10	311
Parasna Fort		53 39 2	308
Mangáwan Building		58 21 32	312
Sauj Building		89 56 52	316
Mainpuri, Court House		149 0 3	321
Gangawára	s.	200 25 30	320
Kusmara Fort		224 52 2	319
Atsara Fort		225 35 57	317
Bisungarh, XX		246 53 24	284
Saunási Fort		247 21 40	318
Kishni Fort		269 26 20	315
Sakráwa	s.	281 17 27	285
Dorona	„	299 45 16	288
Pharenji Fort		305 47 52	313
Birona, XVIII		317 40 29	284
Kuita	„	325 56 7	290
Ber	„	358 46 19	291
Sanra h.s.			
Chandla, III		133 35 3	63
Bánsparh	h.s.	200 48 52	63
Sonha	„	231 55 12	64
Seod s.			
Kakoto Temple		11 40 53	201
Parín Fort Mark (lamp)		33 37 29	203
Atsu, XVI		86 7 35	199
Guári	t.s.	134 48 22	209
Bidhúna	s.	168 50 33	209
Sahár Fort		189 55 41	217
Seontára, XVII		193 38 25	199
Ponti Fort		210 12 10	206
Nandu Sahál Fort		227 14 40	205
Gandaspur, XV		346 3 24	200

Name of station with azimuths of surrounding points			No. of triangle giving distance
Seontara, XVII		° ′ ″	
Seod	s.	13 39 13	199
Phaphúnd Building		46 34 20	204
Atsu, XVI		61 4 33·11	17
Harchandpur Fort		86 1 59	213
Lakna Fort		121 25 17	216
Birona, XVIII		125 31 47·87	18
Bidhúna	s.	145 39 18	208
Kalsán, XIX		190 48 6·54	19
Bela Fort Mark		214 44 56	247
Aneso Fort		223 34 31	242
Khánpur Fort		224 9 26	235
Jiwa Sirsaini Fort		231 35 4	239
Akupu	s.	243 47 15	234
Dabkari Temple		253 59 5	240
Ponti Fort		294 14 38	206
Nandu Sahál Fort		314 35 6	205
Gandaspur, XV		358 37 7·13	17
Seyah h.s.			
Datiára, V		110 15 6	76
Manang, VII		190 10 38	76
Thanela, VI		298 59 31	77
Karri	h.s.	334 14 16	78
Shahabad s.			
Khera Bajhera	s.	169 53 7	344
Kasrak, XXVIII		222 38 45	344
Shamsabad s.			
Guri, XXV		179 43 11	337
Mau, XXIV		279 46 22	337
Sikandra s.			
Nipania, XIII		14 22 8	178
Jatoli Tower		58 35 19	179
Jakha Fort		64 37 48	181
Chháni Fort		68 33 48	182
Bhadek	s.	92 59 49	187
Deokali Temple		118 12 51	186
Auraiya	„	132 39 8	185
Pinarthu Temple		154 36 24	189
Gandaspur, XV		165 14 18	178
Rasdhán Fort		279 6 3	184
Kasboro Fort		335 21 53	183
Sisgarh, X*			
Fatehganj, XXXI		0 34 0·80	34
Atária, XI*		290 38 33·89	34

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral. * Of the North-East Longitudinal Series.

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Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
SONHA h.s.			
Sánra	h.s.	51 59 3	64
Bánsparh	„	142 58 58	64
Tálgaon Hill Mark		259 6 3	65
THANELA, VI			
Bánsparh	h.s.	0 23 43	62
Karri	„	9 7 10	78
Tilona Temple		15 41 30	85
Chandla, III		37 15 29·07	6
Chhatarpur Temple		69 19 30	60
Datiára, V		112 25 36·20	6
Seyah	h.s.	119 1 47	77
Lughasi Fort		125 56 32	89
Manang, VII		174 56 16·26	7
Malka Temple		182 5 53	90
Mankahri House		211 37 6	86
Putli Bakoára	h.s.	269 20 51	80

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
THANELA, VI			
Maniagarh	h.s.	326 17 6	66
Gara Sandna	„	342 7 24	82
TINSMAL, VII†			
Dálípur, II		203 53 44·13	2
Niwar Tiled Building		223 24 40	36
Bakarua	h.s.	229 57 21	39
Katora Tiled Building		232 28 6	35
Kusmár, I		248 14 20·28	1
Rangír, X†		285 50 40·61	1
Patharia	„	324 20 14	35
TURAH SHERGARH h.s.			
Nágonáth, VIII		71 22 21	92
Seonri Temple		93 42 26	95
Phára, IX		223 8 54	92

Name of station with azimuths of surrounding points		° ′ ″	No. of triangle giving distance
TURAH SHERGARH h.s.			
Gogora Temple		315 5 51	94
Churári Temple		335 54 6	93
UNCHAGAON s.			
Ismailpur House (lamp)		77 59 42	349
Fatehganj, XXXI		154 37 13	349
Parbata	s.	321 18 39	351
Janjíri, XXIX		350 10 57	350
YANI s.			
Husapura, XIV		14 11 56	192
Jagamanpur Fort		64 31 36	194
Bareh Temple		112 25 37	192
Bareh Fort		114 38 26	198
Tiar Fort		119 41 26	196
Atsu, XVI		183 9 21	193
Nabáda Fort		230 25 26	197
Bason Fort		274 11 21	195

† Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

July 1879.

J. B. N. HENNESSEY,

In charge of Computing Office.

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RANGIR MERIDIONAL SERIES.

CO-ORDINATES AND DESCRIPTIONS OF ALL STATIONS AND POINTS.

The following table gives the co-ordinates of all the stations and other fixed points, arranged in alphabetical order, also the descriptions of the secondary and intersected (or unvisited) points, and references to the preceding pages where the descriptions of the principal stations are given. In certain instances numbers are added which have reference to the given data of the triangles by which the station or point has been fixed; when these numbers are omitted it is to be understood that no triangles are given.

Note.—λ stands for Latitude North; L for Longitude East of Greenwich; H for Height of station in feet above mean sea level, if determined trigonometrically, H_s for the Height when found by spirit leveling, and *h* for Height of station tower or pillar. The trigonometrical heights always refer to the upper mark-stone or to the upper surface of the pillar on which the theodolite stood: the spirit leveled heights refer to the points on which the leveling staff stood as indicated in footnotes. For visited stations and for other points of superior accuracy the values of λ and L are given to two places of decimals; for well determined objects to one place, and for the remaining points to the nearest second. Principal stations are distinguished by the Roman numerals I, II, &c.; secondary stations by the letters h.s., t.s. and s. The names in italics are those of the territories, states or districts in which the stations or points are situated.

Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Abath Mound, (*Farrukhabad*) Highest point. ° ′ ″ λ 26 51 20·9 L 79 45 20·3 Nos. 253, 254	**Akupu** s. (*Etáwah*) On mound close to the village of same name and about 1¾ miles S.E. of Piprauli; thána, tahsíl and pargana Bidhúna. ° ′ ″ λ 26 45 34·77 L 79 45 7·56 No. 234	**Aneso Fort.** (*Etáwah*) On mound. ° ′ ″ λ 26 45 38 L 79 41 23 Nos. 242, 243
Agani Fort. (*Etáwah*) λ 26 53 58 L 79 19 25 No. 300	**Aliganj Building,** (*Bareilly*) Flag. λ 28 20 24·2 L 79 17 41·0 No. 354	**Áta** s. (*Jálaun*) On highest building on bastion of fort; thána, tahsíl and pargana Áta. λ 26 2 36·53 L 79 38 53·15 Nos. 129, 130
Airo Fort, (*Jálaun*) S. W. corner. λ 25 55 47·4 L 79 33 19·0 No. 121	**Aman Fort,** (*Farrukhabad*) Highest tower on bastion. λ 26 50 27·3 L 79 52 3·1 No. 266	**Atária, XI†.** (*Vide page* 8—K.) λ 28 38 9·53 L 79 37 42·26 H_s 619·32* *h* 37·8 No. 33
Airo s. (*Farrukhabad*) On highest turret of fort, about 1¼ miles N. W. of Ronsa village, 1¾ miles E. of Rasúlpur and the same distance W.S.W. of the large village of Sakatpur; pargana Sakatpur. λ 26 53 12·60 L 79 33 28·70 Nos. 228, 229	**Amolar** s. (*Farrukhabad*) On fort about one mile N. by E. of Maugi and 3¼ miles E. by S. of Tálgrám town; thána Tirwa, pargana Thatia-Tirwa. λ 27 1 45·67 L 79 44 54·31 Nos. 275, 276	**Atária** s. (*Jálaun*) On S.W. bastion of fort; tahsíl Áta. λ 26 4 59·79 L 79 33 0·79 Nos. 113, 114

* This height refers to the mark-stone imbedded at 2 feet above the level of the ground, over which the perforated masonry pillar has been built.
† Of the North-East Longitudinal Series.

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Name of station, district, description, co-ordinates &c.

Atsara Fort.
(*Mainpuri*)

	° ′ ″
λ	27 3 2
L	79 15 46

No. 317

Atsu, XVI.
(*Vide page 6—K.*)

λ	26 35 17·34
L	79 23 38·51
H	527
h	26*

No. 16

Auraiya s.
(*Etáwah*) In town of the same name about 2 miles S. of Málipur, the same distance E. of Mánpur, and the same distance N.N.E. of Shergarh police station; thána, tahsíl and pargana Auraiya.

λ	26 27 56·79
L	79 33 2·50

No. 185

Auser Fort,
(*Farrukhabad*) Highest turret.

λ	26 48 14·6
L	79 50 16·2

Nos. 262,263

Babai Fort.
(*Jálaun*)

λ	26 10 22
L	79 30 14

No. 158

Badarwára h.s.
(*Jhánsi*) On a hill about 4 miles N.W. of Daknesar village and 6¼ miles S.E. of the large village and Customs Post of Irich; thána and pargana Gursarai, tahsíl Garotha.

λ	25 44 42·76
L	79 13 0·42

No. 100

Bádsháhpur h.s.
(*Damoh*) On a hill close to the villages of Gugra, Baukero ruins and Kalkoa.

λ	24 22 20·93
L	79 37 43·86

No. 52

Bajiri Fort,
(*Farrukhabad*) Centre of bastion.

λ	26 57 48
L	79 28 7

Name of station, district, description, co-ordinates &c.

Bakarua h.s.
(*Bundelkhand, Panna State*) On a hill close to and S.W. of Biusa village in ruins, about 1¼ miles W. of Gobindapur and 1 mile N. of Gogra.

	° ′ ″
λ	24 14 41·07
L	79 11 54·39
H	1768

No. 39

Baksua Fort,
(*Bundelkhand, Panna State*) S.W. corner of S.W. turret.

λ	24 15 8·7
L	79 19 30·3

No. 40

Baksua h.s.
(*Bundelkhand, Panna State*) On a detached hill about a mile S. of village of that name, close to and S.E. of Bírgarh and N.W. of Kohi.

λ	24 14 11·13
L	79 19 30·60
H	1813

No. 37

Baksua Temple.
(*Bundelkhand, Panna State*) In village.

λ	24 15 9·0
L	79 19 45·7

No. 41

Bamnora Fort.
(*Bundelkhand, Bijáwar State*)

λ	24 26 17
L	79 9 6
H	1305

No. 48

Banha Fort,
(*Jálaun*) Tree.

λ	26 2 0
L	79 35 29

No. 139

Banora Fort,
(*Jálaun*) Flag.

λ	26 7 24·6
L	79 30 40·1

No. 149

Bansi s.
(*Etáwah*) About ½ mile N. of the bridge over the Ganges Canal, Etáwah Branch, near Kamara village and midway between Phaphúnd and Achalda Railway Stations; thána, tahsíl and pargana Phaphúnd.

λ	26 42 30
L	79 29 33

Name of station, district, description, co-ordinates &c.

Bánsparh h.s.
(*Bundelkhand, Bijáwar State*) On a hill about 2 miles N. by W. of Pathár and 2½ miles E. by N. of Majgoa village.

	° ′ ″
λ	24 37 27·16
L	79 47 20·36
H	1991

Nos. 61, 62

Baradána Fort.
(*Etáwah*)

λ	26 31 12
L	79 37 10

No. 190

Bareh Fort.
(*Etáwah*)

λ	26 30 1
L	79 17 24

No. 198

Bareh Temple,
(*Etáwah*) Remarkably high.

λ	26 29 47·6
L	79 17 21·2

No. 191

Bareilly House.
(*Bareilly*) Diwán Bahádur Singh's house in city.

λ	28 22 13·1
L	79 26 38·2

No. 353

Bareilly Kachahri.
(*Bareilly*)

λ	28 20 8·8
L	79 28 2·7

No. 352

Bargaon Building.
(*Jálaun*) On N.E. bastion of fort in village.

λ	25 57 23·9
L	79 25 50·8

Nos. 123, 124

Barhind Fort,
(*Etáwah*) N.W. bastion.

λ	26 52 56·0
L	79 31 21·4

Nos. 226, 227

Bari Matána Mound,
(*Sháhjahánpur*) Flag.

λ	27 52 56
L	79 43 37

No. 342

* Above the level of the elevated platform on which the station is placed.

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Barkhera s.
(*Farrukhabad*) On mound about 1 mile S.E. of Kanjhana, same distance N.E. of Hismápur and 1¼ miles W. by N. of Jalápur on road from Yákútganj to Chhibramau town; pargana Bhojpur.

	° ′ ″
λ	27 17 28·85
L	79 35 47·59

Nos. 322, 323

Baro Fort,
(*Etáwah*) Bastion.

λ	26 55 28·5
L	79 12 56·2

No. 307

Barsan s.
(*Etáwah*) On S. side of the road from Phaphúnd to Etáwah, about ¾ mile S.W. of Indrapur and ¼ mile N.E. of Indrauki; tahsíl Bharthna.

λ	26 38 58·07
L	79 20 38·39

No. 211

Barsen Fort,
(*Etáwah*) Tree.

λ	26 28 1
L	79 35 44

Basait Fort,
(*Mainpuri*) Bastion.

λ	26 58 53·6
L	79 18 56·1

No. 310

Bason Fort.
(*Etáwah*) Square building on N.E. bastion.

λ	26 27 29·4
L	79 25 22·5

No. 195

Batiagarh Staircase.
(*Damoh*)

λ	24 6 48·5
L	79 23 29·7

See Synoptical Vol. of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Baukhar s.
(*Hamírpur*) About 4½ miles S.S.W. of Chandaut police station and 1½ miles W. of the road from Ráth city to Chandaut village; thána Chandaut, tahsíl and pargana Jalálpur.

λ	25 51 36·66
L	79 38 41·54

No. 119

Bela Fort Mark.
(*Etáwah*)

λ	26 49 24·78
L	79 43 23·31

Nos. 247, 248

Benora s.
(*Farrukhabad*) On fort about 1½ miles S.W. of Tilsara, 1½ miles S.E. of Firozpur and 2 miles N.E. of Koerna village; pargana Thatia-Tirwa.

	° ′ ″
λ	26 53 35·59
L	79 49 9·94

Nos. 259, 260

Ber s.
(*Etáwah*) On building on mound close to the Ganges Canal, Etáwah Branch, about 3¼ miles W.N.W. of Ramáin and 1¼ miles S.S.W. of Kura village; thána, tahsíl and pargana Bharthna.

λ	26 48 38·25
L	79 14 16·36

No. 291

Bhadaura Fort.
(*Etáwah*)

λ	26 50 54
L	79 42 39

No. 252

Bhadaura Temple.
(*Etáwah*)

λ	26 50 10·0
L	79 44 52·0

Nos. 264, 265

Bhadek s.
(*Jálaun*) On high pillar close to the right bank of the Jumna, about 1½ miles S.E. of the road from Jálaun to Shergarh Ghát *viá* Kuthaund police station and 3 miles E. of Salímpur; thána Kuthaund, tahsíl Jálaun, pargana Bhadek.

λ	26 22 21·00
L	79 31 50·32

Nos. 187, 188

Bhoraj, IV.
(*Vide page 4—K.*)

λ	24 50 28·71
L	79 5 31·72
H	1358
h	*Not forthcoming*

No. 4

Bia Barari h.s.
(*Damoh*) On a hill close to the village of that name, about 3 miles S.E. of Kanaura, 3¾ miles W.N.W. of Chopra and 2 miles N.E. of Bisdo village. A platform marks the station.

λ	24 14 49·60
L	79 30 20·12
H	1694

No. 43

Bidhúna s.
(*Etáwah*) On highest turret of fort in the large village of that name, thána, tahsíl and pargana Bidhúna.

	° ′ ″
λ	26 48 10·70
L	79 33 36·27

Nos. 207, 208

Bijáwar Palace.
(*Bundelkhand, Bijáwar State*) N. corner of highest turret.

λ	24 37 27·9
L	79 32 5·6
H	1237

No. 71

Bijáwar Temple,
(*Bundelkhand, Bijáwar State*) New.

λ	24 37 46·5
L	79 32 5·7
H	1195

No. 70

Bila h.s.
(*Bundelkhand, Bijáwar State*) On a hill about 2 miles S.S.E. of Súrajpur village, 1½ miles N. of Biakana and 3¾ miles S.E. of Kari village.

λ	24 28 8·98
L	79 25 24·52
H	1718

Nos. 49, 50

Bina Building,
(*Etáwah*) High.

λ	26 58 24·5
L	79 11 45·6

No. 311

Birona, XVIII.
(*Vide page 6—K.*)

λ	26 51 2·33
L	79 24 31·35
H	542
h	23*

No. 18

Bisungarh, XX.
(*Vide page 6—K.*)

λ	27 6 30·27
L	79 27 15·21
H_s	518·88†
h	23·8

No. 20

* Above the terreplein of the fort on which the tower stands.
† This height refers to the mark-stone imbedded at 1 foot above the level of the ground, over which the perforated masonry column has been built.

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Name of station, district, description, co-ordinates &c.

Bodona S.
(*Sháhjahánpur*) On tree in village close to the left bank of Bahgul Nadi, about 1¼ miles E. of Giridharpur, the same distance N. by E. of Rámpur and ¾ mile S. of Jaraun village; thána and tahsíl Jaláláabad, pargana Mehrabad.

	° ′ ″
λ	27 51 23·37
L	79 36 55·21

No. 340

Chachhúnd Fort.
(*Etáwah*)

λ	26 41 36
L	79 24 58

No. 212

Cháki Fort,
(*Jálaun*) Flag on N.E. bastion, about 5¾ miles N. W. of Jálaun city.

λ	26 12 4·2
L	79 18 54·7

No. 162

Chamári S.
(*Jálaun*) About 3½ miles S.W. of Áta village, 1¼ miles S.E. of Bandha village and 1¼ miles N. by W. of Bomori; thána, tahsíl and pargana Áta.

λ	26 1 14·98
L	79 36 12·66

No. 188

Chandanpur, XXI.
(*Vide page 7—K.*)

λ	27 13 33·73
L	79 41 29·81
H	508
h	38

No. 21

Chandla, III.
(*Vide page 4—K.*)

λ	24 36 33·38
L	79 29 45·12
H	1796
h	*Not forthcoming*

No. 3

Charkhári Fort,
(*Bundelkhand, Charkhári State*) White temple on N.E. end.

λ	25 24 14·2
L	79 47 53·0

No. 91

Charsoni Fort,
(*Jálaun*) Flag, about 2½ miles S.E. of Gurgaon village.

λ	26 10 38·4
L	79 28 56·1

No. 159

Name of station, district, description, co-ordinates &c.

Chháni Fort,
(*Jálaun*) Building on N.E. bastion.

	° ′ ″
λ	26 18 10·3
L	79 29 35·7

No. 182

Chhatarpur Temple.
(*Bundelkhand, Chhatarpur State*) On hill.

λ	24 54 21·0
L	79 37 12·2
H	1198

Nos. 59, 60

Chhibramau Thána,
(*Farrukhabad*) Flag.

λ	27 8 56·3
L	79 32 9·3

Nos. 324, 325

Chirauli Fort.
(*Jálaun*) About 4 miles S. by W. of the large village of Ait.

λ	25 50 18·5
L	79 17 47·6

Nos. 109, 110

Churári Temple.
(*Bundelkhand, Naigawán Ribai Jágír*) On hill.

λ	25 19 21·2
L	79 35 41·4

No. 93

Churki Fort.
(*Jálaun*) Close to and E. of the village of that name.

λ	26 9 1·4
L	79 33 40·8

No. 157

Dabkari Temple.
(*Etáwah*) On mound.

λ	26 43 52·5
L	79 43 36·7

Nos. 240, 241

Dakoli Temple.
(*Jhánsi*) On hill immediately W. of village of the same name.

λ	25 48 12·4
L	79 10 44·0

Nos. 105, 106

Dálípur, II.
(*Vide page 4—K.*)

λ	24 26 57·43
L	79 11 45·87
H	1599
h	*Not forthcoming*

No. 2

Name of station, district, description, co-ordinates &c.

Dantoli Temple.
(*Jálaun*) In fort.

	° ′ ″
λ	26 1 52·9
L	79 20 11·2

No. 128

Datiára, V.
(*Vide page 4—K.*)

λ	25 6 22·21
L	79 24 52·04
H	1151
h	*Not forthcoming*

No. 5

Degaon Fort,
(*Jálaun*) Bungalow.

λ	26 9 2·6
L	79 29 53·5

No. 156

Deokali Temple.
(*Etáwah*)

λ	26 25 52·1
L	79 32 9·7

No. 186

Dháka, XXVI.
(*Vide page 7—K.*)

λ	27 44 58·41
L	79 43 25·73
H	535
h	38

No. 27

Dhanora Temple.
(*Jhánsi*)

λ	25 43 45·8
L	79 20 5·2

No. 104

Dhasán River Temple.
(*Bundelkhand, Orchha State*)

λ	24 42 50·5
L	79 17 28·2
H	1381

No. 58

Díg Fort,
(*Etáwah*) Highest building.

λ	26 54 24·9
L	79 16 48·6

No. 303

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Name of station, district, description, co-ordinates &c.

Dilwári Mound,
(*Budaun*) Flag.

	°	′	″
λ	28	2	47
L	79	26	55

No. 345

Dipkai h.s.
(*Jhánsi*) On a hill close to the village about 1¼ miles S.W. of Rámpura village and 3 miles E. of Bangra; thána, tahsíl and pargana Garotha.

λ	25	31	15
L	79	20	35

Dorápur Building.
(*Etáwah*)

λ	26	47	40
L	79	35	42

Dorona s.
(*Farrukhabad*) On fort about a mile W. of Ishwarpur, ½ mile N. of Bijpura and 1½ miles E.S.E. of Baraura village; thána and pargana Sakráwa.

λ	26	56	44·57
L	79	23	7·69

Nos. 287, 288

Duhelkhand s.
(*Jálaun*) On right bank of the Jumna river, about 1½ miles E. of the village of Nipania and same distance N.N.W. of Urkra village; thána Nipania, tahsíl Áta, pargana Kálpi.

λ	26	12	37·87
L	79	40	47·66

No. 164

Ekri House (lamp).
(*Sháhjahánpur*)

λ	27	44	16·57
L	79	31	30·09

No. 341

Etáwah Fort (lamp).
(*Etáwah*) At flagstaff on old fort.

λ	26	45	34·20
L	79	3	17·75

Nos. 292, 293

Farídpur Thána,
(*Bareilly*) Flag.

λ	28	12	20·7
L	79	34	44·5

Nos. 346, 347

Farrukhabad Palace,
(*Farrukhabad*) S.W. turret in fort.

λ	27	23	50·4
L	79	36	52·2

Nos. 332, 333

Name of station, district, description, co-ordinates &c.

Farrukhabad Temple.
(*Farrukhabad*) At Mau Gate of city.

	°	′	″
λ	27	23	51·9
L	79	35	46·9

Nos. 330, 331

Fatehganj, XXXI.
(*Vide page* 8—K.)

λ	28	27	28·69
L	79	21	5·87
H_s	572·12*		
h	37·9		

No. 32

Fatehgarh Church.
(*Farrukhabad*)

λ	27	21	58·8
L	79	40	12·5

Nos. 328, 329

Gadákhár h.s.
(*Damoh*) On a hill about 1½ miles E. of Bori, 2½ miles N.W. of Garwa and 1½ miles S.W. of Náráyanpur village on the same range of hills.

λ	24	19	14·26
L	79	30	58·51
H	1706		

No. 51

Gaili Fort,
(*Etáwah*) Temple in haveli.

λ	26	51	17·6
L	79	40	41·1

Nos. 255, 256

Gajnera, XXX.
(*Vide page* 8—K.)

λ	28	20	2·02
L	79	40	58·11
H	631		
h	38		

No. 31

Gandaspur, XV.
(*Vide page* 6—K.)

λ	26	28	28·98
L	79	38	21·53
H	482		
h	28		

No. 15

Gangawára s.
(*Mainpuri*) On mound about 2¾ miles S.W. of Bewar town, 1½ miles S. of Naya Devi on road from Bewar to Bhongaon town and 2½ miles W. of Rájpur; thána, tahsíl and pargana Bhongaon.

λ	27	11	32·16
L	79	18	10·28

No. 320

Name of station, district, description, co-ordinates &c.

Garar Mound (lamp).
(*Jálaun*) On high building.

	°	′	″
λ	26	0	53·10
L	79	25	20·28

Nos. 126, 127

Gara Sandna h.s.
(*Bundelkhand, Chhatarpur State*) On a detached hill close to the villages of Gara and Sandna, about a mile W. of Hatwa and 2½ miles E. of Pára.

λ	24	49	48·28
L	79	50	21·21

Nos. 81, 82

Garotha Temple.
(*Jhánsi*)

λ	25	34	9
L	79	20	39

Garwai Fort,
(*Jhánsi*) Flag.

λ	25	41	17
L	79	15	24

No. 101

Gasáro Fort.
(*Etáwah*)

λ	26	42	56
L	79	23	30

Nos. 214, 215

Gijnor s.
(*Jálaun*) Also called Jignor S. on mound, about ½ mile N.E. of Haripur and 1 mile S. of Biria; thána, tahsíl and pargana Jálaun.

λ	26	11	38·19
L	79	24	0·42

Nos. 142, 143

Girthan Fort,
(*Jálaun*) Flag.

λ	25	55	12
L	79	22	5

No. 120

Gogora Temple.
(*Hamírpur*) On hill.

λ	25	25	8·3
L	79	35	24·6

No. 94

Gokulphára, X.
(*Vide page* 5—K.)

λ	25	45	37·06
L	79	19	46·22
H	699		
h	12		

No. 10

* This height refers to the mark-stone imbedded at 2 feet above the level of the ground, over which the perforated masonry pillar has been built.

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Name of station, district, description, co-ordinates &c.

Gopálpur h.s.
(*Bundelkhand, Bijáwar State*) On a range of hills running along the left bank of the Chuhi Nadi, about 1¼ miles W. of Lakhangaon, 2 miles S. of Bainshori and 2½ miles N.E. of Sagauni village.

	°	′	″
λ	24	24	41·99
L	79	30	13·81
H	1686		

No. 53

Guári t.s.
(*Etáwah*) About 1½ miles N. from the bridge over the Ganges Canal, Etáwah Branch, near Achalda Railway Station, on left bank of the Ahnaiya Nadi, about 1¼ miles W.N.W. of Khurda and 1¾ miles E. of Laituria village; thána, tahsíl and pargana Bidhúna.

λ	26	44	10·13
L	79	27	10·60

Nos. 209, 210

Gulganj Fort,
(*Bundelkhand, Bijáwar State*) S.W. corner.

λ	24	41	53·3
L	79	25	2·1
H	1057		

No. 73

Gura, XI.
(*Vide page* 5—K.)

λ	25	57	41·39
L	79	36	10·40
H	477		
h	33		

No. 11

Gurgaon Fort,
(*Jálaun*) Centre.

λ	26	12	22·7
L	79	27	15·6

No. 169

Guri, XXV.
(*Vide page* 7—K.)

λ	27	40	0·84
L	79	28	43·22
H	533		
h	38		

No. 26

Harchandpur Fort.
(*Etáwah*)

λ	26	42	9
L	79	33	40

No. 213

Name of station, district, description, co-ordinates &c.

Hardua Tree.
(*Saugor*) Also called Hírahát Tree; flag on hill tree.

	°	′	″
λ	24	20	38
L	79	14	42
H	1527		

Nos. 44, 45

Haseran Fort,
(*Farrukhabad*) Bungalow.

λ	26	55	31·7
L	79	37	5·3

Nos. 232, 233

Hasri h.s.
(*Saugor*) On a small house S. of village, about ¼ mile N.W. of Rámpura village which stands on the opposite bank of the stream running between the two villages and 2 miles S. by E. of Bamnora fort.

λ	24	24	11·29
L	79	9	40·82
H	1261		

No. 46

Hatta Jail,
(*Damoh*) S.W. corner.

λ	24	7	34
L	79	38	59

Hatta, Magistrate's House.
(*Damoh*)

λ	24	7	7
L	79	38	30

Hatta, N. Temple,
(*Damoh*) Spire, N. of Jail.

λ	24	8	23·33
L	79	38	49·16

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Hatta, S. Temple.
(*Damoh*)

λ	24	7	43·9
L	79	38	25·1

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Himilia s.
(*Jálaun*) On mound, about 1½ miles S.W. of Usergaon, 1¾ miles N.E. of Kapási and 2¼ miles N. of Kaitheri village on the road Orai to Gursarai; thána, tahsíl and pargana Orai.

λ	25	58	31·39
L	79	24	8·69

Nos. 115, 116

Name of station, district, description, co-ordinates &c.

Husapura, XIV.
(*Vide page* 6—K.)

	°	′	″
λ	26	21	42·37
L	79	21	30·43
H	500		
h	34		

No. 14

Indargarh Fort,
(*Farrukhabad*) High square building.

λ	26	55	36·6
L	79	43	16·6

No. 258

Ismailpur House (lamp).
(*Bareilly*)

λ	28	18	55·96
L	79	16	28·05

No. 348

Itaura Temple.
(*Jálaun*)

λ	26	0	55·7
L	79	44	0·6

No. 137

Jagamanpur Fort,
(*Jálaun*) Temple.

λ	26	24	17·4
L	79	15	23·0

No. 194

Jakha Fort,
(*Jálaun*) Flag on highest building on S.W. bastion.

λ	26	17	41·4
L	79	30	18·1

No. 181

Jalálabad s.
(*Sháhjahánpur*) On fort, about ¼ mile S.W. of Jalálabad town, 1 mile E. of Pitar Mau village and the same distance N.E. of Ahmednagar; thána and pargana Jalálabd.

λ	27	43	23·02
L	79	41	53·43

Nos. 338, 339

Jálaun Palace,
(*Jálaun*) Staircase.

λ	26	8	37·7
L	79	22	41·4

No. 155

Jálaun Temple No. 1.
(*Jálaun*)

λ	26	8	33·6
L	79	22	41·8

Nos. 153, 154

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Name of station, district, description; co-ordinates &c.

Jálaun Temple No. 2,
(*Jálaun*) Three domed.

	° ′ ″
λ	26 8 50
L	79 22 38

Janjíri, XXIX.
(*Vide page 8—K.*)

λ	28 10 52·01
L	79 26 43·30
H	584
h	38

No. 30

Jankath Fort,
(*Farrukhabad*) White building.

λ	26 51 27·9
L	79 54 5·1

No. 267

Jaraun Fort,
(*Etáwah*) High bastion.

λ	26 52 37·8
L	79 39 2·6

Nos. 230, 231

Jatáshankar Fort.
(*Damoh*) Denoted by a platform.

λ	24 13 43·6
L	79 36 5·2

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Jatoli Tower,
(*Jálaun*) Flag.

λ	26 16 21·0
L	79 30 5·9

Nos. 179, 180

Jiwa Sirsaini Fort.
(*Etáwah*)

λ	26 44 4
L	79 40 17

No. 239

Kacher Hill Mark.
(*Jhánsi*) On a detached hill immediately W. of the village of the same name, 2 miles E.N.E. of Hírá-nagar and 3 miles S.S.E. of the large village of Kakarbai; thána, tahsíl and pargana Garotha.

λ	25 39 18·72
L	79 23 19·50

No. 99

Kaitwa Fort,
(*Jálaun*) White building in centre.

λ	26 16 40·1
L	79 24 16·8

No. 175

Name of station, district, description, co-ordinates &c.

Kakoto Temple.
(*Etáwah*)

	° ′ ″
λ	26 29 2·2
L	79 34 39·1

Nos. 201, 202

Kálpi, Chaurási Temple.
(*Jálaun*) In ruins.

λ	26 6 49·6
L	79 46 9·0

No. 165

Kálpi s.
(*Jálaun*) On fort close to and N. of town of the same name; thána and pargana Kálpi, tahsíl Áta.

λ	26 7 51·16
L	79 47 21·98

No. 141

Kalra h.s.
(*Jálaun*) On hill, about 1½ miles S. by E. of Jakoli on road from Áta to Jhánsi and 1 mile N.E. of Jamrahi; thána Ait, tahsíl Orai.

λ	25 50 26·51
L	79 15 23·00

No. 111

Kalsán, XIX.
(*Vide page 6—K.*)

λ	26 57 10·27
L	79 41 7·48
H_s	501·22*
h	23·1

No. 19

Kanwa, XII.
(*Vide page 5—K.*)

λ	26 4 8·19
L	79 18 56·14
H	540
h	28†

No. 12

Karmer s.
(*Jálaun*) In village of same name, about ¼ mile W.S.W. of Lebupura and 1¾ miles N.N.W. of Gura village; thána, tahsíl and pargana Áta.

λ	25 59 0·95
L	79 35 21·94

Nos. 134, 135

Karri h.s.
(*Bundelkhand, Chhatarpur State*) On a hill close to village of that name and about 2 miles W. by S. of Berauno village.

λ	24 52 26·43
L	79 46 32·00

Nos. 78, 79

Name of station, district, description, co-ordinates &c.

Karsán Tower.
(*Jálaun*)

	° ′ ″
λ	26 0 5
L	79 28 13

Karwai Village,
(*Jálaun*) Date trees.

λ	25 55 1
L	79 35 34

Kasáve Building (lamp).
(*Farrukhabad*)

λ	27 4 22·45
L	79 35 5·45

No. 282

Kasáve Fort,
(*Farrukhabad*) Flag on house.

λ	27 4 23·1
L	79 35 3·0

No. 283

Kasboro Fort.
(*Cawnpore*)

λ	26 18 17
L	79 42 8

No. 183

Kasera Fort,
(*Mainpuri*) Bastion.

λ	26 59 17·0
L	79 21 28·6

Kasrak, XXVIII.
(*Vide page 8—K.*)

λ	28 3 22·65
L	79 42 12·15
H	608
h	38

No. 29

Katora Tiled Building.
(*Saugor*)

λ	24 9 29·7
L	79 5 26·5

No. 35

Katri Temple.
(*Cawnpore*)

λ	26 13 25·6
L	79 44 41·4

No. 166

Khairnagar Fort.
(*Farrukhabad*)

λ	26 52 30
L	79 50 38

No. 268

* This height refers to the mark-stone imbedded at the level of the ground, over which the perforated masonry column has been built.
† Above the terreplein of the fort on which the tower stands.

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Name of station, district, description, co-ordinates &c.

Khairnagar Temple.
(*Farrukhabad*)

	°	′	″
λ	26	53	16·1
L	79	51	20·3

No. 270

Khánpur Fort,
(*Farrukhabad*) Highest turret.

λ	26	49	34·2
L	79	45	43·2

Nos. 235, 236

Khatoli Gateway.
(*Bundelkhand, Panna State*) Tamarind tree on gateway (in ruins).

λ	24	34	10·4
L	79	24	21·9
H	1408		

No. 57

Khera Bajhera s.
(*Sháhjahánpur*) On mound in village of the same name, about 1¼ miles W. of Bálhanpur and 1¼ miles E. of Bundia Kalán; pargana Khera Bajhera.

λ	28	1	39·16
L	79	35	11·06

No. 343

Kishni Fort.
(*Mainpuri*)

λ	27	1	29
L	79	18	15

No. 315

Korára Flag.
(*Etáwah*)

λ	26	32	40
L	79	34	55

Koratha Temple.
(*Jhánsi*)

λ	25	43	29·1
L	79	17	3·4

No. 103

Kotra Temple,
(*Jálaun*) E. minaret.

λ	25	48	26·0
L	79	21	4·8

No. 107

Kudarkot Temple.
(*Etáwah*)

λ	26	48	41·9
L	79	26	15·9

No. 221

Name of station, district, description, co-ordinates &c.

Kudrail Fort,
(*Etáwah*) Building on N.W. bastion.

	°	′	″
λ	26	54	15·8
L	79	21	47·2

Nos. 304, 305

Kuita s.
(*Etáwah*) On fort, about ¾ mile W. of a jhíl and 1¼ miles N.N.E. of Kowa village; thána Usráhár, tahsíl and pargana Bharthna.

λ	26	56	22·38
L	79	17	47·39

Nos. 289, 290

Kukargaon Building.
(*Jálaun*)

λ	26	3	48·4
L	79	26	20·2

No. 140

Kumraul Tree,
(*Farrukhabad*) Flag.

λ	27	35	7
L	79	36	53

Kundalpur Temple,
(*Damoh*) Highest, on hill.

λ	23	58	53·6
L	79	46	3·7

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Kúrsi s.
(*Etáwah*) On mound, about ½ mile N.W. of Bunenpur and 1¼ miles E. of Alípur; thána, tahsíl and pargana Bidhúna.

λ	26	48	6·05
L	79	37	50·25

Nos. 237, 238

Kusma Temple.
(*Bundelkhand, Chhatarpur State*) On hill.

λ	25	1	29
L	79	46	44

Kusmár, I.
(*Vide page 4—K.*)

λ	24	14	44·92
L	79	22	51·13
H	1815		
h	7		

No. 1

Kusmara Fort,
(*Mainpuri*) Bungalow.

λ	27	6	34·3
L	79	19	40·6

No. 319

Name of station, district, description, co-ordinates &c.

Kuthaund Fort,
(*Jálaun*) White building.

	°	′	″
λ	26	21	52·2
L	79	27	17·5

No. 177

Kuthaund Temple.
(*Jálaun*)

λ	26	21	39·9
L	79	27	17·3

No. 176

Laigaon Fort,
(*Mainpuri*) S.W. bastion.

λ	26	58	32·7
L	79	21	52·3

No. 309

Lakna Fort,
(*Etáwah*) Centre of bastion.

λ	26	43	47·2
L	79	35	30·4

No. 216

Lughási Fort,
(*Bundelkhand, Lughási Jágír*) South or highest tower.

λ	25	4	25·3
L	79	37	36·2

No. 89

Mahewa Building,
(*Jálaun*) Highest.

λ	26	7	29·8
L	79	39	49·6

No. 150

Mainpuri, Court House.
(*Mainpuri*)

λ	27	13	49·2
L	79	5	38·7

No. 321

Majelo Fort,
(*Farrukhabad*) Flag on building.

λ	26	54	29·8
L	79	43	35·0

Nos. 271, 272

Malhausi s.
(*Etáwah*) On highest point in fort, about 1¼ miles N.W. of Piprauli, 1 mile E. by S. of Níbhar and 2 miles S.S.W. of the large village of Bela; thána Bela, tahsíl and parganah Bidhúna.

λ	26	47	47·60
L	79	42	51·45

Nos. 244, 245

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Name of station, district, description, co-ordinates &c.

Malka Temple.
(*Hamírpur*) On hill, about ¼ of a mile E.N.E. of the junction of roads from Nowgong, Bánda and Saugor and 2¼ miles S.W. by S. of the village of Srinagar.

	° ′ ″
λ	25 8 45·1
L	79 47 55·8

No. 90

Maman Fort,
(*Etáwah*) Highest square building.

λ	26 52 7·0
L	79 19 26·9

Nos. 296, 297

Manang, VII.
(*Vide page 5—K.*)

λ	25 17 28·38
L	79 45 35·16
H_s	1145·63*
h	3

No. 7

Mangáwan Building,
(*Etáwah*) Old.

λ	26 59 13·3
L	79 9 56·9

No. 312

Mangrai Building.
(*Bundelkhand, Panna State*) A window in S.E. face of a two storied square building in village.

λ	24 15 29·6
L	79 18 28·5

No. 42

Maniagarh h.s.
(*Bundelkhand, Chhatarpur State*) On a hill close to and S. of Rájgarh, N.W. of Ráipura and N.E. of Pátan village.

λ	24 42 49·73
L	79 58 29·79
H	1651

Nos. 66, 67

Mankahri House.
(*Bundelkhand, Chhatarpur State*) Dhaukal Singh's house in village.

λ	25 0 28·6
L	79 49 14·2

No. 86

Mardángaib Temple.
(*Hamírpur*) On hill.

λ	25 36 8·8
L	79 32 31·6

No. 98

Name of station, district, description, co-ordinates &c.

Masmaria Fort,
(*Jálaun*) Flag.

	° ′ ″
λ	26 7 1
L	79 34 11

Nos. 147, 148

Mau, XXIV.
(*Vide page 7—K.*)

λ	27 30 4·20
L	79 42 50·90
H	516
h	38

No. 25

Mau Building.
(*Etáwah*) On W. bastion of fort.

λ	26 52 48·1
L	79 41 13·3

No. 257

Mau Saria Temple.
(*Bundelkhand, Chhatarpur State*) On hill, about 3 miles S.E. by E. of the new barracks in Nowgong cantonment.

λ	25 0 47·8
L	79 31 46·1

No. 87

Maudo s.
(*Farrukhabad*) On house in village, about ¼ mile E.S.E. of Atsáni and 1¼ miles N.E. of Lakraula village; thána and pargana Muhammadabad.

λ	27 17 1·09
L	79 30 44·71

Nos. 326, 327

Muhammadabad, XXII.
(*Vide page 7—K.*)

λ	27 18 24·05
L	79 28 6·98
H	565
h	17†

No. 22

Muhammadabad s.
(*Jálaun*) In village, about 1¼ miles S.W. of Kalkanda and 2 miles N.E. of Kusmilia; thána and tahsíl Orai, pargana Muhammadabad.

λ	25 55 56·56
L	79 29 35·01

Nos. 117, 118

Mukána Hill Mark.
(*Bundelkhand, Bijáwar State*)

λ	24 41 8·05
L	79 49 34·86

No. 83

Name of station, district, description, co-ordinates &c.

Munj Building,
(*Etáwah*) High.

	° ′ ″
λ	26 53 47·9
L	79 12 0·7

No. 302

Nabáda Fort.
(*Etáwah*) Building on top of fort.

λ	26 28 30·6
L	79 24 20·9

No. 197

Nagar Temple.
(*Damoh*)

λ	24 3 15·1
L	79 29 28·9

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Nágonáth, VIII.
(*Vide page 5—K.*)

λ	25 26 54·19
L	79 22 39·73
H	987
h	*Not forthcoming*

No. 8

Nagroa h.s.
(*Bundelkhand, Bijáwar State*)

λ	24 43 19·30
L	79 30 30·56
H	1449

Nos. 68, 69

Naili Fort,
(*Cawnpore*) Centre of haveli (in ruins).

λ	26 47 1·9
L	79 52 41·9

No. 261

Nandu Sahail Fort,
(*Etáwah*) Building.

λ	26 39 52·9
L	79 40 51·6

No. 205

Náráyanpur Fort,
(*Bundelkhand, Bijáwar State*) W. corner of Building.

λ	24 40 40·2
L	79 36 43·1
H	1061

No. 72

Narsinghgarh Fort,
(*Damoh*) Flag.

λ	23 59 55·4
L	79 26 24·4

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

* This height refers to the mark on the upper surface of the circular paka platform.

† Above the bastion of the fort on which the tower stands.

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Name of station, district, description, co-ordinates &c.

Nawábganj s.
(*Farrukhabad*) On thána in village of the same name, about 1¼ miles W. by N. of Sírmaua and 1½ miles N. E. of Bírpur village; thána Nawábganj, tahsíl and pargana Shamsabad.

	° ′ ″
λ	27 26 9·65
L	79 26 44·94

No. 334

Nibora Temple,
(*Damoh*) Staircase.

λ	24 0 55·0
L	79 20 22·3

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Nipania, XIII.
(*Vide page 5—K.*)

λ	26 13 30·70
L	79 37 52·27
H	477
h	39

No. 13

Nipania Village.
(*Jálaun*)

λ	26 12 26
L	79 38 40

Niwar Tiled Building.
(*Bundelkhand, Panna State*)

λ	24 12 46·6
L	79 7 56·7

No. 86

Orai Temple.
(*Jálaun*)

λ	25 59 9·8
L	79 29 33·3

Nos. 132, 133

Orekhi Fort,
(*Jálaun*) Tree on S.E. bastion.

λ	26 11 1·9
L	79 20 18·8

No. 161

Oroláki Fort,
(*Etáwah*) Bastion.

λ	26 46 50·5
L	79 46 23·5

No. 346

Pai Temple.
(*Bundelkhand, Chhatarpur State*)

λ	24 53 39·6
L	79 56 18·4

No. 84

Name of station, district, description, co-ordinates &c.

Pál House,
(*Jálaun*) In village.

	° ′ ″
λ	26 14 47·0
L	79 38 48·1

No. 168

Palera Temple,
(*Bundelkhand, Orchha State*) On hill.

λ	25 0 39·5
L	79 16 16·7

No. 88

Panchamnagar Temple.
(*Damoh*)

λ	24 3 41·6
L	79 12 21·1

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Parásan Fort,
(*Jálaun*) Flag.

λ	25 56 3
L	79 43 50

No. 131

Parásan Temple.
(*Jálaun*)

λ	25 56 16·9
L	79 43 52·5

No. 122

Parasna Fort,
(*Etáwah*) Turret.

λ	26 57 51·5
L	79 8 32·2

No. 308

Parbata s.
(*Bareilly*) In village about ¾ mile W.S.W. of Kíratpur, ¾ mile S. of Dothoka and 1½ miles E. by N. of Rámpura village; thána and pargana Faríd-pur.

λ	28 14 37·25
L	79 30 9·86

No. 351

Parbatpur s.
(*Jálaun*) On mound on road from Jálaun to Kálpi, about 1¼ miles W. by N. of Aditpur on the same road and same distance S.E. of Kusmara; thána, tahsíl and pargana Jálaun.

λ	26 8 16·24
L	79 28 9·31

Nos. 144, 145

Parín Fort Mark (lamp).
(*Etáwah*)

λ	26 30 1·73
L	79 31 48·27

No. 208

Name of station, district, description, co-ordinates &c.

Patera h.s.
(*Damoh*) On a hill close to and S. of village of the same name and N. of Minwar and about 1½ miles E. of Seria village.

	° ′ ″
λ	24 4 30·47
L	79 26 40·91

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Patharia h.s.
(*Damoh*) On a hill close to and W. of village of the same name and about 2 miles N.N.W. of Bansa.

λ	23 53 45·02
L	79 12 42·79

See Synoptical Volume of the Calcutta Longitudinal Series of the South-East Quadrilateral.

Perona Fort.
(*Jálaun*)

λ	25 51 9
L	79 11 21

No. 112

Phaphúnd Building.
(*Etáwah*) Flag on highest building.

λ	26 35 51·2
L	79 30 15·8

No. 204

Phára, IX.
(*Vide page 5—K.*)

λ	25 41 7·57
L	79 42 54·66
H	637
h	*Not forthcoming*

No. 9

Pharenji Fort,
(*Mainpuri*) Building.

λ	26 59 51·5
L	79 16 25·0

No. 313

Pichora Building,
(*Cawnpore*) In village.

λ	26 14 34·0
L	79 41 55·4

No. 167

Pinarthu Temple.
(*Cawnpore*)

λ	26 24 33·8
L	79 38 53·7

No. 189

Pola h.s.
(*Bundelkhand, Bijáwar State*) On a detached peak about 2 miles N.W. of Chopra village, 1½ miles N.E. of Biakana and 2½ miles S.E. of Súrajpur village.

λ	24 28 22·82
L	79 26 19·18
H	1732

Nos. 54, 55

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Name of station, district, description, co-ordinates &c.

Ponti Fort,
(*Etáwah*) Ruins.

	°	′	″
λ	26	41	39
L	79	39	53

No. 206

Pothári, XXIII.
(*Vide page 7—K.*)

λ	27	23	16·45
L	79	27	21·41
H	574		
h	38		

Nos. 23, 24

Punja Fort,
(*Etáwah*) Building.

λ	26	53	10·4
L	79	14	37·2

No. 301

Putli Bakoára h.s.
(*Bundelkhand, Chhatarpur State*) On a detached hill close to and S.E. of Bakoára village, 1 mile S. by W. of Seori and ¾ mile N.E. of Putli or Putri.

λ	24	57	56·16
L	79	51	22·64

No. 80

Ragauli Fort.
(*Bundelkhand, Bijáwar State*) S. W. angle of highest building.

λ	24	44	17·4
L	79	33	34·5
H	1226		

No. 74

Ráipura Fort,
(*Jhánsi*) Flag.

λ	25	35	24
L	79	20	3

Ráipura Temple.
(*Jhánsi*)

λ	25	35	15
L	79	20	14

Rájnagar Temple.
(*Bundelkhand, Chhatarpur State*) N.W. of town.

λ	24	53	40
L	79	57	9

Rangír, X.*
(*Vide page 4—K.*)

λ	24	0	20·37
L	79	28	26·43
H	1184		
h	5		

No. 1

Name of station, district, description, co-ordinates &c.

Rasdhán Fort.
(*Cawnpore*) Square Building to N.E.

	°	′	″
λ	26	21	41·2
L	79	42	8·2

No. 184

Rathgaon Fort,
(*Etáwah*) Flag.

λ	26	49	27
L	79	31	54

Rauli s.
(*Farrukhabad*) On house in village of that name about 1¼ miles S.E. of Sikandarpur, 1 mile E. by N. of Singhpur and 1¼ miles W. by S. of Daulat Sarai; thána and pargana Chhibramau.

λ	27	7	5·32
L	79	39	25·88

Nos. 273, 274

Rausen Fort (lamp).
(*Farrukhabad*)

λ	26	59	21·86
L	79	35	30·14

Nos. 280, 281

Rewábarti Temple.
(*Hamírpur*) On hill.

λ	25	36	33·1
L	79	26	48·7

Nos. 96, 97

Rinia Building.
(*Jálaun*)

λ	25	57	36·8
L	79	28	4·9

No. 125

Roshanabad House,
(*Farrukhabad*) Flag.

λ	27	29	43·6
L	79	30	39·3

Nos. 335, 336

Ruru (Bara) Fort.
(*Etáwah*)

λ	26	45	21
L	79	30	19

No. 219

Ruru (Chhota) Old Fort,
(*Etáwah*) Centre, highest wall.

λ	26	45	53·5
L	79	28	37·0

No. 220

Sabhad Fort,
(*Etáwah*) Flag on bastion.

λ	26	51	40·1
L	79	34	24·4

Nos. 224, 225

Name of station, district, description, co-ordinates &c.

Sagauli Temple.
(*Jhánsi*) On hill.

	°	′	″
λ	25	41	31·1
L	79	9	18·5

No. 102

Sahár Fort,
(*Etáwah*) Flag.

λ	26	45	30
L	79	38	6

Nos. 217, 218

Sahu Building.
(*Jálaun*) On mound.

λ	26	12	41·8
L	79	21	56·1

No. 163

Saipur, XXVII.
(*Vide page 7—K.*)

λ	27	54	59·21
L	79	27	5·58
H	539		
h	38		

No. 28

Sakráwa s.
(*Farrukhabad*) On building in fort about 1¼ miles W. of Rasúlpur and ¾ mile E. of Devípur; thána and pargana Sakráwa.

λ	26	59	3·96
L	79	27	11·28

Nos. 285, 286

Sámán s.
(*Mainpuri*) On fort about ¾ mile S.S.W. of Katra village and 3¼ miles W.S.W. of Harchandpur; thána Kishni, tahsíl Bhongaon and pargana Kishni-Nabiganj.

λ	27	1	26·47
L	79	13	58·02

No. 284

Samárhu Fort,
(*Jálaun*) Tree.

λ	26	13	8
L	79	36	26

No. 170

Sandi Fort,
(*Jálaun*) Flag.

λ	26	0	35
L	79	38	28

No. 186

Sánra h.s.
(*Bundelkhand, Chhatarpur State*) On hill about 1¼ miles N.W. of Tipári village and close to and N. of Tipári Ghát and 2 miles S.W. of Raichor village.

λ	24	25	33·89
L	79	42	23·69
H	1734		

No. 63

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

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Name of station, district, description, co-ordinates &c.

Saráwan Fort,
(*Jálaun*) Flag on eastern corner of palace.

	°	′	″
λ	26	14	37·1
L	79	19	52·1

Nos. 171, 172

Sarhar Fort,
(*Jálaun*) Flag.

λ	26	4	37
L	79	19	3

Sarhau Fort,
(*Etáwah*) Highest white building.

λ	26	49	56·2
L	79	20	29·4

Nos. 294, 295

Sarsai Fort.
(*Jálaun*)

λ	26	10	47
L	79	31	50

No. 160

Sauj Building.
(*Mainpuri*) On mound.

λ	27	1	26·3
L	79	11	9·9

No. 316

Saunási Fort.
(*Mainpuri*)

λ	27	3	45
L	79	20	11

No. 318

Sayyidnagar Temple.
(*Jálaun*)

λ	25	48	56·5
L	79	18	31·0

No. 108

Semra Fort,
(*Bundelkhand, Panna State*) N.W. tower.

λ	24	14	0·1
L	79	22	14·3

No. 38

Senpa Temple.
(*Bundelkhand, Bijáwar State*) On hill.

λ	24	32	25·2
L	79	17	38·6
H	1368		

No. 56

Seod s.
(*Etáwah*) On fort bastion about 2 miles S. of Phaphúnd Railway Station and 1¼ miles E. by S. of Lahákhar; thána, tahsíl and pargana Phaphúnd.

λ	26	36	4·01
L	79	36	15·99

Nos. 199, 200

Name of station, district, description, co-ordinates &c.

Seonri Temple,
(*Hamírpur*) Spire.

	°	′	″
λ	25	29	44·6
L	79	24	35·8

No. 95

Seontára, XVII.
(*Vide page* 6—K.)

λ	26	42	25·60
L	79	37	59·11
H	518		
h	17*		

No. 17

Seonthana Fort,
(*Etáwah*) Building.

λ	26	55	53·6
L	79	19	11·1

No. 306

Seyah h.s.
(*Bundelkhand, Chhatarpur State*) On a low range of hills skirting the road from Saugor to Bánda, about 2 miles S. by W. of Malára village.

λ	25	0	32·99
L	79	42	14·64

Nos. 76, 77

Sháhabad s.
(*Sháhjahánpur*) On tree in village about ½ mile W. of Kuthua Bhoj, the same distance N.E. of Bahari and ½ mile S. of Mádora; pargana Khera Bajhera.

λ	27	57	26·19
L	79	36	1·92

No. 344

Sháhgarh Fort,
(*Saugor*) N.W. corner of highest building.

λ	24	16	27·6
L	79	9	46·1
H	1328		

No. 47

Shamsabad s.
(*Farrukhabad*) On house in town of that name about 1¼ miles N.W. of Alipur, ½ mile N. by E. of Sikandarpur and 1¼ miles N.E. of Niwalpur; thána and pargana Shamsabad.

λ	27	32	14·71
L	79	28	45·78

No. 337

Shamsherganj Fort,
(*Mainpuri*) Bastion.

λ	27	0	11·8
L	79	22	12·9

No. 314

Name of station, district, description, co-ordinates &c.

Siahari Mound,
(*Jálaun*) Tree.

	°	′	″
λ	26	5	48
L	79	29	20

No. 146

Sikandra s.
(*Cawnpore*) On highest turret of house in town of that name about ¼ mile N.W. of Mánpur and 2 miles W. by N. of Rasdhán fort; thána and pargana Sikandra.

λ	26	21	57·40
L	79	40	16·18

No. 178

Siriáo Fort,
(*Etáwah*) W. bastion.

λ	26	50	24·1
L	79	40	15·3

Nos. 250, 251

Sirsa Fort,
(*Jálaun*) S.W. building.

λ	26	17	22
L	79	28	19

Sirsai Fort,
(*Farrukhabad*) Tree on mound.

λ	26	49	15·2
L	79	47	53·3

No. 249

Sirwabara h.s.
(*Jhánsi*) On a detached hill immediately W. of Marha village and S. of Haibathpur; thána, tahsíl and pargana Garotha.

λ	25	34	24
L	79	16	33

Sísgarh, X.†
(*Vide page* 8—K.)

λ	28	43	38·07
L	79	21	16·72
H	670		
h	38		

No. 34

Sonár Hill Mark.
(*Bundelkhand, Bijáwar State*)

λ	24	53	17·33
L	79	27	58·44

No. 75

Sonha h.s.
(*Bundelkhand, Chhatarpur State*) On a hill close to and W. of the waterfall N. of Kakra village and S.E of Kusail Ghát.

λ	24	32	12·38
L	79	51	40·08
H	1765		

No. 64

* Above the level of summit of the fort tower on which the station is placed. † Of the North-East Longitudinal Series.

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Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.	Name of station, district, description, co-ordinates &c.
Sukhi Fort. (*Farrukhabad*) λ 26 52 43 L 79 47 5 No. 269	**Tiar Fort,** (*Etáwah*) N.E. bastion. λ 26 28 19·6 L 79 21 49·4 No. 196	**Túrah Shergarh h.s.** (*Hamírpur*) On a detached hill about 4 miles W. N.W. of Kaitha village and same distance N. of the large village of Panwári; thána, tahsíl and pargana Ráth. λ 25 29 22·99 L 79 30 45·23 No. 92
Sumáin Fort. (*Etáwah*) λ 26 50 57 L 79 28 7 Nos. 222, 223	**Tilona Temple.** (*Bundelkhand, Chhatarpur State*) On hill. λ 24 54 46·7 L 79 46 32·0 No. 85	**Unchagaon s.** (*Bareilly*) On mound on left bank of the Rámganga river, about 2 miles W. of Bareilly city, 1¾ miles S.S.W. of Bákarganj village and 1¼ miles N. by E. of Chaupál; thána Bareilly, pargana Karor. λ 28 20 30·73 L 79 24 50·27 Nos. 349, 350
Táka Fort, (*Etáwah*) W. bastion. λ 26 52 30·6 L 79 21 59·9 Nos. 298, 299	**Tinsmál, VII.*** (*Vide page 3—K.*) λ 24 7 12·97 L 79 2 12·45 H 2139 *h* 9 No. 1	**Urgaon Temple.** (*Jálaun*) λ 26 8 1·8 L 79 26 17·6 Nos. 151, 152
Tálgaon Hill Mark. (*Bundelkhand, Panna State*) λ 24 34 56·84 L 80 7 18·72 H 1744 No. 65	**Tirwa Palace,** (*Farrukhabad*) Staircase. λ 26 57 44·5 L 79 49 50·6 No. 277	**Usrári Fort,** (*Etáwah*) Building. λ 26 33 41 L 79 37 12
Tarsor Fort, (*Jálaun*) Window of building on bastion. λ 26 16 8·3 L 79 27 28·5 Nos. 173, 174	**Tirwa Temple,** (*Farrukhabad*) Prominent. λ 26 57 45·8 L 79 50 25·1 Nos. 278, 279	**Yani s.** (*Etáwah*) On centre of W. bastion of fort on road from Phaphúnd to Jhánsi *vid* Dalílnagar, about 3 miles W.S.W. of Roshangpur and 4 miles N. of Bijhalpur on N. bank of the Jumna; thána, tahsíl and pargana Auraiya. λ 26 27 38·09 L 79 23 10·34 Nos. 192, 193
Thanela, VI. (*Vide page 5—K.*) λ 24 57 53·79 L 79 47 29·61 H 1098 *h* *Not forthcoming* No. 6	**Tonga Fort,** (*Cawnpore*) Bungalow on S.W. bastion. λ 26 11 45 L 79 46·44	

* Of the Calcutta Longitudinal Series of the South-East Quadrilateral.

July 1879.

J. B. N. HENNESSEY,
In charge of Computing Office.

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RANGIR MERIDIONAL SERIES.

PRINCIPAL TRIANGULATION. ADDENDUM TO DESCRIPTION OF STATIONS.

NOTE.—Consequent on modern alterations of district and other boundaries, the sites occupied by the stations are in some instances now included in civil divisions of territory which differ from the district, pargana, or village, recorded in the descriptions of stations: a complete list of all the stations of the Series including a suitably modified statement of the altered subdivisions in question is accordingly given in the following table, and is derived chiefly from the annual reports, up to 1881, made by the Civil Officials to whose care the stations have been committed. The statement also gives the present condition of certain of the stations; where no entry regarding present condition is made against a station it is to be assumed that the station when last reported on by the district Official was in good order.

The spelling of names is in accordance with that given in the lists of more important places published under the orders of Government whenever such names occur in the lists.

No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station	
VII*	...	Saugor	Thá., Tah. and P. Banda	Tinsi	...	...
X*	...	Damoh	Tah. Damoh	Rangír	...	...
I	...	Bundelkhand Political Agency	P. Bakswáho	Kusmár	...	...
II	...	,,	P. Bijawar	Dálípur	...	...
III	...	,,	Ditto.	...	...	...
IV	Bhojraj	,,	P. Baldeogarh	Sarkanpur	...	...
V	Chabútara	Hamírpur	Thá. Ajnár, Tah. Kulpahár, P. Panwári-Jaitpur	Narwara	...	...
VI	...	Bundelkhand Political Agency	P. Chhatarpur	Sela	...	...
VII	Chabútara	Hamírpur	Tah. and Thá. Kulpahár, P. Panwári-Jaitpur	Salat Malat of Garhauli Jágír	...	...
VIII	...	Jhánsi	Tah. Garotha	Gura	...	...
IX	Chabútara	Hamírpur	Thá. Jariya, Tah. and P. Ráth	Phára	...	...

NOTE.—Stations VII* and X* appertain to the Calcutta Longitudinal Series of the South-East Quadrilateral. P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

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No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
X	Firangi-ka-Chabútara	Jhánsi-Gursarai State	Tah. Garotha	Gokulphára	... ...
XI	Sorái	Jálaun	Thá. and Tah. Orai	Gura Khurd	In 1872, the District Officer reported the station as completely destroyed by the rains of 1871. In 1873, a paka platform was built by the same Officer for the protection of the mark-stone.
XII	,,	,,	Thá. and Tah. Jálaun	Kanwa	... ...
XIII	,,	,,	Thá. Damrás, Tah. Kálpi	Nipania	... ...
XIV	,,	,,	Thá. Kuthaund, Tah. Mádhogarh	Husapura	... ...
XV	...	Cawnpore	Thá. and P. Derapur	Gandaspur	The mark-stone in the floor of the arched passage was found intact. The corners at the base of the pillar and the interior of the arched passage much injured by the digging out of bricks.
XVI	...	Etáwah	Tah. and P. Auraiya, Táluka Bhareh, Thá. Ajítmal	Atsu	... ...
XVII	...	,,	Thá. Sahail, Tah. and P. Bidhúna	Seontára	The corners at the base of the pillar and the interior of the arched passage were found considerably injured as at (XV) Gandaspur Station. The hollow in the passage was filled in with burnt bricks.
XVIII	Barona Kalán	,,	Thá. Kudarkat, Tah. and P. Bidhúna	Barona Kalán	The mark-stone in the floor of the arched passage was found all right, the corners of the pillar injured at the base.
XIX	Minára	Farrukhabad	Tah. and P. Tirwa	Kalsán	The mark-stone in the floor of the arched passage was found all right, the pillar above the arch cracked.
XX	Mastúl or Minár	,,	Tah. and P. Chhibramau	Bisungarh	The mark-stone in the floor of the arched passage was found perfect, as also the pillar.
XXI	Minára or Gargaj	,,	P. Bhojpur, Tah. Farrukhabad	Rájípur	The mark-stone in the arched passage was found perfect, the arch cracked on one side by the digging out of bricks.
XXII	,,	,,	P. Muhammadabad, Tah. Farrukhabad	Muhammadabad Khás	The tower considerably dug into at the base, on the east face the excavation reaching the central pillar, the tower was repaired with burnt bricks.

NOTE.—Stations XV to XXXI, also X and XI of the North-East Longitudinal Series, were visited in 1866 by Mr. W. Ivey, Assistant Surveyor, especially deputed for the purpose. The perforated masonry pillars at these stations were found more or less dug into at their bases and bricks extracted from the interior of the arched passages, and otherwise injured by cracks. These pillars were protected by Mr. Ivey as follows:—the arched passages were closed, platforms of sun-dried bricks built around the bases of the pillars to height of from 10 to 14 feet, and the openings at their summits capped by conical mounds to carry off the rain fall; after which all these stations were transferred to the charge of the chief local Official.

P. stands for pargana, Tah. for tahsíl, and Thá. for thána.

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No. of Station	Local name	District	Pargana, &c.	Village in which the Station lies	Remarks on the Construction and Condition of the Station
XXIII	Minára or Gargaj	Farrukhabad	P. Muhammadabad, Tah. Farrukhabad	Pothári	The mark-stone in the floor of the arched passage was found perfect, the interior of the passage and its floor injured.
XXIV	Minára	„	P. Imratpur, Tah. Aligarh	Mau Rasúlpur	The mark-stone in the floor of the arched passage was found dug out, the pillar much injured and dug into.
XXV	Gundi	Sháhjahánpur	Tah. and P. Jalálabad	Gundi	The mark-stone in the floor of the passage was found perfect, the pillar injured at the base on all sides, and its arch cracked on the east side.
XXVI	Dháka	„	Ditto.	Dháka	Ditto.
XXVII	Sháhpur	Budaun	Thá. and P. Hazratpur, Tah. Dátaganj	Sháhpur	The mark-stone in the floor of the arched passage was found cracked, its central iron pin extracted though the stone appeared to be firmly imbedded, the pillar was slightly injured at the base.
XXVIII	...	Sháhjahánpur	Tah. Tilhar, P. Miránpur Katra	Kasrak	The station was found completely destroyed down to the very foundation; below the *debris* the mark-stone was found lying loose, this was embedded below the ground level and a conical pillar, 12 feet in height, built over it to mark the site of the station.
XXIX	Chanjiri	Bareilly	P. Ballia	Chanjiri	The mark-stone in the floor of the arched passage was found all right, the base of the pillar much injured by the digging out of bricks.
XXX	...	„	P. Farídpur	Gajnera	Ditto.
XXXI	...	„	P. Karor	Fatehganj	... ...
X	...	„	P. Sirsáwán	Sísgarh	... ...
XI	...	„	P. Richha	Atária	... ...

NOTE.—Stations X and XI appertain to the North-East Longitudinal Series. P. stands for pargana, Tah. for tahsíl, and Thá for thána.

September, 1882.

J. B. N. HENNESSEY,
In charge of Computing Office.

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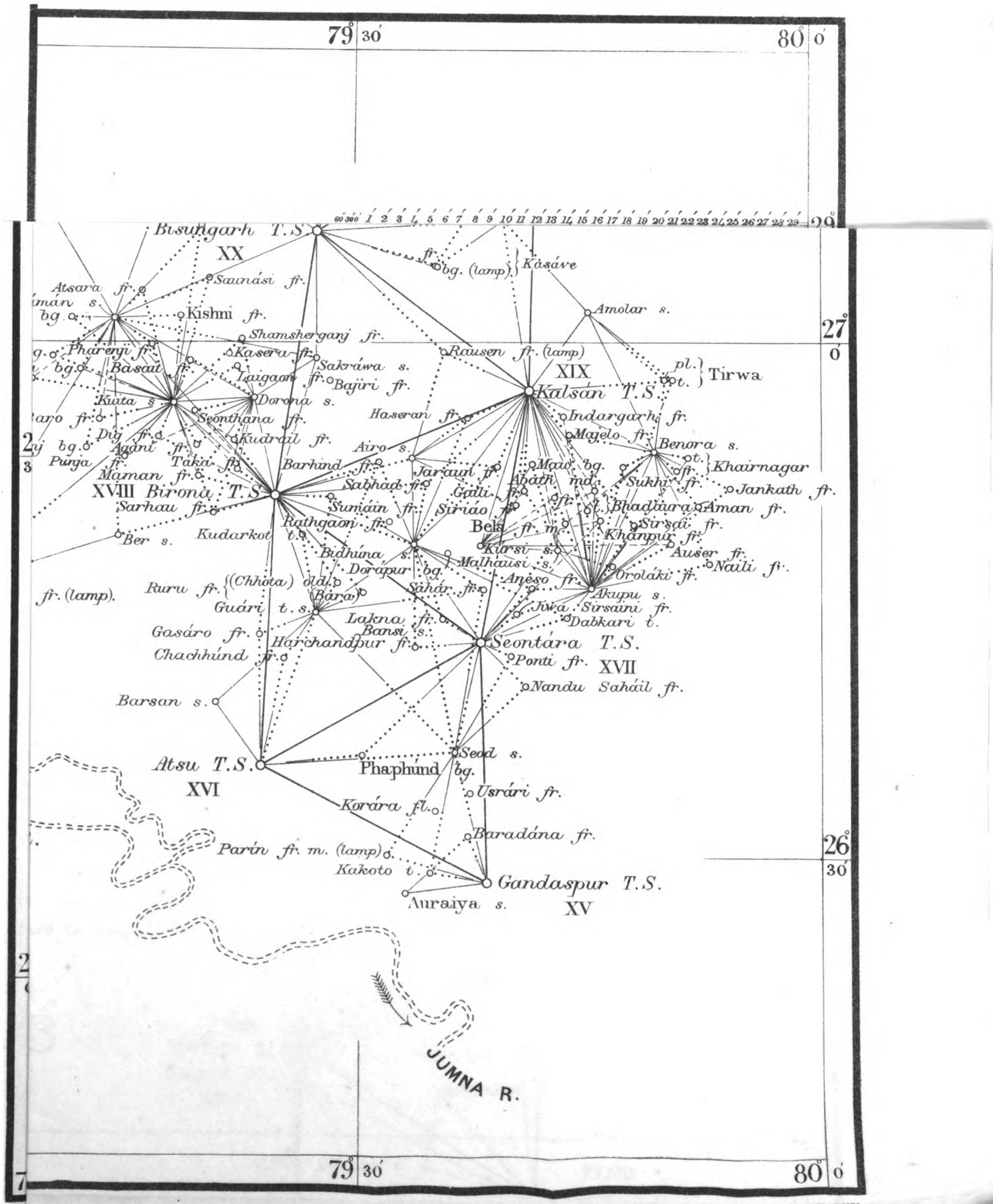

C. G. OLLENBACH, ZINCO.

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List of Published Works of the Great Trigonometrical Survey of India.

An Account of the Measurement of an Arc of the meridian between the parallels of 18° 3′ and 24° 7′, being a continuation of the Grand Meridional Arc of India as detailed by the late Lieutenant-Colonel Lambton in the Volumes of the Asiatic Society of Calcutta. By Captain George Everest, of the Bengal Artillery, F.R.S., &c. London, 1830.

An Account of the Measurement of two Sections of the Meridional Arc of India, bounded by the parallels of 18° 3′ 5″; 24° 7′ 11″; and 29° 30′ 18″. By Lieutenant-Colonel Everest, F.R.S., &c., late Surveyor General of India, and his Assistants. London, 1847.

Account of the Operations of the Great Trigonometrical Survey of India.

Volume I. The Standards of Measure and the Base-Lines, also an Introductory Account of the early Operations of the Survey, during the period of 1800-1830. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey. Dehra Dún, 1870.

Do. II. History and General Description of the Principal Triangulation and of its Reduction. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.

Do. III. The Principal Triangulation, the Base-Line Figures, the Karáchi Longitudinal, N.W. Himalaya, and Great Indus Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1873.

Do. IV. The Principal Triangulation, the Great Arc (Section 24°-30°), Rahún, Gurhágarh and Jogí-Tíla Meridional Series, and the Sutlej Series of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1876.

Do. V. Details of the Pendulum Operations by Captains J. P. Basevi, R.E., and W. J. Heaviside, R.E., and of their Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún and Calcutta, 1879.

Do. VI. The Principal Triangulation of the South-East Quadrilateral including the Great Arc—Section 18° to 24°, the East Coast Series, the Calcutta and the Bider Longitudinal Series, the Jabalpur and the Biláspur Meridional Series, and the Details of their Simultaneous Reduction. Prepared under the directions of Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1880.

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List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Account of the Operations of the Great Trigonometrical Survey of India—(*Continued*).

Volume VII. General Description of the Principal Triangulation of the North-East Quadrilateral including the Simultaneous Reduction and the Details of Five of the Component Series, the North-East Longitudinal, the Budhon Meridional, the Rangír Meridional, the Amua Meridional, and the Karára Meridional. Prepared under the directions of Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.

Do. VIII. Details of the Principal Triangulation of Eleven of the Component Series of the North-East Quadrilateral, including the following Series; the Gurwáni Meridional, the Gora Meridional, the Huríláong Meridional, the Chendwár Meridional, the North Párasnáth Meridional, the North Malúncha Meridional, the Calcutta Meridional, the East Calcutta Longitudinal, the Brahmaputra Meridional, the Eastern Frontier—Section 23° to 26°, and the Assam Longitudinal. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1882.

Do. IX. Electro-Telegraphic Longitude Operations executed during the years 1875-77 and 1880-81, by Lieut.-Colonel W. M. Campbell, R.E., and Major W. J. Heaviside, R.E. Prepared under the directions of Lieut.-General J. T. Walker, C.B., R.E., F.R.S., Surveyor General of India and Superintendent of the Trigonometrical Survey. Dehra Dún, 1883.

Synopses of the Results of the Great Trigonometrical Survey of India, comprising Descriptions, Co-ordinates, &c., of the Principal and Secondary Stations and other Fixed Points, of the Several Series of Triangles, as follows;—

Volume I. The Great Indus Series, or Series *D* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. II. The Great Arc—Section 24° to 30°, or Series *A* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. III. The Karáchi Longitudinal Series, or Series *B* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1874.

Do. IV. The Gurhágarh Meridional Series, or Series *F* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

Do. V. The Rahún Meridional Series, or Series *E* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

Do. VI. The Jogí-Tíla Meridional Series, or Series *G*, and the Sutlej Series, or Series *H* of the North-West Quadrilateral. By Colonel J. T. Walker, R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1875.

Do. VII. The North-West Himalaya Series, or Series *C* of the North-West Quadrilateral, and the Triangulation of the Kashmir Survey. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1879.

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List of Published Works of the Great Trigonometrical Survey of India—(Continued).

Synopses of the Results of the G. T. Survey of India, &c.—(*Continued*).

Volume VIII. The Great Arc—Section 18° to 24°, or Series *A* of the South-East Quadrilateral. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.

Do. IX. The Jabalpur Meridional Series, or Series *E* of the South-East Quadrilateral. By Colonel J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1878.

Do. X. The Bider Longitudinal Series, or Series *D* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.

Do. XI. The Biláspur Meridional Series, or Series *F* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.

Do. XII. The Calcutta Longitudinal Series, or Series *B* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.

Do. XIII. The East Coast Series, or Series *C* of the South-East Quadrilateral. By Major-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1880.

Do. XIV. The Budhon Meridional Series, or Series *J* of the North-East Quadrilateral. By Lieutenant-General J. T. Walker, C.B., R.E., F.R.S., &c., &c., Surveyor General of India and Superintendent of the Survey, and his Assistants. Dehra Dún, 1883.

February, 1883.

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