

11415

ANNUAL REPORT

OF THE

REVENUE SURVEY OPERATIONS IN THE NORTH-WESTERN PROVINCES,

THE

PUNJAB AND SINDH,

FOR

SEASON 1856-57.

11415

No. 30.

FROM
THE DEPUTY SURVEYOR GENERAL,

To

C. BEADON, ESQUIRE,

Officiating Secretary to the Government of India,

Foreign Department,

FORT WILLIAM.

Dated Calcutta, 6th September, 1858.

SIR,

I HAVE the honor to transmit herewith, for submission to the Honorable the President of the Council of India in Council, and for the information of the Authorities in the N. W. Provinces and the Punjab, the annexed condensed Annual Operation Report for Season 1856-57, of the Revenue Surveys under my superintendence in the N. W. Provinces, the Punjab, and Sindh. A similar Report for the Lower Provinces has already been furnished to the Bengal Government.

2nd.—Some delay has unavoidably occurred in the preparation of this Report, the causes of which are succinctly stated in the Report itself; and as the late occurrences in India have more or less affected all Departments of the State, the one under my control has likewise, I regret to state, suffered in some measure, in consequence of which the Local Revenue Surveyors have been prevented from forwarding their Annual Documents and Statements to this Office at the usual prescribed period for examination and consideration.

3rd.—The delay has however enabled me to bring up the proceedings on each Survey to a late date, and to record the Field outturn of the current season, which I trust counterbalances the disadvantage which would otherwise have been felt.

4th.—The only point on which early orders are necessary, is the subject of the increased grant to Captain Johnstone's Survey in the Derajat, to enable that Officer to make his preparations accordingly for the ensuing season's work. In recommending this suggestion for the additional outlay of Rupees 4,448, I beg leave to add for the information of Govern-

SKETCH MAP
of the
PUNJAB
AND
CIS SUTLEJ STATES

EXHIBITING THE PROGRESS OF THE REVENUE SURVEY OPERATIONS
FROM THE COMMENCEMENT UP TO, AND INCLUDING SEASON 1857/58

Scale of Miles.

0 10 20 30 40 50

W. H. Smith
Deputy Surveyor General of India.

The Eastern Island Peak has been Surveyed

1st. Black Remainsing for Revenue Survey

2nd. Yellow Shows the Topographical Survey

Operations, under the Surveyor General of India

Light Pink with portion Surveyed in 1857/58

To accompany Annual Report
No 50 A, Dated 2nd August 1858.



ment, that in consequence of the abolition of the Jhansie party, the sum of Rupees 37,524 has been saved to the State this season.

5th.—The future disposal of the two available Survey parties, forms the subject of a separate correspondence.

I have, &c.,

(Signed) H. L. THUILLIER,
Deputy Surveyor General

REVENUE SURVEYOR
GENERAL'S OFFICE,
Calcutta, 6th Sept., 1858.

No. 3198.

FROM

C. BEADON, ESQUIRE,
Officiating Secretary to the Government of India,

TO

MAJOR H. L. THUILLIER,
Deputy Surveyor General.

Foreign
Department.

Dated, FORT WILLIAM, 17th September, 1858.

SIR,

HAVING laid before the President in Council your letter No. 30, dated the 6th Instant, with the Annual Report on the Revenue Surveys in the North Western Provinces, the Punjaub, and Sind for the Season 1856-57, I am directed to state that in the opinion of His Honor in Council the results therein exhibited are most satisfactory, and reflect the highest credit on yourself, and on all the Officers employed under your orders.

2nd.—I am desired also to take the opportunity of informing you that the President in Council highly commends your foresight and promptness in preparing Maps and plans of the disturbed districts, and the diligence and efficiency shewn in supplying them to the Departments and Officers requiring them. His Honor in Council wishes to know, whether there are any of the subordinate Officers of your Establishment whom you desire to recommend for special notice and reward, for the assistance they have rendered in enabling you to furnish these Maps and plans to Officers engaged in active operations against the rebels.

3rd.—The increased grant of Rupees 4,448 a year to the Survey in the Derajat is sanctioned.

4th.—I am also to request that you will print your Report, and these orders of the President in Council on paper of uniform size as that on which the Annual Administration Reports are printed, and that you will strike off copies for the Government, and as many more as you require for the use of your own Department.

I have the honor to be, &c.,

(Signed) CECIL BEADON,
Officiating Secretary to the Government of India.

FORT WILLIAM,
The 17th September, 1858.

ANNUAL REPORT of the Progress of the several Revenue Surveys, carrying on in the North-Western Provinces, the Punjab, and Sindh, for the Season 1856-57.

No. 30 A., Dated CALCUTTA, 2nd August, 1858.

REVENUE SURVEY DEPARTMENT.

Provinces under the Jurisdiction of the North-Western Government.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
<p><i>Superintendent.</i> Major H. L. Thuillier, Artillery, Deputy Surveyor General and Superintendent Revenue Surveys, 5th February, 1847.</p>	<p>General Superintendence and control of the operations. The charge of the Revenue Survey office, and the duties devolving on the Deputy, to the Surveyor General of India, in the General Department.</p>	<p>GENERAL REMARKS.—The survey operations in the North-Western Provinces and the Punjab, during the eventful year of 1857, have been more successful, and less interrupted than we might have dared to expect, under the great pressure which so suddenly threatened all Europeans on detached employment. At the period when the outbreak occurred field operations had been just brought to a close, and the parties had repaired to their recess stations, consequently the records were for the most part secured. One sad and most lamentable exception unfortunately has to be recorded, that of the party at Jhansee, who were all massacred, the details of which will be found under the head of that survey. The Saugor and Jubbulpore parties were in a most critical and anxious position and the loss of a small portion of the field books and field sketches of the Bhurtpoor survey likewise occurred, but in all other respects the whole of the results of the seasons work are happily safe, and although not all completed and lodged in this office as yet from unavoidable causes, will be so, in a short time, whenever the roads are considered sufficiently safe for the transit of such valuable documents.</p> <p>On the whole, therefore, we have great cause for thankfulness that no greater damage was done to this Department and it is a source of gratification that the operations are proceeding again as vigorously as ever. Owing to the suspension of all work for several months in the Saugor and Jubbulpore surveys, it was found impossible by the Executive Officers to furnish their Annual Returns until very recently—and this Report could not therefore be prepared and submitted at an earlier date, the Report for the Lower Provinces consequently has been separately made to the Bengal Government, whilst the details for the North-West and Punjab surveys have been combined together, owing to the change in the North-Western Government.</p>	<p>Continuation of the same duty, directing the Revenue surveys in the above Districts and Provinces.</p> <p>The whole of the executive parties being well employed as usual during the current season of 1857-1858, no stoppage or hindrance having been felt, except in the Saugor and Jubbulpore Districts, which simply caused the Surveyors to be transferred to the Nagpore Province, where they have both made fair progress.</p>	

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		<p>The several surveys included in this Report, 9 in number, together with those employed in the Bengal or Lower Provinces, 5 in number, separately reported on, making a total of 14 parties, have achieved in the aggregate the following outturn.</p> <table><tr><th>No. of Parties.</th><th>Divisions of Surveys.</th><th>Area Surveyed.</th><th>Total cost</th><th>Average rate per square mile.</th><th>Grant allowed.</th><th>Savings to Government.</th></tr><tr><td></td><td></td><td>Sqre. Miles.</td><td>Rs. As. P.</td><td>Rs. As. P.</td><td>Rs. As. P.</td><td>Rs. As. P.</td></tr><tr><td>5</td><td>Bengal, ...</td><td>6965-69</td><td>176183 1 1</td><td>25 4 7</td><td>187620 0 0</td><td>11436 14 11</td></tr><tr><td>5</td><td>North-Western Provinces, ...</td><td>5109-57</td><td>149117 0 9</td><td>29 2 11</td><td>150096 0 0</td><td>978 6 3</td></tr><tr><td>4</td><td>Punjab, ...</td><td>12509-76</td><td>160592 12 0</td><td>12 13 3</td><td>167516 0 0</td><td>× 3076 12 0</td></tr><tr><td>14</td><td>Total for season 1856-57,</td><td>24585-02</td><td>485803 6 10</td><td>19 12 2</td><td>495232 0 0</td><td>9338 9 2</td></tr><tr><td></td><td>Ditto for „ 1855-56,</td><td>18313-97</td><td>419472 4 5</td><td>22 14 5</td><td>547830 5 11</td><td>128367 1 6</td></tr><tr><td></td><td>Difference, ...</td><td>× 6271-05</td><td>× 66421 2 5</td><td>— 3 2 3</td><td>— 526-7 5 11</td><td>— 119028 8 4</td></tr><tr><td></td><td>Grand Total for 11 seasons, (1846-47 to 1856-57 inclusive, ...)</td><td>155170-45</td><td>3523436 4 2</td><td>22 11 4</td><td>4018217 15 6</td><td>494781 11 4</td></tr></table> <p>Thus 24,585 square miles have been surveyed at a grand outlay of 4,85,893 Rupees, which gives a mean general average of Rupees 19-12-2 per square mile. The area being in excess of that accomplished during the previous season, by 6,271 square miles, for an additional expenditure of only 66,421 Rupees, which reduces the rate by 3-2-3. The highest rates are those on the North-West Provinces, where the hilly and densely covered nature of the ground, has caused a large expenditure on a very moderate area, the whole of the work effected being of the most minute description. The Punjab rate is very low, owing to the immense areas effected in the “Barh” or jungle, and uninhabited tracts, which have been rapidly surveyed topographically only, at a very trifling cost, these rates could not prevail, if the whole area demanded the same description of survey as in the other Provinces. The Bengal rates are steady and nearer the mean average, and what may fairly be expected in open champaign countries with experienced establishments.</p>	No. of Parties.	Divisions of Surveys.	Area Surveyed.	Total cost	Average rate per square mile.	Grant allowed.	Savings to Government.			Sqre. Miles.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.	5	Bengal, ...	6965-69	176183 1 1	25 4 7	187620 0 0	11436 14 11	5	North-Western Provinces, ...	5109-57	149117 0 9	29 2 11	150096 0 0	978 6 3	4	Punjab, ...	12509-76	160592 12 0	12 13 3	167516 0 0	× 3076 12 0	14	Total for season 1856-57,	24585-02	485803 6 10	19 12 2	495232 0 0	9338 9 2		Ditto for „ 1855-56,	18313-97	419472 4 5	22 14 5	547830 5 11	128367 1 6		Difference, ...	× 6271-05	× 66421 2 5	— 3 2 3	— 526-7 5 11	— 119028 8 4		Grand Total for 11 seasons, (1846-47 to 1856-57 inclusive, ...)	155170-45	3523436 4 2	22 11 4	4018217 15 6	494781 11 4		
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* Vide sketch map
of the Punjab annex-
ed.

During the season under review the sum of Rupees 9,338, has been saved from the authorized grants, after deducting the sums spent in excess in the Punjab and Sindh.

The several Tables A. B. E. E. in the Appendix exhibit the amount and distribution of the expenditure and the savings effected from the annual maximum grant sanctioned for each establishment. The cost and strength of each class, and the comparative results on all the surveys are likewise shewn, those for the North West Provinces being distinguished from those of the Punjab.

Whilst the surveys in the North-West and Central Provinces may be said to be but commencing, and a wide field lies before us in different quarters, those in the Punjab, are very nearly drawing to a close,* the Sind Sagur-Doab and Derajat, are alone occupied by our parties, the progress in the former is approaching a junction, near the Salt Range, with the Topographical operations under the Surveyor General of India, and will perhaps be brought to a conclusion by the end of season 1858-59. The Derajat work is also rapidly advancing but will occupy at least two seasons more. The Baree Doab party has been reported available for transfer together with another party lately employed in Bhurtpoor.

From the season 1846-47, the date of my incumbency, as well as the commencement of the Revenue Survey operations in the Cis and Trans Sutlej Provinces, a gross area of 1,55,170 square miles has been surveyed at a total cost of Rupees 35,23,436, giving an average rate of 22-11-4 per square mile. The grants sanctioned for the same period have been Rupees 40,18,217, leaving a balance therefore to the credit of the Department of Rupees 4,94,781, or very nearly five lacs, as savings to Government effected by the control and check of this office.

The materials thus furnished from the numerous surveys, amounting to no less than 24,585 square miles of country, all on the one inch scale, in addition to the village scale, have afforded very ample employment for my small office establishment. Of the North-Western Provinces the district maps have not been compiled owing to the non-completion of the survey, but each map on the $\frac{1}{4}$ inch scale is brought up to the extent of the Surveyor's records received, so that on the completion of a survey, no time is lost in publishing the map.

Of the Punjab, the series of most useful and valuable maps on the scale of two miles to the inch (or $\frac{1}{4}$ inch scale) shewing village boundaries, has been continued with vigor, and the Districts of "Shahpoor" and "Jhung" have been compiled, but the delay, in the re-adjustments of the boundaries by the local Civil Authorities prevent their being sent to the Press. "Khanghur" has been surveyed, and the compilation will now be commenced. "Goojrat" has been lithographed and issued on the same scale, and "Googaira," a very large district, is nearly transferred to the stone and will be ready very shortly.

The five districts composing the "Lahore Division" have been compiled on the $\frac{1}{4}$ inch scale and sent to Press; this fine map embracing the upper and larger portions of the Baree and Rechna Doabs, between the Sutlej and Chenab rivers is now on the point of being issued from the Press, and will prove a great acquisition. The Cis Sutlej map has likewise issued from the Press of this office and been largely distributed, it is a good specimen of lithographic work.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>A new edition of the "Jullundhur Division" map on the same scale has been beautifully lithographed in England and furnished to the authorities.</p> <p>A new general map of the Punjab has long been under preparation on the scale of 8 miles to the inch, and considerable progress has been made with it, but the extent of the great triangulation does not admit of its completion at present. By the time the whole of the Revenue Surveys are done, I hope to be in a position to publish a very fine map on the above scale.</p> <p>During the past year, the Lithographic Department has been very active in endeavouring to meet the pressing and extensive demands for maps of the disturbed districts, and for plans of the Military operations. Foreseeing this demand, I commenced very early in bringing out road maps between the Hills and Agra, in the first instance, with a map on a large scale of the country round Delhi, and a plan of that fortress, also a new and much improved edition of Joseph's second section of the Grand Trunk Road from Benares to Agra, on the 4 mile = 1 inch scale. Subsequently a series of general maps on the uniform scale of 8 miles to the inch of the country bordering the Grand Trunk Road, between Calcutta and Delhi, embracing the seat of war, Oudh, Rohileund, part of Bundelcund, Rewah, and the Goruckpoor frontier with North and South Behar, Chota Nagpore, &c., were issued, and circulated to every Civil and Military authority, as well as to every regiment and officer proceeding on duty to the disturbed districts. These maps, I believe, from the immense demand for them, have proved eminently serviceable, especially to the troops newly arrived from England; and it has been my earnest endeavour to satisfy every enquirer, and every applicant; for without good maps of the country, every officer moving about must be at a loss.</p> <p>A series of Military plans of the operations at Lucknow and Cawnpore, have been published and distributed to a very large extent, the amount of labor caused by the coloring and correspondence connected with the distribution of these various maps and plans in addition to ordinary duties has been very great; but I am happy to think it has been successfully met. The entire duties of the Quarter Master General's Department in respect of this branch of business, has in fact devolved on myself.</p> <p>The Geography of Central India, including Malwa, Meywar, Marwar, Jeypore, Joudhpore and the other Rajpootana and adjoining states being but little known, and no commonly correct maps being available, I have for several years past been engaged on a general compilation of the tract in question, on the 8 mile to the inch scale, which I am happy to say has at length been completed and is now in the Press undergoing transfer to the stone with all the rapidity possible. The map will embrace all the countries between the Cis Sutlej States frontier, and Kurnal on the north, and the Nerbudda river on the south and from the meridian of Saugor including Sindhias territory on</p>		

the East, to the Sindh and Bombay Presidency Frontier on the West; and although a large portion of it is of necessity merely approximately correct, laid down prior to any regular survey, yet I have no doubt it will be found to supply a very great want, and serve a good purpose, pending the number of years which must elapse before all the Native States can be surveyed. With a distinct note on the map as to the value of the materials, it is hoped that no misunderstanding may arise hereafter to the detriment of the character of this Department, in publishing maps which partake of a premature birth.

Of the general map, No. 2, between Benares and Delhi, although many hundred impressions have been taken and issued, a second edition is called for, this I am now employed on, and have taken great pains to obtain the best information from various sources with a view to improving and correcting the map as much as possible. The revised and extended edition will shortly be ready.

The destruction of the records by the rebels at many of the stations in the North-West Provinces and Behar, has added another most serious and extensive demand on this Department for duplicate copies of the village and pergunnah plans in manuscript. Of the old North-Western surveys, none of the village plans unfortunately were ever deposited in the Surveyor General's Office, Calcutta, but the originals were left in charge of the Board of Revenue at Agra, who again entrusted the same to the Commissioners of divisions, the duplicates being in the several Collectorates, the consequence of this fatal policy has, I believe, been that every volume of these most valuable records has been lost.

The originals of those districts and villages only, which have been surveyed during the last ten or eleven years together with a few of the old Delhi survey of 1822 to 1833 are forthcoming, and of these the requisitions up to the present time extend to no less than 34,333 village plans, besides 138 pergunnah or one inch plans. It has of course been totally out of my power to comply with any of these urgent requisitions with my slender establishment already far over-taxed, but the Government of India having called for a report on the whole question, the necessary means for undertaking such a task will be applied for.

With these prefatory remarks on the general business of the superintending office, I proceed to describe the operations of each survey party in detail.

NORTH-WESTERN PROVINCES

BENGAL PRESIDENCY.

1st Division, Jubbulpore.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Captain D. C. Vanrenen, Artillery, Revenue Surveyor, 3rd October, 1846.	In executive charge of the survey of the Jubbulpore District.	Arrangements having been made for taking the field, operations actually commenced on the 18th November 1856, in pergunnahs Bilherree, Sleemanabad, Koomber, Gosulpoor, and Punagur, of this district. The Superintending Officer, Captain Vanrenen, having obtained privilege leave on urgent private affairs, was absent during the month of November, but the wants of the survey parties and their disposition were all carefully provided for, and arranged beforehand, and the field allotted for survey, was taken up by two strong divisions, one under the Covenanted Assistant Lieutenant J. H. Grant with Mr. E. Johnson, Assistant Surveyor, an experienced and excellent officer, the other started under Mr. J. Campbell, Assistant Surveyor, also a very competent Assistant, who was shortly joined by the Revenue Surveyor himself on his return from leave.	The scene of operations for the current season of 1857-58 has been changed from the Jubbulpore District to the Nagpore Territory, where the party arrived on the 18th January, 1858, and immediately commenced the survey in the pergunnahs Nagpore, Ambhora, Bhooree, Kigurdhur and Ramteak of the District of Nagpore, to the eastward of the city of Nagpore, where the necessary adjustment and demarcation of boundaries had been commenced by the Civil Authorities and an area of about 540 square miles, comprised in 324 villages, has been accomplished in a satisfactory manner by Captain Vanrenen's party, which considering all the circumstances attending the	On the representation of the Commissioner of the Saugor division to the central Government in consequence of the state of anarchy and confusion in which the Saugor and Nerbudda states were thrown by the mutiny of 1857, and the impracticability of carrying on the survey during the current season, the Lieutenant Governor was pleased to direct the suspension of the operations, and the abolition of the professional survey establishments unless suitable employment could be found for them elsewhere, as per Central Government Secretary's letter, No. 145, dated 7th September last.
<i>Assistants.</i>		From the experience gained of the nature of the country during the preceding season, and from the information derived from the Deputy Commissioner Captain Pinkney, it was found absolutely necessary that the measurements in the pergunnahs above noted, should be based on triangulation. The tract in question being extensively covered with hills and jungle, a net work of minor triangles was provided for, on which all the linear measurements were closed to serve as a check on the extension of error, inevitable in claiming over uneven and broken ground. By the written instructions issued by the Revenue Surveyor for the guidance of the several parties, it was arranged that the triangulation should keep well ahead of the circuit survey, and that the data derived from the former should alone be adopted in closing the circuit survey calculations. Every main circuit was thus checked by the triangulation and amongst the hills, where the usual Mouzawar sub-division would have been a waste of time and money, a cluster of villages were surveyed together angularly by the theodolite, and the details laid down by the plane table, such intermediate boundaries as could be ascertained being also defined at the same time and in the same manner.		On reference to the Supreme Government, the Right Honorable the Governor General of India in Council, was pleased to direct that the services of two efficient and well trained establishments should not be lost to the State, and as the Commissioner
Lieutenant J. H. Grant, Artillery, 8th July, 1856.	Assisting.			
Mr. E. T. S. Johnson, 11th October, 1847.	Ditto.			
Mr. J. Campbell, 8th October, 1844.	Ditto.			
<i>Sub-Assistants.</i>				
Mr. G. Cline, 20th December, 1855.	Assisting.			
Mr. F. Grant, 11th July, 1856.	Ditto.			
Mr. W. Sinclair, 6th October, 1855.	Ditto.			
24 Native Surveyors.		Whilst therefore the minor triangulation has served as a check on the circuit survey by connecting the latter with the stations of the G. T. Survey, and closing on them, the actual amount of error of the season has been thus calculated.		

Seven principal and secondary stations of the Calcutta Longitudinal Series of the G. T. Survey have been identified and connected with this work, and from the subjoined Tabular Statement of comparative results, it will be observed that the maximum error is only 1.74 feet per mile which is highly satisfactory, and looking to the great difficulty of the country, and the means at the disposal of the Surveyor, I think the style and character of the work is most favorable, and although of necessity rather small in quantity, yet it is work that must prove of the highest value, and will doubtless perpetuate the professional reputation of the Surveyor.

Names of Stations.	From Revenue Survey in feet.	From G. T. Survey in feet.	Error of Revenue Survey in feet.	Error per mile in feet.
From Lora to Salaia,	144628.70	144581.06	+ 47.64	+ 1.74
" " " Amua,	212520.52	212487.65	+ 32.87	+ 0.81
" " " Bhensakund, H. S., ...	99675.84	99661.30	+ 14.54	+ 0.77
" " " Amua to Bhensakund, H. S., ...	124241.04	124217.28	+ 23.76	+ 1.00
" " " Salia,	194805.60	194769.15	+ 36.45	+ 0.98
" " " Kudri, H. S.,	105536.11	105533.90	— 17.79	— 0.89
" " " Jokehi, H. S.,	23007.57	23006.10	+ 1.47	+ 0.34
Total,	904415.38	904276.44	+ 138.94	+ 0.81
	or 171.29 sq. miles.			

It was reported in the previous season by the Surveyor, that owing to the number of years elapsed since the Great Trigonometrical survey had traversed across the Jubbulpore district, it was most difficult to get a clue to the secondary stations, and several could not be identified after the most careful enquiries conducted near the spot. The same remarks apply to the season under review, several points have been laid down and their direct distances calculated and compared, but as a doubt exists relative to their precise identity, they have been struck out of the comparative Tabular results. The Surveyor thus speaks of the country:—

"26th. Pergunnah Belharee, Sleemanabad which derives its name from the old town of Belharee, formerly of considerable extent, and the new town of Sleemanabad, named after the late General Sleeman, is situated within the parallels of 23° 32' and 24° North Latitude; and the meridian of 79° 50' and 80° 30' East Longitude."

march down from Jubbulpore, during the best part of the cold season, and the very late date of commencing operations in a new district with authorities unaccustomed to the precise wants of Surveyors, and the general feeling of anxiety as to the peace and quietness of the country, under survey, shews that the Surveyor availed himself of all the means at his disposal, and acted with energy and discretion incompleting so much, and successfully getting all his assistants back to Cantonments in safety. Recess quarters have been found at Kamptee.

of Nagpore had expressed his anxiety for a revenue survey of that province, both the Jubbulpore and the Saugor parties were moved down to Kamptee, as soon as the state of the country permitted, which was not until after the relief of Saugor by Sir Hugh Rose's force.

During the trying events of the station of Jubbulpore through the eventful period of the recess of 1857, the Revenue Surveyor and his Assistant, Lieutenant Grant, being both Artillery Officers were employed in the absence of any Engineer Officers, in preparing the defence of the Residency premises, which they carried out in concert with other Officers, I believe with great energy and ability.

A separate report and plan has been made of this, which has been submitted to Government in the Military Department. On the 4th July, all the European residents went into the Residency for mutual protection, the building had not then been in any way strengthened, and the garrison was quite at the mercy of the sepoys of the 52nd N. I., and there was not one, perhaps, who did not deem the position extremely critical, and one of considerable danger. The agency house having speedily been put

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		<p>"27th. It is bounded on its Northern face, by the independent Bundelcund States, "on its Western by the Dumoh District, whilst pergunnah Sehora forms its Southern, "and pergunnah Koombee, its Eastern boundary. It comprises within its area 678 "square miles, and contains 331 villages."</p> <p>"28th. The general character of this tract is hilly, the hills being covered with "intricate thick jungle forest. The Bander range of hills of granatic origin, striking "the pergunnah at its S. W. corner, traverses it in a direction N. East. Indeed these "hills cover an area of nearly one-half of the pergunnah viewed from the East and "South, they present a bold rugged outline, some of them being of considerable "height, whilst to the North West, they gradually subside, and are lost in the high "table land of Bundelcund."</p> <p>"31st. The villages on the Bhandar plateau, consisting of nearly one-half of the "whole pergunnah are very scantily cultivated, being occupied by dense jungle forest, "composed chiefly of the Domla, Doodia, Mahowa, Kooloo, Bel, Tendoo, Kair, Hurdoo, "Segouna (teak dwarf,) with the Kurhoo Goorhoo, and Ail thorny bushes."</p> <p>"32nd. The others again are well cultivated, the soil being chiefly a black loam, "with no deficiency of water.* The principal crops are "wheat, gram, kodoo. A small quantity of poppy is grown "in Kouria, and adjoining villages."</p> <p>"33rd. Belharee, the chief town in this pergunnah bears unmistakable marks of "having been a place of considerable extent, and importance. About 400 yards East "of the town and overlooking a fine tank, was a square redoubt, with flanking "corner towers, and deep ditch. The whole built entirely of stone and lime cement "by Luchmun Singh, in the year A. D. 1489."</p> <p>"34th. This fort was destroyed by me in August last, under the orders of the Com- "missioner of the division. Copy of my report with a ground plan and elevation are "annexed (Appendix A.) No answer has been received to this report. For many "days and during incessant rain, I was engaged in superintending its destruction, and "as it necessarily took me away from my survey duties, I here mention the circumstance."</p> <p>"35th. Next in importance to Belharee Khas is Sleemanabad (formerly known "as Khoka), where there is a Tahsilree and Thanah Salala, (where there is a small "mud Fort or Gurhee), Khirehnee* Khas, Kourea, Bhoraybun, Burtulla and Bakul, "are also considerable villages."</p> <p>"36th. In the Eastern division, (and in the plain's portion) the pergunnah is "studded with tanks, some of them large. The waters of these tanks being retained "by means of embankments, are used for irrigation purposes during the dry months."</p> <p>"39th. The people are miserably poor, ill-clothed and badly fed. Those living on "the hills, or on the Bhandar, subsist chiefly on kodoo, a coarse rice, I found them "to be gentle and tractable, and truthful, particularly the Gonds."</p> <p>"41st. An excellent metalled road, and, partially bridged, leading from Jubbulpore "to Mirzapoor, passes from the Eastern portion of the pergunnah, another made road, "though scarcely passable during the rainy season traverses its North-East corner, "leading from Jokehi to Saugor, via Damp. These are the only respectable roads, "the others being merely foot tracts, leading from village to village."</p>		<p>into a state of defence, this order of occupancy was maintained until the arrival of the Kamptee moveable column on the 19th August 1857, when Officers were allowed to return to their houses. In consequence however of further plots, the Residency was again taken possession on the 29th August, the day of the Mohurram festival; and on the 18th September, the 52nd sepoy quietly left the station leaving the treasure and spare stand of arms untouched, and without attempting to fire the bungalows.</p> <p>A part of the Kamptee moveable column having been sent back to Jubbulpore, comparative order and safety were restored. For two months Captain Vanrenen and Lieutenant Grant were entirely employed on these duties, and all the Sub-Assistants cheerfully took their share and mounted guard in turn.</p> <p>By the mercy of divine Providence, the safety of the garrison was thus secured. The very strong position held in the Residency, and the extraordinary vacillating conduct</p>

"42nd. Iron in considerable quantities is found in this pergunnah. The means for smelting it are of the rudest description."

"54th. The portion of pergunnah Gostupoor, surveyed during the past season may be thus briefly described."

"55th. The greater part is an open, undulating but well cultivated plain. Small detached hills protruding only along its Southern border; these hills are thickly wooded and in a state of nature."

"60th. The Inhabitants are thin, emaciated, and apparently sunk into the lowest depths of poverty, they are ill-clad, or I should say, almost in a state of nature, why this should be, I know not, because the soil is fruitful, and grain abundant."

The several maps and plans prepared comprise four general main circuits on the one inch scale, 60 sheets of congregated villages on the 20 chains to the mile scale and one index of the whole together with 2 volumes of computations. These specimens which happily are safely lodged, have afforded me the highest satisfaction, they are admirably got up in every respect and extremely complete. The topographical features are shown as they should be and the delineation of the hilly ground very effective. The village sheets on the larger scale are most useful and valuable records, and bound up in a lasting manner.

The field operations of the season terminated by the 1st June 1857, although several of the parties retired earlier, as each finished the work allotted to it. The general outturn is 888.08 square miles comprised in 12 main circuits, containing 479 hulkas or village circuits separately proved professionally, the average size of which is 1,186 acres, so large owing to the hills and jungle prevailing. The cost of this work, as represented by the establishment permanent bills is Rupees 37,153-7-3, yielding an average rate of 41-13-3 per square mile, and Rs. 77-8-11 per village circuit, thus leaving an available balance of Rs. 370-8-9 only from the maximum grant. The results of the two seasons are placed in juxta position.

Season.	Square miles.	Number of circuits.	Average size of circuits.	Cost.			Average rate per square mile.			Average rate per village circuit.		
				Rs.	As.	P.	Rs.	As.	P.	Rs.	As.	P.
1855-56,	819.24	629	834½	31,362	15	5	38	4	6	49	13	9
1856-57,	888.08	479	1,186½	37,153	7	3	41	13	3	77	8	11
Difference,...	+ 68.84	-150	+ 351½	+5,790	7	10	+ 3	8	9	+27	11	2

of the sepoys tended to this happy result, which forms a subject of deep thankfulness and satisfaction, the more so when the terrible fate of the Jhansee survey party is borne in mind.

Captain Vanrenen's services and experience as an Artillery Officer were further taken advantage of to depute him to destroy the old fort of Bilherce built by Luchmun Singh in A. D. 1489, distant from Jubbulpore about 47½ miles. He was out at this place for 10 days, and the whole of the works which are described as of great strength constituted of stone and lime cement have been rendered entirely untenable and uninhabitable. It appears to me that in this and his other Military services in the Residency defences, Captain Vanrenen has rendered valuable service to the State at a critical juncture. It is a source of proud gratification to know that the resources of a Surveyor are seldom thrown away; fertile in ingenuity, and always active, energetic and intelligent, he generally manages to prove of use in whatever sphere he may be called on to act, and I feel assured that the conduct of all the Surveyors of this party at Jubbulpore is worthy of being placed on record in

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.										
		<p>This rate in comparison with other surveys is obviously high, but as before stated it is impossible in such a rugged country, as the Saugor and Nerbudda Territories, to compete with the progress and rates in champaign Districts where the monotonous level, affords but comparatively little work for the Surveyor. The cost of these surveys has always been an anxiety, but I see no probability of our effecting really good and practically useful work under an average when all may be completed of about 50 Rupees the square mile.</p> <p>In most other districts the Contingent expenses are nil, but here a very serious item of Rupees 7,577-9-8 as detailed in the margin has to be brought against the survey operations chiefly for cutting jungle, for clearing the lines for survey where so many boundaries had to be laid down. The Surveyor explains</p> <table> <tr> <td>Coolies for cutting jungle,</td> <td>Rs. 4,959</td> </tr> <tr> <td>Feed and keep of Elephants,</td> <td>1,788</td> </tr> <tr> <td>Pay of Civil Officers' Chuprassies,</td> <td>733</td> </tr> <tr> <td>Conveyance of Government parcels,</td> <td>97</td> </tr> <tr> <td></td> <td><u>7,577</u></td> </tr> </table> <p>that this heavy expense arises first, from having been necessitated to entertain Coolies or Bildars by the month, who were employed in jungle cutting, instead of getting them by the day, as occasion demanded; because owing to the scantily populated pergunnahs under survey, men could not be obtained in sufficient numbers. This very unusual proceeding insisted on by the local authorities, has of course greatly added to the expense of the survey. Salaried men by the month, for such a purpose can only be a waste of Government funds; and I conceive the system to be quite prohibitory of survey operations requiring so much jungle clearing. Another item never before heard of is that of charging a professional survey establishment with the cost of the thanah or civil functionary's chuprassies, in attendance on the survey, for the mutual benefit of Surveyors and the people of the district, for the collection of the necessary supplies, and for giving and gaining information generally, as to village Authorities attendance for the purpose of assisting in pointing out boundaries, affording local names, &c. The Commissioner insisted on all these things being paid for, and charged to the survey. Consequently survey operations have given immense unnecessary trouble and anxiety to all concerned. The contingencies have raised the mileage rate to Rupees 50-5-11, and the quantity of work performed is the smallest yet known in any district of this Presidency. Without some sort of assistance from the landowners or village people, it is impossible, for a Revenue boundary defining survey to proceed at a fair speed. This Department does not object to a moderate remuneration to daily workmen for cutting lines round the village boundaries; but such duty should be compulsory on the proprietors of such villages, so as not to entail a large and cum-</p>	Coolies for cutting jungle,	Rs. 4,959	Feed and keep of Elephants,	1,788	Pay of Civil Officers' Chuprassies,	733	Conveyance of Government parcels,	97		<u>7,577</u>		<p>this place, for the information of superior authority.</p> <p>The conduct of the Uncovenanted Assistants is spoken of as highly satisfactory; they continue to maintain their character for zeal and assiduity, and have merited my thanks for the labors of the past season under so many trials of no ordinary description. Mr. J. Campbell's qualifications and merits have been specially recommended for an increase of salary from 250 to 300, to which I solicit the confirmation of Government. Messrs. J. Cline and F. Grant, have also been noted for promotion to Sub-Assistant, 2nd Class, on 125 Rupees each per mensem, as promising and deserving Subordinates.</p> <p>Lieutenant J. H. Grant, Artillery, joined this party on the 8th September, 1856, in succession to Lieutenant G. Hamilton, transferred to the charge of Bhurtpoor Survey. Owing to the death of Captain J. W. Blagrove, and the departure on sick furlough of Lieutenant Willoughby, Revenue Surveyor of the Saugor party, I was obliged to transfer Lieutenant</p>
Coolies for cutting jungle,	Rs. 4,959													
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Conveyance of Government parcels,	97													
	<u>7,577</u>													

brous paid establishment, for which work is not at all times to be found. The reason therefore of the very high contingencies in this district must be attributed to the Commissioner's orders.

From the commencement of operations in this district in 1854-55, up to the present season, the following general results have been obtained. An area of 2,222 square miles surveyed at a total cost of Rupees 96,174-0-0 or Rupees 43-4-5, the average rate per square mile, and Rupees 59-14-1 per village circuit :—

Season.	Area in square miles.	Cost.	Average rate per square mile.	Average rate per village circuit.
		Rs. As. P.	Rs. As. P.	Rs. As. P.
1854-55,	514-78	27,657 12 4	53 11 8	55 8 7
1855-56,	819-25	31,362 15 5	38 4 6	49 13 9
1856-57,	888-08	37,153 7 3	41 13 3	77 8 11
Total, ...	2,222-11	96,174 3 0	43 4 5	59 14 1

The Jubbulpoor District being estimated to contain about 4,569 square miles, it follows that about 2,365 square miles remain to be taken up consisting of the Eastern and South Eastern portion of the district on the Mandla and Rewah Frontier, which partakes of a wild jungly character.

The whole of the District, West of the Great Deccan Road, from Mirzapore with a small slip also along the Eastern edge has been finished, but one pergunnah "Burgey" South of the Nerbudda and pergunnahs Gosulpoor, Koombee, Bureya, Sonapore, &c. to the South East, and North of the Nerbudda have yet to be surveyed.

Grant to take charge of that survey, as the only available Officer.

2nd Division, Saugor.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Captain J. W. B. Blagrave, 74th Regiment N. L., Revenue Surveyor, 26th November, 1847.	In executive charge of the survey of the Saugor District.	By a judicious distribution of the portion of country marked out for survey and the arrangement of the establishment into two convenient divisions or working parties under Lieutenant Willoughby and the Head Uncovenanted Assistant, Mr. Wilson, Captain J. W. B. Blagrave, effected a very good season's work, commencing in the beginning of November 1856, and prosecuting the boundary and triangulation survey until the month of April 1857, after which period the topographical detail survey was continued during May until the disturbed state of the district rendered it necessary to withdraw the parties, and by excellent management, the interior details of only one village remained unfinished. By this distribution the whole of the Southern and Western portion of the Saugor District has been completed leaving only a small portion to the North-West untouched.	The survey of the Saugor District having been suspended by orders of the central Government, the scene of operations has been changed to the Nagpore Province where ground was broken about the middle of March last, by Lieutenant J. H. Grant, and a small area of about 200 square miles effected in pergunnah Kingnah in the Western Division.	Towards the middle of May 1857, after some slight opposition had been made to the progress of the detail survey, the Deputy Commissioner recommended the Surveyor not to continue his operations at Narhat in the unsurveyed portion of pergunnah Malthone, as the Thakoors were not friendly to the Government.
<i>Assistants.</i>		With this season's work the survey has been suspended, and it is greatly to be regretted that the entire district has not been completed.		A detachment of troops being ordered to march on the 13th June to the relief of Lullutpoor, that station being threatened by the Bandpoor Rajah and Thakoors, Lieutenant Willoughby, Assistant Surveyor, volunteered to accompany it in charge of two guns, owing to the paucity of Artillery Officers, and in blowing up the defences of the gate of the fort of Balabet, this excellent and energetic young officer was very severely wounded by the debris of the masonry falling on him and injuring his hip and leg with a compound fracture, which confined him to his couch for the whole of the period, the garrison continued to
Lieutenant Edward Willoughby, Artillery, 11th September, 1854.	Assisting.	The portion which came under survey, pergunnahs Jysinghnuggur, Rahutghur, Khemlassa and Khorye, Erun, Etawah, Dogaha Malthone and Dogaha, a long irregular tract stretching from the South-West of Saugor Khas, Westerly and afterwards North-Westerly, is bounded by the unsurveyed portion of pergunnah Malthone and the Shahgurb territory on the East by pergunnahs Dhamonee, Nureaolee, and Saugor, on the South and West by the Bhopal territory, and on the North-West by the Gwalior territory and Chunderee. The general nature of this area is hilly, covered with jungle, the hills running in small ranges North and South, often broken and irregular, varying in height from 150 to 300 feet only. The conical shape tops of many of the Hills being covered with large masses of igneous rock, inducing the belief that they had once been volcanic.	The party is now stationed at Kamptee which place affords better accommodation than Nagpore.	
Mr. W. A. Wilson, 24th September, 1829.	Ditto.	Pergunnahs Rahutgurb, Khemlassa, and Khorye from their hilly character, were surveyed by triangulation, the sides of the former season's triangles adjacent being used as bases for its continuation and checks during progress. Further check being obtained by the points of the Calcutta Longitudinal series of Great Trigonometrical Survey, all of which within reach, having been carefully connected to the extent of five principal stations as detailed below:—	It is expected that a full season's work will be prepared by the settlement officer in advance in good time for commencing season 1858-59.	
<i>Sub-Assistants.</i>				
Mr. J. J. Burrows, 1st October, 1847.	Ditto.			
Mr. W. Vvall, 13th June, 1856.	Ditto.			
Mr. C. A. Montgomery, 16th June, 1854.	Ditto.			
Mr. A. F. Bonny, Office Assistant, 1st September, 1854.	Ditto.			
Mr. G. Bonny, Office Assistant, 1st February, 1856.	Ditto.			
33 Native Surveyors.				

Names of G. T. Stations.	From G. T. Survey.	From Revenue Survey.	Error of Revenue Survey.	Error per mile.	G. T. Survey, Azimuth.	Revenue Survey, Azimuth.	Difference.
	Feet.	Feet.	Feet.	Feet.	° ' "	° ' "	° ' "
Pataree to Peeperheree, ...	82698.20	82630.02	-68.18	4.35	79.18.56	79.21.36	+0.2.40
Pataree to Tora, ...	63022.3	62965.62	-56.68	4.778	.....	95.02.41	.....
Tins to Semra } Punaree, ... }	66549.4	66520.74	-28.66	2.27	76.42.20	76.43.27	+0.01.7
Tins to Dewulchowree, ... }	53224.5	53196.00	-28.5	2.828	43.31.23	43.33.45	+0.2.22

The ratio of error on these comparisons is exceedingly satisfactory. The data afforded by the Surveyor cannot be checked in this office, owing to the absence of all the records of the survey for the season under review.

The total area accomplished amounts to 977.94 square miles comprised in four main circuits, containing 586 villages, the average area of which is as much as 1,068 acres each caused by the preponderance of hills and jungle. The total expenditure comes up to Rupees 38,038-2-6, giving an average rate per square mile of Rupees 38-14-2, and per village circuit of Rupees 64-14-6. This contrasted with the previous season gives the following results:—

Season.	No. of main circuits.	No. of villages.	Area in square miles.	Cost.	Average rate per square mile.	Average rate per village circuit.
				Rs. As. P.	Rs. As. P.	Rs. As. P.
1855-56, ...	3	308	715.40	34,640 15 1	48 6 8	112 7 6
1856-57, ...	4	586	977.94	38,038 2 6	38 14 2	64 14 6
Difference, ...	+1	+278	+262.54	+3,397 3 5	-9 8 6	-47 9 0

occupy the fort of Saugor.

In consequence of the state of the country around, and the disaffection of some of the native troops, and natural suspicion resting on the others, the whole of the European community were ordered to leave their houses in the cantonments, and to occupy the fort, which is surrounded by the city of Saugor on the west, north and east sides, the houses being built close up to the walls, and by the lake on the south side.

In this state of siege 220 days were passed, the European Officers, Civil Assistants, Clerks and others keeping guard night and day, and in consequence of the fatigue and exposure to the night air on a delicate constitution, Captain J. W. Blagrove died of Liver Complaint on the 6th of October, the department thus losing a valuable member, and the survey party its kind and much respected chief.

Lieut. Willoughby succeeded to the vacancy by the orders of the Central Government, No. 77, dated the 29th of October, 1857, and he continued to superintend the work until the relief of the place by Sir Hugh Rose's force, enabled him to withdraw the establishment on the

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>This is highly satisfactory, exhibiting an increase in area of nearly one-third at a cost of about one-tenth in excess only, of the preceding season's expenditure, reducing the average rates by about one-fifth. There has been a slight overstepping of the maximum grant, which has not been explained by the Surveyor; the expenditure exceeds the authorized maximum by the small sum of Rupees 514-2-6, this I believe to have been caused by the confusion the establishment was thrown into at Saugor owing to the state of affairs at that place, and the difficulty of reducing the strength as usual, as the native Surveyors could not go away to their homes. This difference will be easily adjusted by the large savings on the other surveys. Owing to the stoppage of the postal communication with Calcutta, the bills could not be checked in this office.</p> <p>The contingent expenses for the season have amounted to Rupees 1,052-7-3 of which the chief item is for the tehseel or civil officers' chuprassies, regarding the payment of which I have already remarked in connection with the Jubbulpore survey.</p> <p>None of the records connected with this survey have yet been deposited in this office. Owing to the extraordinary events of the past year, and the state in which all the residents at Saugor were placed, it is not to be wondered at, that delicate work of this nature could not be finished properly. The melancholy death of the Revenue Surveyor Capt. J. W. Blagrove, and the serious injury which befell his successor, Lieutenant Willoughby, (in blowing up the defences of the gate of the fort of Balabet, for which duty he volunteered as an Artillery Officer with Major Gausson's detachment in June 1857, thereby severely wounding him in the leg and hip) of course had a serious effect on the progress of the work, and it was not until the month of December that any systematic and regular attention could be paid to bringing up the arrears. It is satisfactory to think, that the whole of the records are perfectly safe and now in due course of completion at Nagpore under the present Officiating Surveyor. The Saugor survey having been suspended, the party left the fort of Saugor on the 6th February 1858, after the relief of that place by Sir Hugh Rose's force to take up new ground in the Nagpore Province.</p> <p>Lieutenant Willoughby on whom devolved the duty of furnishing the Annual Report and Returns for the season, thus expresses himself;—</p> <p>Para. "26th. The work of the past season has been carried on under considerable difficulties; several serious drawbacks have had to be contended with during its progress. The disturbances in the district rendered it necessary to suspend field work in May, and the outbreak of the troops at Saugor towards the end of June obliged the European inhabitants of the station to seek protection within the Saugor fort, this entirely put a stop to the work for a time, there being no suitable place within the fort, in which to carry on the office work, and it being considered dangerous to remain outside. The records and instruments were all stowed away in the fort godowns, and the tents</p>		<p>6th February, and accompany it, together with all the instruments, records, &c., to Kamptee, which place was safely reached on the 4th March 1858, and the young Surveyor manfully strove to start the survey afresh, and to bear up against the severe effects of his wounds, which so long a confinement as nearly seven months in the fort at Saugor, had not tended to diminish, although endowed with much fortitude and determination of character, the drain on his constitution was too great, and he was obliged to proceed to Bombay and from thence to England on Medical Certificate, vide G. O. G. G., No. 1570, dated the 23rd April, 1858.</p> <p>Thus has this party been deprived of its superintending officer a second time within a few months; and the department has suffered a temporary loss in the absence of this promising officer from whom much was expected; but I trust he may be spared to return with renewed health and vigor.</p> <p>A separate report with a plan of the fort of Saugor, explanatory of the</p>

"and other property in buildings in the bazar adjacent. A short account of the disturbances at Saugor being attached, it will not be necessary to dwell further on this subject. Towards the end of September, the Revenue Surveyor, the late Captain J. W. B. Blagrave became so seriously indisposed from an attack of liver and exposure to night air during the rains, as to be unable to superintend the work; he rapidly sank under the effects of the disease, till the 6th of October, on the morning of which he died; the department thus losing a most valuable member and the survey party its kind and much respected Chief. In addition to this the next Senior, the Covenanted Assistant, Lieutenant Willoughby, was at this time unable to superintend the progress of the work satisfactorily, owing to a wound received by him in June last, whilst on duty with the detachment under Major Gaussen to which he was attached, there being a paucity of Artillery Officers with the force."

"27th. All these circumstances tended seriously to throw back the work, and it was not till the end of December, that any thing like progress began to shew itself. The party at this time was preparing to march to Nagpore in accordance with orders received from Government to that effect, when an alarm of disaffection amongst the native troops that had remained staunch up to the present time, once more rendered it advisable to remain within the fort. The report was communicated to the Officiating Revenue Surveyor by the Deputy Commissioner, Major Western, who advised him strongly not to leave Saugor, and threatened to bring it to the notice of Government if he reduced the garrison by taking away the five assistants; the march was consequently put off "sine die." What object the Deputy Commissioner had in delaying the departure of the survey party, remains unknown to this day, as the report of disaffection proved to be groundless, nor was the evidence ever sufficient to justify any faith being put in it, another opportunity of marching did not occur till the garrison had been relieved by Sir Hugh Rose's column on the 3rd of February 1858. The party then marched for Nagpore on the 6th idem, and arrived safely with all the records, instruments, &c. at Kamptee, on the 4th March 1858, on which date this report closes."

"28th. Nothing further now remains but to bring to the notice of Government the good conduct of the Uncovenanted Assistant, Mr. W. A. Wilson, and the Sub-Assistants, Messrs. J. J. Burrowes, W. Vyall, A. Bonny and G. Bonny, throughout the season, and the zeal and energy they displayed in their efforts to bring up the arrears of work, under the most trying circumstances, they at the same time having to take their tour of Sentry duties at night in common with the rest of the garrison. The small increase recommended in the qualification report attached, will, it is hoped, be granted."

The ability and successful exertions of the late lamented Captain J. W. Blagrave, as well as of his immediate successor, Lieutenant Willoughby, have been conspicuous, and much credit is due to them, and their Uncovenanted Assistants, not only for the excellent season's work but for the manner in which they comported themselves during the trying period they were confined to the fort, and for their ready aid and cheerful assistance on all occasions.

From the commencement of operations in this district, in season 1854-55, up to the present time, the following are the general results. An area of 2,277 square miles surveyed, at a total cost of Rupees 1,06,635, the average rate per square mile being Rupees 46-13-1, and per village circuit Rupees 90-2-2.

causes which led to the occupation of the fort by the residents, has been furnished by Lieut. Willoughby, which has been submitted to the Government of India, in the Military Department, with the report regarding the defence of the residency at Jubbulpore.

The only arrangement that could be made to supply Lieut. Willoughby's place, was to transfer the Covenanted Assistant Lieut. J. H. Grant, from the Jubbulpore party to take charge; and this was approved by the Government letter, No. 1563, dated the 23rd April, 1858, and Lieut. Grant is now successfully prosecuting the new work in Nagpore, as well as bringing up all the maps and computations of the past season, and he intimates to me that the maps have been got up with great care and nicety, the topographical details being elaborated to the fullest possible extent.

Lieutenant Willoughby strongly recommends his head Assistant, Mr. Wilson, for an increase of salary from 250 to 300 Rs. per mensem, and Messrs. F. Bonny and G. Bonny, Office Assistants, from 85 to 100 Rs., from the 1st June, 1858, which I have much satisfaction in supporting, and solicit the confirmation of Govern-

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.					On what duty proposed to be employed during the ensuing year.	REMARKS.
		Season.	Area in square miles.	Cost.	Average rate per square mile.	Average rate per village circuit.		ment to the same, the extra expense of course being defrayed out of the authorized grant. Captain T. C. Blagrave, Revenue Surveyor of Sindh, who has been on special Military employ, since the commencement of the mutinies, having been replaced at the disposal of this Department by G. O. No. 461, dated the 25th May, 1858, has been recommended for the charge of this party.
				Rs. As. P.	Rs. As. P.	Rs. As. P.		
		1854-55,	584.18	33,956 9 0	58 2 0	117 7 10		
		1855-56,	715.40	34,640 15 1	48 6 8	112 7 6		
		1856-57,	977.94	38,038 2 6	38 14 2	64 14 6		
		Total, ...	2277.52	1,06,635 10 7	46 13 1	90 2 2		
		The Sanger District being estimated to contain about 3656 square miles, there remain only about 1378.48 square miles to complete it, in the North West direction as above described.						

3rd Division, Bundelcand.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Captain F. J. Burgess, 74th Regiment, N. I., Revenue Surveyor, 29th September, 1847.	In Executive Charge.	<p>The field operations of this party commenced on the 15th November 1856 and were successfully carried on until the middle of May following, soon after which, when the whole party had retired to Jhansee for Recess duties, the sad and terrible tragedy at that place took place, and not one soul remains to tell the tale. By the latest accounts received from Captain Burgess, dated the 30th May 1857, he expressed himself full of hope and felt apparently sanguine that even if the Sepoys of the wing of the 12th Native Infantry and the 14th Irregular Cavalry should mutiny the European residents might hold out in the Fort until some relief came, and as the Revenue Surveyor was living and holding his office inside the Fort, he thought he could put it into a state of defence, to resist any musquetry fire or the attempts of the Sepoys if unaided by Artillery. How delusive these hopes proved, the fatal and complete massacre on the 8th June 1857 of all the Christians in the place, both male and female, is sufficient evidence.</p> <p>In the absence of any definite and matured Reports from the Executive Surveyor, as to the precise state of the computations and mapping work at the close of the Field Season in May 1857, I am only able to define briefly the ground which was gone over and the approximate area surveyed, from the Returns of the Monthly proceedings. It appears that a regular Mouzawar survey took place in Pergunnahs Jhansee and Mow, of the Jhansee District to the extent of about 799 square miles and likewise a Topographical survey of the Independent Native States, Oorcha, Chuckharee and Chatterpore interlacing with the British States to the extent of about 960 square miles, making a total of about 1759 square miles as far as the reports up to, and including the month of March, afford the information. A topographical survey on a large scale of the city of Jhansee was also in hand.</p> <p>The sums passed to the Revenue Surveyor on his pay abstracts from October 1856 to April 1857, amount to Rupees 26,215-1-1, in addition to which the salaries for May and 8 days of June to the above establishment amounting to Rupees 3,376-10-4 are due, but have not been yet paid. A bill for the salaries due to the estates of the late Surveyor and Christian Assistants only has lately been drawn for Rupees 2,224-4-3 for the above period, under sanction of the Central Government. The sums due to the native members of the Establishment have not yet been drawn, on account of the suspicion which attaches to many of them as to their complicity in the rebellion at Jhansee on the date referred to. This must be left for future adjustment after full enquiry has been instituted.</p>	The extinction of the whole party, and the Military operations which have been going on during the present year, have prevented any attempt to renew the Survey at present, the country being still in too unsettled a state to warrant the expectation in the Commissioner's opinion that any thing may be done even during the ensuing season of 1858-59, consequently it has not been proposed to depute another establishment into the Division.	<p>The best and most authentic information relative to the dreadful massacre of all the Christian residents at Jhansee, caused by the revolt of the sepoy at that place, I had the honor of submitting to the Government of India, Military Department, in a letter, No. 8, dated the 6th March last.</p> <p>This information was received from Lieut. J. H. Grant, Assistant Surveyor, at Jubbulpore, who obtained it from Native sources, and I believe subsequent events have fully realized the truth of the account rendered. This statement redounds so greatly to the credit of Captain Burgess, whose bravery seems to have been of the highest order, that I cannot refrain from transcribing it in this place. The loss of these valuable Officers and their seven Christian Assistants with their wives and families has caused myself and the whole department the deepest pain and grief. Captain Burgess may be well said to</p>
<i>Assistants.</i>				
Lieutenant F. H. Turnbull, Artillery, 28th December, 1855.	Assisting.			
Mr. D. F. Blyth, 1st October, 1836.	Ditto.			
<i>Sub-Assistants.</i>				
Serjeant H. Millard, 1st December, 1847.	Assisting.			
Mr. W. H. Bennett, 1st October, 1852	Ditto.			
Mr. J. Young, Draftsman, 1st April, 1853.	Ditto.			
Mr. T. Munrowd, 1st November, 1856.	Ditto.			
Mr. H. W. Palphryman, Apprentice.	Ditto.			
Mr. G. Young, Apprentice.	Ditto.			
31 Native Surveyors.				

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Name and date of Appointment.	On what duty employed during the year	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>It has been ascertained by the enquiries of the Commissioner of Jhansee on the spot, that the Native Assistant Surveyors noted in the margin,* were implicated in the attack on the Christians at that place. Their names have consequently been carefully made known to the Authorities of the districts where they live, and the Government were pleased to direct that they should be dismissed Government employ. Two have been caught and retained under custody by the Commissioner of Rohilkund, pending further enquiry at Jhansee. Madar Bux took service with the Ranee and is supposed to have been killed or escaped with the fugitives, as did also Mooneer Khan. The three last named accompanied the officers into the fort, but proved traitors and were all three shot by Lieutenant Gordon, Deputy Commissioner or Captain Burgess.</p> <p>The sum due to the estates of the Covenanted Officers Rs. 1,236-4-3 has been paid into the General Treasury, under orders of Government in the Military Department, whilst the sum of Rs. 823-5-4 has been deposited with the Administrator General, on account of the estates of the Uncovenanted Assistants.</p> <p>On the recapture of Jhansee by Sir Hugh Rose's force, Captain Pinkney, the new Commissioner informed this Office that a large quantity of survey records, instruments and other Government property attached to the survey party, had been discovered in a godown in the fort. Of course most of the papers and field maps were in a state of utter confusion, and many of them much damaged, and it is impossible to say until they have been examined by competent persons how far the work of the past season may be turned to any account. Several of the volumes of village plans of former seasons survey, which were in abeyance in the Surveyor's hands, have most fortunately been preserved intact, and it is to be hoped that many useful documents may yet be discovered. The instruments for the most part have all been more or less destroyed, but these are of small value in comparison with the Field Books and rough maps, and calculations of the season's work, which if it can by any possibility be put into an intelligible shape, will add materially to the completeness and value of the Bundelcund map of this unfortunate Officer's Survey.</p> <p>On the suggestion of the Commissioner one or two of the Native Assistant Surveyors, who returned to Jhansee and are certified as faithful subjects, have been re-entered from the 15th April last to arrange, classify and preserve the recovered records; and they are now in charge of the same under the general control of the Officiating Executive Engineer, who I trust will be able to render some assistance in the matter. I do not anticipate however that any practical results will follow, until the whole of the records have been subjected to careful European Professional scrutiny, and the services of a party</p>		<p>have died nobly after a resistance of many days in the fort until ammunition and food failed, and not until he had actually killed 25 or 26 persons with his own hand. So perished this enterprising and talented Officer.</p> <p>Such a catastrophe cannot speedily be effaced; but it will, together with the events at other stations, connected with our valued friends of this department, long be remembered with the most painful thoughts:—</p> <p>"The sepoys after looting the Treasury went away, but the scoundrels of sowars of the 14th I. C. remained behind, thirsting for the blood of those in the fort. It was bravely defended, the gentlemen firing and the ladies cooking and making balls for them. One of the guns brought against the fort by the rebels was disabled by the steady firing from the fort, and the rebels retired leaving it, but got it away during the night with ropes. On the third day, a Jemadar (I think Burgess' own) said he would not stay any longer in the fort, and was told he could not leave, he said he would, and with his brother began to undo the gate: Burgess shot him dead, and instantly the bro-</p>

might be devoted to this purpose if the new field contemplated to be taken up, cannot be sufficiently prepared in advance, so as to admit of commencing operations next season.

Professional operations commenced in Bundelcund in the latter end of 1853-1854.

The following Pergunnahs, Districts, and Native States have come under survey up to the dissolution of the establishment.

In season 1853-1854 Pergunnahs Madooghur and Indoorkee of Kuchwaghur.

Pergunnahs Jalaon, Rampoorah,	} of District Jalaon.
Jorajor, Juggurmunpore Lahar	
Muchand, Duboh and Bhandhere,	} of District Jhansee
Pergunnahs Mote and Garotha,	
Pergunnahs Jeitpore and Mahobah,	} of District Humeerpore.

Area 1341.80 square miles, cost Rs. 37,347-10-0.

In season 1854-55, pergunnahs Madooghur, Indoorkee and } of Kuchwaghur.

Jagheers,	} of Jalaon.
" Duboh,	
" Bhandheree,	} of Jhansee.
" Garotha,	
" Mahoba,	} of Humeerpore.
" Punwaree,	
" Myra,	} of Nagode.

The above were either wholly or partially completed as well as a survey of a line of road from Nowgong to Jhansee.

Area effected 924.11 square miles, and cost Rs. 36,159-6-8.

In 1855-56, pergunnahs Mow, ... } of Jhansee.

Pundwah, }
Independent States,—Sumpthur.
Churkharee.
Nuddeagaon.
Alumpoor.
Gombhar.
Chatturpoor.
Bijawur.
Gerowlee.

Jagheers, Alleepoor, Logassee.

The total area 1304.76 square miles, cost Rs. 33,411-10-7.

In this season a considerable quantity of work, arrears which had accumulated of former seasons, was brought up and lodged.

"ther turned round and cut
 "down Powis (I think), and
 "was shot by Burgess also.
 "On the fourth day, when
 "the besieged were suffering
 "greatly from hunger, the
 "rebels got guns and ele-
 "phants from the Rancee and
 "forced the two outer gates.
 "Before this, Burgess had
 "been killed by a bullet
 "through his head, having
 "shot 26 men with his own
 "hand, (from the account of
 "Natives who were with
 "him). On the gates being
 "forced the besieged gave
 "in, on promise of their
 "lives being spared. They
 "were tied and taken down to
 "a garden where the gentle-
 "men had their heads cut off.
 "The wretched mothers then
 "saw their children hacked
 "to pieces, and were killed
 "themselves last. Two or
 "three gentlemen who could
 "not get into the fort galloped
 "away for their lives, one
 "of them was Turnbull, he
 "went a long distance and
 "climbed a tree,—poor fellow
 "he was seen by his blood-
 "thirsty pursuers and shot
 "dead. The other (name
 "unknown) reached the vil-
 "lage of Boor Sangor, and
 "then gave his horse and
 "watch to a native Surveyor
 "who was there, and in ex-
 "change procured a suit of
 "native clothes. He was
 "hardly away when two sow-
 "ars, who were in pursuit,
 "came up and recognizing
 "the horse, asked where the
 "sahib was; the Moot-
 "suddee, not being able to
 "tell exactly, was marched
 "back a prisoner to Jhansee
 "along with the Kotwal of

4th Division, Bhurtpoor.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Lieutenant G. Hamilton, 51st Regiment N. I., Revenue Surveyor, 15th December, 1851.	In executive charge of the survey of the Bhurtpoor State.	<p>In the former report regarding this survey party, it was stated that a commencement had been made in the Bhurtpoor territory, and a small area effected of 497 square miles in the centre of the district, leaving two portions, one to the north and one to the south for the work of the season under review. The establishment which was at first but small, was reinforced by drafts from other surveys, and by the appointment of a Covenanted Assistant Lieutenant A. D. Vanrenen, with a view to the completion of the work if possible in the season of 1856-57. A very fair attempt was made by Lieutenant Hamilton to secure this desirable object, but he was not quite successful, one pergunnah only remaining after a long working season, which was abruptly brought to a close by the out-break in May 1857.</p> <p>The pergunnahs Byanah, Weir, Oochein Roopbas, Roodawul, part of Bhurtpoor khas, and the Jagheer of Bullubghur, to the south, and those of Deig, Nuggur, Puharee and Kama, to the north of the portion previously surveyed, were taken up, giving an area of 1,312.77 square miles.</p> <p>That portion of the district to the south, which was the most difficult, being intersected by numerous ravines and hills, was first completed in the most favorable months, leaving the northern and more open country for the hot months, and it was in this direction that a small area was unavoidably left for the succeeding season, owing in a great measure to the immense quantity of water covering part of the country, the remains of very extensive inundations to which the greater portion of the Bhurtpoor territory is subject. This, and other obstructions, especially in Oochein and Weir pergunnahs, which are very hilly and much intersected by ravines, brought the season up to May, when it became impossible to wait longer to attempt to take up the remaining pergunnah of Gopalghur.</p> <p>The area surveyed 84,017.47 acres, or 1,312.77 square miles, is comprised in 10 pergunnahs or main circuits, and 904 villages (inclusive of a few detached, and outlying from the parent pergunnahs) of an average size of 929 acres each, a size peculiarly favorable to the progress of the survey, and which contributed to the fairness of the out-turn. The expenditure incurred for the whole year is 36,671-13-2, which gives an average rate per square mile of Rs. 27-14-11 and per village circuit of Rs. 40-9-0, which contrasts exceedingly well with the results of the prior season as follows:—</p>	Continuation of the survey of the Bhurt- poor State. Pergun- nah Gopalghur left untouched last sea- son, and pergunnahs Kama and Puharee re-surveyed. The party, after again collecting together at Agra, started the work early in Febru- ary 1858, with the approval of the Poli- tical Agent, who ac- companied them, fix- ing their chief camp at Deig, with another at Gopalghur, where there was a small mud fort, and two re- giments of the Bhurt- poor troops, with two guns.	Several changes have taken place in this estab- lishment since last report. Mr. Macconochie, the Se- nior Assistant, a very prom- ising young gentleman, who, together with Mr. Young, having received a liberal education in Eng- land, were recommended to this Department by the late lamented Sir Henry Lawrence, was induced to resign his appointment on the 1st January, 1857, for one offered to him in the Customs Department. He was replaced by the trans- fer of Mr. Talbot from the Baree Doab Survey.
<i>Assistants.</i>				
Lieutenant A. D. Vanrenen, 71st Regiment N. I. 8th July, 1856.	Assisting.			
<i>Sub-Assistants.</i>				
Mr. G. B. Maconochie, 20th November, 1854.	Assisting.			
Mr. R. J. Young, October, 1854.	Ditto.			
Mr. H. B. Talbot, 1st October, 1852.	Ditto.			
Mr. C. Atts, 19th March, 1856.	Ditto.			
Mr. H. L. Pemberton, 20th December, 1856.	Ditto.			
Mr C. Sweetenham, 1st October, 1854. 36 Native Surveyors.	Ditto.		By the excellent and judicious man- agement of the Sur- veyor, aided by Cap- tain Nixon, all the field work was hap- pily brought to a suc- cessful termination by the end of April, 400 square miles of country have been laid down, and the district is now com- plete in every res-	Mr. Atts, having been found unsuited for the Department, and reported to have changed much for the worse, has been allow- ed to resign from the 12th January, 1858. Mr. Sweetenham, Sub- Assistant, also resigned on the 21st September last. Mr. Henry Pemberton, son of the Bengal Revenue Surveyor of the same name, a very promising young man, from the Doveton College, was appointed a Sub-Assistant of the 4th Class on the 20th Decem-

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.						On what duty proposed to be employed during the ensuing year.	REMARKS.
		Season.	Number of village circuits.	Average size of circuits.	Square miles.	Cost.	Average rate per square mile.	Average rate per village circuit.	
						Rs. As. P.	Rs. As. P.	Rs. As. P.	
		1855-56, ...	332	959	497.70	17,503 13 6 $\frac{1}{4}$	35 2 8	52 11 6	
		1856-57, ...	904	929	1312.77	36,671 13 2	27 14 11	40 9 0	
		Difference, ...	+572	-30	+815.07	+19,167 15 7 $\frac{3}{4}$	-7 3 9	-12 2 6	
		<p>Thus, for about double the expenditure, treble the area has been effected reducing the average rates in both instances nearly one-fourth. This is to be accounted for by the greater efficiency and experience of the establishment generally, and by a full and uninterrupted field season having been enjoyed which was not the case in starting the work the previous year. These results appear to me creditable to the supervision and judicious arrangements of the Revenue Surveyor, and to the zeal and energy of his assistants.</p> <p>The pergunnahs of Bullubghur, Weir and Byanah, and a portion of Roopbas, are stated to be hilly, and to contain a tract known as the "Dhaug," which is so much cut up into ravines and is altogether of so wild and inaccessible a nature and inhabited by so lawless a race of people, chiefly Goojurs, as to have become a by-word, and the state of Bhurtapore, being met along the borders of this tract by those of Jeypore, Kerrowlee, and Dholepore, is therefore taken advantage of, by bad characters of every description, who when driven out of any of the neighbouring states, seek shelter amidst the ravines of the "Dhaug" and meet with sympathy from the lawless inhabitants of this wild tract.</p> <p>In the Roopbas hills there are quarries of a beautiful description of white and red sandstone yielding considerable revenue to the Raj, which is in great demand for the common purposes of building as well as for the higher order of architecture, the magnificent palace of Daig being constructed of the same.</p>							
		<p>pect. On leaving Agra, it appeared exceedingly doubtful whether the country was sufficiently tranquil to enable survey operations to proceed, as rebels were stated to be constantly traversing the district, but none of the Assistants suffered any molestation, and the establishment returned to Dehra, to go on with the work of the present recess.</p> <p>The future employment of this party is a matter for the consideration of the Government, and has been prominently brought to notice in a separate letter.</p>							
		<p>ber, 1856, having passed the required examination, and evinced considerable taste for drawing.</p> <p>On the strong and well-founded recommendation of the Surveyor, who speaks in high terms of the excellent conduct and exertions of all his Assistants, Messrs. Young and Talbot, are specially brought forward for promotion, the former from 250 to 300 per mensem, and the latter from 200 to 250, with effect from the 1st March last. Mr Young is an excellent Surveyor and first rate Draftsman, he has done most excellent service, and in his Military capacity before Delhi with the Jheend Artillery, I believe is deserving of high praise. Mr. Talbot has also given much satisfaction, and is described as a most able, hard-working and conscientious Assistant. I therefore trust the above promotions may receive the confirmation of Government.</p> <p>The establishment has lost many of its old Native Surveyors, who have not returned from leave since the commencement of the rebellion, but this will speedily be rectified by</p>							

The topography has been carefully laid down, and connected with the following points of the great trigonometrical survey, the distances between which as derived from the Revenue Survey, have been compared with the data derived from the triangulation, and furnish the following results:—

Names of G. T. Stations.	From Revenue Survey.	From G. T. Survey.	Error of Revenue Survey.	Error per mile.
Alipur to Madhoni,	147103.44	147259.78	156.34	— 5.61
Alipur to Dimdima,	122254.50	122173.31	81.19	+ 3.50
Dimdima to Madhoni,	130410.01	130714.03	304.02	—12.27
Madhoni to Usira,	120927.51	120977.28	49.77	— 2.17
Usira to Dimdima,	125532.98	124546.83	986.15	+41.80
Madhoni to Rasia,	111823.14	111896.98	73.84	— 3.48
Rasia to Alipur,	123012.78	123199.08	186.30	— 7.99

The ratio of error per mile in most of the instances is very fair, but on one side Usira to Dimdima, the difference is very considerable, and it is possible that the point may not have been clearly identified. The Surveyor reports that the ground between the two stations was exceedingly bad for chaining, being much broken into ravines as well as hilly, which is barely sufficient to account for the discrepancy.

On the cessation of the field work at the latter end of April 1857, the establishment broke up, and under permission of the Supreme Government repaired to Dehra Dhoon for the recess. Lieutenant Hamilton with his Head Quarters, and the chief bulk of his office records reached Dehra in safety, but unfortunately, one of his Sub-Assistants, Mr. Talbot, was less successful, and was caught by the disturbed state of the Doab, and lost the whole of his field books, maps, and the entire work of the two pergunnahs Kama and Puharee, amounting to 319 square miles, plundered on the road at Allyghur, the Sub-Assistant himself escaping with difficulty into Meerut with the loss of every thing he possessed, and where he was detained for two months unable to proceed. Mr. Young, Senior Assistant being at Bhurtpore at the time of the out-break, volunteered and joined the Bhurtpore force when it moved on Muttra, subsequently after great exposure, he made his way to the British camp before Delhi, where he joined the Jheend Rajah's contingent, with the commission of unattached Lieutenant in command of the Raja's Artillery, and did most excellent service until the fall of Delhi, when he rejoined the Head Quarters of the survey at Dehra Dhoon. Mr. Atts left Bhurtpore in June and served in the Agra Militia from August up to the end of December.

recruiting and training as may be necessary. Golarh Nubi Khan, Sub-Assistant, lately attached to this survey was dismissed by the orders of the President of the Council of India, No. 1840, dated the 14th May, 1858, in consequence of the part he played during the outbreak at Allahabad.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>In consequence of the unavoidable absence of these officers, the recess work of the survey was of course left very much in arrears, but considering the position the establishment was in, and the stirring events which were at that time in progress all round the scene of the survey, we have great cause for thankfulness, that no greater mischief was caused. The whole of the instruments and Government property had been carefully placed in a small house situated on the left bank of the Jumna river, in which Mr. Macconochie, one of the Assistants, who had recently resigned his situation in consequence of obtaining a better one at Agra, resided, and to this circumstance, added to the faithfulness of the guard, the survey instruments did not share the same fate as all other property in Agra, and they are now again in full use.</p> <p>For the above reasons the maps and computations of the season under review could not be completed at the usual time, but on the Surveyor coming down to Agra again in the end of November last, great exertions were made to bring up the work, since that time the roads have not been sufficiently safe to entrust valuable maps by the post.</p> <p>The usual pergunnah and village plans are reported to have been constructed in duplicate with every care as to fidelity and minuteness of detail. The city, fort and environs of Bhurtpore have also been surveyed and mapped on a very large scale, as well as the palace, city and tanks of Deig, on the same scale 8 inches to the mile.</p> <p>But although the usual documents from this survey have not been received, and I am therefore unable to bear personal testimony to their work, I feel peculiar pleasure in having it in my power to place on record, that my respected Chief, the Surveyor General of India, who is ever ready to prove his interest in the great work in which we are engaged, and to favor us with his valued counsel and advice, has addressed me a letter on the result of his inspection of the Revenue Surveyor's Office. The Surveyor General's opinion contained in this letter, which I subjoin, is as honorable and creditable to Lieutenants Hamilton and A. D. Vanrenen, and the Uncovenanted Assistants, as it is satisfactory and gratifying to myself, and I cannot sufficiently express my sense of the obligations we are under to Colonel Waugh, and how highly I appreciate his kindness in inspecting the work of one of our parties accidentally recessing at Dehra:—</p> <p><i>From Surveyor General of India, to Deputy Surveyor General, No. 109555, dated 12th November, 1857.</i></p> <p>SIR,</p> <p>"During the recess of 1857. I have been able to visit on several occasions, the office of the Revenue Survey of the Raj of Bhurtpore under Lieutenants George Hamilton and A. D. Vanrenen, and have seen their work in progress, and now on the close of the recess, at the request of Lieutenant Hamilton I have inspected all the plan and maps which have been finished. This inspection afforded me great satisfaction and impressed</p>		

"me most favorably as regards the merits of those officers and their Assistants. I am sure therefore it will be as gratifying to you to receive from me so favorable a report of the labors of this revenue survey party, as it is a pleasure to me to make it."

"2nd. I annex for your information copy of the letter addressed by me to Lieutenant Hamilton, expressing my approval as well as his reply and a statistical return of work performed, which I hope will be satisfactory to you."

"3rd. Although portions of this party were out when the rebellion commenced, they met with no disasters, beyond the loss of a small portion of their records. Mr. Young was cut off from the Head Quarters of his survey, but after many adventures was able to render very good service at Delhi, where he served with the rank of Lieutenant in command of the Jheend Rajah's Artillery. It has given me great pleasure to make Lieutenant Young's acquaintance."

"4th. I take this occasion to recommend to your notice as an officer well deserving of advancement when it may be in your power to promote him, Lieutenant A. D. Vanrenen, of whom I have seen a great deal. He has impressed me with a very favorable opinion of his character and qualifications, being replete with zeal, good judgment and excellent business habits. He was professionally educated as a Surveyor and is a good Draftsman. I shall be very glad if, concurring in my good opinion of him, you are able to advance his interests."

"5th. The completion of the survey of Bhurtpore is very important as regards filling up sheet 50 of the atlas which is very bare of details in the Native states. Forming as it does the centre of sheet 50, this revenue survey will be a valuable contribution to Indian Geography, for which we shall be indebted to the influence of the late lamented Sir H. Lawrence. I sincerely trust therefore that nothing will be allowed to stop the progress of Lieutenant Hamilton's operations in the state of Bhurtpore."

"6th. The improvement introduced by you with respect to the congregated village sheets appears to me a very happy one, both as regards saving of labor, and rendering the sheets more useful as topographical plans."

I have, &c.,

(Signed) A. S. WAUGH, *Lieut. Col.*

Lieutenant Hamilton is a most industrious and pains-taking officer, and I have great reason to commend his successful exertions to the favorable notice of Government. During the present season he has brought the entire survey of the district to a close, notwithstanding the state of the country arising from the late disturbances. The whole of the maps, plans, and calculations, will very shortly be put in a final shape, after which I much regret to say, we are to lose his services in the Department, in consequence of his nomination to the Political Department, I sincerely trust this officer's future career, will be greatly benefited by the experience he has gained as a practical Surveyor.

It is fortunate that so able and efficient an Assistant as Lieutenant A. D. Vanrenen, is, as stated by the Surveyor General, ready to undertake the independent charge of a survey, educated specially for a Surveyor and by a previous employment in the Department Public Works, he is far more experienced than other Assistants of his own standing in this Department, and is already an accomplished Draftsman. From the opinion expressed of this officer, and from my own previous knowledge, I can confidently recommend him to succeed Lieutenant Hamilton whenever the latter officer is allowed to leave.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>Lieutenant Hamilton draws particular attention to the great assistance rendered to the survey by both Major Morrieson, the Political Agent, and Captain Nixon, the officer in charge of the settlement duties, and begs that the cordial co-operation he has at all times met with, may be prominently brought to the notice of Government. Captain Nixon from the nature of his work has been very closely associated with the Surveyor, and has afforded invaluable assistance. His Thakbust maps were exceedingly well got up, especially in the Champaign country, and by his thorough knowledge of, and indefatigable attention to, the wants of the survey, no impediments or hindrance occurred.</p> <p>A final report on the Bhurtpore survey with an accurate account of the total expense incurred, to be defrayed by the Raj, will be submitted as soon as the proceedings have closed.</p>		

5th Division, Goruckpore.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
J. Vaughan, Esq., Sub-Assistant Surveyor, 1st January, 1854, and 10 Native Surveyors.	In executive charge.	<p>This small detached party under a Sub-Assistant Surveyor resumed the duty of surveying the jungle grants in the Goruckpore district, on the 25th November 1855, and entered the pergunnahs Haveylee and Benaikpoor east for that purpose, the demarcations of which had been duly prepared.</p> <p>The grants for survey were scattered in detached portions, for the due connection of which proper lines had to be run, in addition to the closing on the stations of the great trigonometrical survey wherever practicable.</p> <p>In pergunnah Haveylee Jungle Block, east Lehra, containing an area of 16,822 acres, was divided into 9 fresh allotments, and 4 previously settled grants. In pergunnah Benaikpoor east, two tracts, Tuppas Nugooa and Baragawan, of the aggregate area of 42,894 acres were surveyed, the first entire, forming one allotment by special desire of the Collector, and the second forming 7 grants and one new allotment. Nugooa, which borders on Nepaul, in being thus laid down filled up a gap on the map, and connected the other grants together, a circumstance of much importance on professional grounds.</p> <p>In pergunnah Tilpoor the several jungle tracts, cited marginally, were accomplished, having an area of 44,492 acres in 17 grants, and 33 new allotments. A portion of the river Gunduk has likewise been enclosed in a separate circuit to the extent of 5,345 acres. A gross area of 1,09,555 acres, or 171.18 square miles, comprising 29 previously settled grants, and 43 fresh allotments in the above 4 pergunnahs has thus been effected at an expenditure of Rupees 8,814-13-6, which gives an average rate per square mile of Rupees 51-7-10, a high figure, but necessarily so for operations on a small scale, such as these, in a densely covered and insalubrious country, where it is impossible to work with any degree of safety, after the month of April.</p> <p>The tracts surveyed are described as covered by a dense Saul or Sakho forest, affording an impregnable retreat for wild animals, including the buffalo and elephant, the incursions of which, having effectually frightened the neighbouring zemindars, from attempting to cultivate the skirts of the forest. The remains of deserted Indigo factories, with substantial building vats, out offices, avenues of trees, and symptoms of roads, contrasting singularly with the wildness of the country around, point out the impracticability of reclaiming these waste lands, and the futility of individual enterprise. The climate of these parts (in Bhowar) is dreaded like a plague by the natives, the greater portion of this block is a grass jungle, with here and there patches of forest "Thikbye" tree, which yields "Kutha" or catiu. Block Domarkhund</p>	<p>The survey of the Government forest grants in Goruckpore has alike with the surveys in the Saugor and Nerbudda territories, been brought to a stoppage under the orders of the Central Government, in consequence of the disturbed state of the district. The area remaining for survey at the commencement of the season 1856-57 was 300 square miles according to the requirements of the Collector, of which it has been shewn that 171 square miles have been completed. About 130 square miles therefore remain to be taken up, the grants composing this area are scattered over the district, and would therefore have occupied this party one more season.</p> <p>The suspension of a desultory survey of this nature is not of so great consequence,</p>	<p>After the completion of the most important part of the Goruckpore plans and records, Mr. Vaughan's services being urgently wanted in one of the Bengal surveys to fill a vacancy, he was transferred to the 2nd division party and proceeded to join on the 1st January last, as Senior Sub-Assistant on a salary of 200 Rs. per mensem, the Central Government having authorized the disposal of his services in any way that might be considered necessary.</p> <p>Mr. Vaughan during the time he has been on detached employ, has given much satisfaction. He is a very promising Assistant, careful and methodical, and has submitted all his work in a business-like and efficient manner. Accidentally left to conduct the survey of the grants in Goruckpore, and although, but of short service in the Department, he has successfully conducted the duties connected with this minor survey entrusted to him.</p> <p>The Native Surveyors, who were on leave on half-pay have been discharged</p>

Name and date of Appointment.	On what duty employed during the year	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.																																			
		<p>Kullan on the Gunduk has covers of forest, composed chiefly of the Sakhoos and Khyr Trees; the soil bears sufficient evidence of almost total submersion during the rainy season; even so late as April it was considered imprudent to let cattle go to any, but the usual watering fords, lest they should sink inextricably in the bogs surrounding the Chunda and other Tals or Lakes.</p> <p>Between the blocks Ehowar and Domakhund Kullan, 9 settled villages have been surveyed to complete the operations; both banks of the river Gunduk have been also surveyed, and from the comparison made with former surveys, a considerable portion of tuppa Domakhund appears to have been washed away.</p> <p>In addition to the above, another pergunnah Sidhooa Jobunna was commenced on, and the skeleton and topographical details surveyed, giving an area of 69 square miles; but the dividing off into allotments, the most tedious and trying part of the work, could not be accomplished, owing to much sickness amongst the establishment, and the very late period of the season it was undertaken, the Sub-Assistant's own health preventing him from remaining out after the 25th April 1857, when he retired to Goruckpore for the recess.</p> <p>Of the total area surveyed, only 13,750 acres, or 21.48 of cultivated land was found, chiefly, in pergunnahs Benaika and Tilpoor. The same system of dividing the jungle allotments, as before was pursued, straight lines were cut right through the forest from triple junction point to point, and wherever a good natural boundary, such as a high road or nullah presented itself, it was adopted in preference.</p> <p><i>The comparative results of the two seasons stand as follows:—</i></p> <table><tr><th>Season.</th><th>Grants.</th><th>Allotments.</th><th>Area in Sqr. Miles.</th><th>Cost.</th><th>Per Square Mile.</th><th>Per Circuit.</th></tr><tr><td></td><td></td><td></td><td></td><td>Rs. As. P.</td><td>Rs. As. P.</td><td>Rs. As. P.</td></tr><tr><td>1855-56,</td><td>33</td><td>71</td><td>206.62</td><td>10,300 3 3</td><td>49 13 7</td><td>99 0 7 1/4</td></tr><tr><td>1856-57,</td><td>29</td><td>43</td><td>171.18</td><td>8,814 15 6</td><td>51 7 10</td><td>122 6 10</td></tr><tr><td>Difference,...</td><td>—4</td><td>—28</td><td>—35.44</td><td>—1,485 6 9</td><td>+1 10 3</td><td>+23 6 2 1/4</td></tr></table>	Season.	Grants.	Allotments.	Area in Sqr. Miles.	Cost.	Per Square Mile.	Per Circuit.					Rs. As. P.	Rs. As. P.	Rs. As. P.	1855-56,	33	71	206.62	10,300 3 3	49 13 7	99 0 7 1/4	1856-57,	29	43	171.18	8,814 15 6	51 7 10	122 6 10	Difference,...	—4	—28	—35.44	—1,485 6 9	+1 10 3	+23 6 2 1/4	<p>as in the case of an entire district.</p> <p>On the evacuation of Goruckpore by the Civil Authorities on the 13th August 1857, the native establishment was paid up and discharged, many of the mootsudees and classies being at that time on leave.</p> <p>A few classies were left behind in charge of the camp equipage, but of course the whole fell into the hands of the enemy.</p> <p>Fortunately Mr. Vaughan was able to bring away some of the most valuable of the instruments with him, all the theodolites and prismatic compasses, which have been duly deposited in store. The Sub-Assistant is deserving of high praise for his laudable zeal for the public property when he lost almost the whole of his own.</p>	<p>and paid up, after producing proper certificates of their loyalty from the Magistrates of the districts in which they were residing. These men will be again drafted into other surveys as occasion demands.</p>
Season.	Grants.	Allotments.	Area in Sqr. Miles.	Cost.	Per Square Mile.	Per Circuit.																																	
				Rs. As. P.	Rs. As. P.	Rs. As. P.																																	
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Difference,...	—4	—28	—35.44	—1,485 6 9	+1 10 3	+23 6 2 1/4																																	

The above shews a falling off in the extent of work performed during the past season, owing to the causes above mentioned.

Unfortunately the field books and field sketch of the circuit in pergunnah Sidhooa Jobunna, are stated to have been lost in the hurry of the evacuation of the station of Goruckpore; consequently no map of this can be made.

The work of the season has been closed upon three of the principal stations of the great trigonometrical survey, and a comparison of the direct distances affords the following highly satisfactory results, both as regards the linear measurements and the azimuths:—

Names of G. T. Stations.	G. T. Survey distance in feet.	Revenue Survey, distance in feet.	Difference per mile in feet.	G. T. Survey, Azimuth.	Revenue Survey, Azimuth.	Difference.
From Saonbursa to Banarsi,	52740'41	52735'32	—0'509	35.43.18	35.45.07	0'01'49
" Soopoor to Banarsi,	61749'87	61777'32	+2'35	271'47'52	271.44'30	—0'3'22
" Chanda to Soopoor,	54950'51	54904'08	—4'46	280'55'31	280'57'41	+0'2'10

In addition to the general cost above noted, as given from the regular pay bills, the contingencies have been considerable, amounting to Rs. 2,800-12-4, of which Rs. 2,136-6-0 was for clearing the jungle along the rays for the boundaries of the allotments, and Rs. 664-6-4 for the feed and keep of Government elephants.

The contingent bills for cutting the jungle were checked by the local authorities.

In consequence of the breaking up of this party, the following expenses incurred for the three months of the current official year, October to December are recorded in this place, viz.:

	Rs.	As.	P.
Sub-Assistant's salary and contingent allowance,	750	0	0
Native establishment,	336	4	10
Total expenditure to be debited to the Goruckpore survey,	1,086	4	10

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.							On what duty proposed to be employed during the ensuing year.	REMARKS.
		From the commencement of these operations to the close, the following out-turn has been derived:—								
		Number of grants, allotments and villages.	Total area in square miles.	Cost.			Rate per square mile.			
				Rs.	As.	P.	Rs.	As.	P.	
		160	489-98	31,242	6	1	63	12	1	
		<p>the above expense has to be met out of the general savings from the whole of the surveys in the N. W. Provinces.</p> <p>The village or allotment plans have all been duly prepared and together with their computations lodged in two volumes containing 72 plans, but the general map on the one-inch scale is in abeyance, owing to the sudden breaking up of the establishment in August 1857, and the loss of time occasioned to the Sub-Assistant in charge, who after vacating Goruckpore, was detained some time at Ghazeepore, and then came down to Calcutta to complete his work in this office, under authority of the Central Government, No. 515, dated the 24th September last. The remaining Map will shortly be completed and sent in.</p> <p>The following copy of Mr. Vaughan's letter, dated the 18th August last, refers to the order for the evacuation of Goruckpore, and shews what Government property was abandoned:—</p> <p>No. 18, dated 18th August 1857, from J. Vaughan, Esq., Sub-Assistant Surveyor in charge Goruckpore Survey, to Deputy Surveyor General.</p> <p>SIR,</p> <p>I have the honor to forward herewith copy of a note from W. Wynard, Esquire, Officiating Judge of Goruckpore referring to our departure from that station. Mr. Wynard has not dated his note, but I received it on the evening of the 11th Instant, and on the evening of the 13th Instant, the station was made over to the Rajahs, and the officers and all the residents left with the Goorkha force en route to Benares.</p> <p>2nd. The want of carriage has prevented me from bringing away more than the plans and numerical data of the current year, five theodolites, two prismatic compasses, the correspondence, and bill book. The rest of the Government property has been left at Goruckpore, in charge of fourteen men including the guard burkundazes.</p>								

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>3rd. Under the circumstances mentioned, I think it advisable that I should proceed to Calcutta and bring up my work at your office; as in the absence of any mathematical instruments, it will be impossible to complete the general and village plans, I will however feel obliged by your instructions as to how I should act; and whether in the event of my coming to Calcutta, I may bring the theodolites and prismatic compasses with me, or make them over to the nearest magazine.</p> <p>I have, &c., (Signed) J. VAUGHAN, Sub-Assistant Surveyor in charge.</p>		

REVENUE SURVEYOR GENERAL'S OFFICE, }
Calcutta, 2nd August, 1858.

E. W. HOPPNER,
Assistant Revenue Surveyor.

H. L. THUILLIER, Major,
Deputy Surveyor General.

TABLE A.

General Return of Professional Work for Season 1856-57, namely, from the 1st of October, 1856, to the 30th of September, 1857, exhibiting Cost, Area, and Average Rates per Square Mile and per Circuit.

NORTH-WESTERN PROVINCE SURVEY.

Superintending Officers.	Names of Districts.	PROFESSIONAL WORK.									
		Number of Pergunnahs.	Number of Pergunnah or Main Circuits.	Number of Mouzahs.	Number of Huikas or Traverse Circuits.	Average size of Traverse Circuits.	Area Surveyed in		Cost of Work including Guards.	Average per Sq. Mile.	Average rate per Traverse Circuit.
							Acres.	Sq. Miles.			
Captain D. C. Vanrenen, Artillery, Revenue Surveyor, ...	Jubbulpore, { Eastern and Western portions of pergunnahs Bilherce, Steemanabad, of Koombee, and Jozulpore, ... }	3	12	479	479	1186-6	568371-19	888-08	Rs. 37,153 7 3	As. 41 13 3	P. 77 8 11
Captain J. W. B. Blagrave, 74th Regiment, N. L., Revenue Surveyor, died at Fort Saugor, 6th October, 1857, ... Lieutenant E. H. Willoughby, Artillery, Officiating Revenue Surveyor, ...	Saugor, { Pergunnahs Rahutgurb, Mallhone, Kooye, and Mathone, ... }	4	4	586	586	1068-0	625887-48	977-94	Rs. 38,038 2 6	As. 38 14 2	P. 64 14 6
Captain F. J. Burgess, 74th Regiment, N. L., Revenue Surveyor, massacred with the whole of his Christian establishment, 8th June, 1857, ...	Bundelcund, { Pergunnahs Jhansee, Mow, Oorcha, Churkharce and Chutterpoor, work unfinished and left in a confused and disordered state, ... }	...	5	303	303	3716-6	1126144-00	1750-60	Rs. 28,439 5 4	As. *16 2 7	P. 93 13 8
Lieutenant G. Hamilton, Revenue Surveyor, ...	Bhurtpoor, { Pergunnahs Byanah, Roopbas, Roodawal, Deig, Nuggur, Bhurtpoor Khas, Bulubghur and Oochim, ... }	...	10	904	904	929-39	840174-47	1312-77	Rs. 36,671 13 2	As. 27 14 11	P. 40 9 0
Mr. J. Vaughan, Sub-Assistant Revenue Surveyor, in charge, ...	Goruckpoor, { East Lehra, Tuppah Nagoosa, pergunnah Tilpoor and river Gunduk, ... }	...	4	72	72	1521-59	109554-81	171-18	Rs. 8,814 13 6	As. 51 7 10	P. 122 6 10
Total cost and averages, inclusive of Bundelcund Survey, ...		7	35	2344	2344	1395-10	3270131-95	5109-57	Rs. 1,49,117 9 9	As. 29 2 10	P. 63 9 9
Ditto ditto, exclusive of ditto ditto, ...		7	30	2041	2041	1050-46	2143987-95	3349-97	Rs. 1,20,673 4 5	As. 36 0 3	P. 59 1 11

* The Bundelcund rate is only for a portion of the season, and the work only half finished.

H. L. THUILLIER,
Deputy Surveyor General.

REVENUE SURVEYOR GENERAL'S OFFICE,
Calcutta, 2nd August, 1858.

E. W. HOPNER,
Assistant Revenue Surveyor.

TABLE B.

General Statement of Expenses of Native Establishments of each Survey for Season, 1856-57.

Divisions.	Surveys.	Superintending Officers.	Professional Survey including Guards.			Total.		
1st,	Jubbulpoor,	Captain D. C. Vanrenen,	15391	7	3	15391	7	3
2nd,	Saugor,	Lieutenant E. H. Willoughby,	17466	2	6	17466	2	6
3rd,	Bundleeund,	Captain F. J. Burgess,	15010	3	4	15010	3	4
4th,	Bhurtpoor,	Lieutenant G. Hamilton,	16644	9	3	16644	9	3
5th,	Goruckpoor,	Mr. J. Vaughan,	5814	13	6	5814	13	6
Total Native Establishment,			70327	3	10	70327	3	10
Superintending Officers and Contingencies,			34674	9	7	34674	9	7
European Assistants,			44115	12	4	44115	12	4
Total corresponding with Table A,			149117	9	9	149117	9	9

REVENUE SURVEYOR GENERAL'S OFFICE, }
Calcutta, 2nd August, 1858. }

E. W. HOPPNER,
Assistant Revenue Surveyor.

H. L. THUILLIER,
Deputy Surveyor General.

TABLE E.

General Statement of sums actually drawn, inclusive of Guards, for the 5 Revenue Surveys, during the Season 1856-57, exhibiting amount short-drawn in each Class.

MONTHS.	Superintending Officers and Contingent Allowances.			European Assistants.			Native Establish-ment.			Guards.			Total.		
October, 1856,	2,691	0	0	4,219	8	7	7,775	11	8	324	9	9	15,010	14	0
November, "	3,154	0	0	3,865	0	0	9,620	1	5	313	0	0	16,952	1	5
December, "	3,154	0	0	3,864	3	1	8,159	8	5	329	11	4	15,507	6	10
January, 1857,	3,154	0	0	4,098	11	4	8,131	11	4	332	0	0	15,716	6	8
February, "	3,154	0	0	4,225	0	0	8,087	15	5	332	0	0	15,798	15	5
March, "	3,154	0	0	4,120	0	0	7,815	0	7	326	6	0	15,415	6	7
April, "	3,154	0	0	4,120	0	0	6,949	10	6	246	1	0	14,469	11	6
May, "	3,154	0	0	4,120	0	0	3,346	8	1	176	2	0	10,796	10	1
June, "	2,621	9	7	3,073	5	4	2,408	7	8	157	0	0	8,260	6	7
July, "	2,428	0	0	2,820	0	0	1,930	7	1	157	0	0	7,335	7	1
August, "	2,428	0	0	2,820	0	0	1,624	2	8	111	0	0	6,983	2	8
September, "	2,428	0	0	2,770	0	0	1,562	1	0	110	15	11	6,871	0	11
Total drawn for each Class,	34,674	9	7	44,115	12	4	67,411	5	10	2,915	14	0	1,49,117	9	9
Total passed for each Class,	34,848	0	0	54,720	0	0	55,920	0	0	4,608	0	0	1,50,096	0	0
Total saving to Government,	173	6	5	10,604	3	8	+11,491	5	10	1,692	2	0	978	6	3

Of the above Statement the following Table exhibits the expense under each class, and the savings on each of the 5 Revenue Surveys.

Divns.	Surveys.	Surveyors and Contingent Allowances.			Average number.	European Assistants.			Average number.	Guards.			Average number.	Native Surveyors.			Average number.	Classes or Measurers.			Total Expense.			Total Saving.		
1st,...	Jubbulpore,	8,712	0	0	6	13,050	0	0	12	680	5	6	26	6,778	2	4	162	7,932	15	5	37,153	7	3	370	8	9
2nd,...	Saugor,	8,712	0	0	6	11,860	0	0	17	1,024	10	4	36	6,592	11	3	183	9,848	12	11	38,038	2	6	+514	2	6
3rd,...	Bundlecund,	6,001	9	7	6	7,427	8	5	9	415	10	8	23	6,343	5	6	161	8,251	3	2	28,439	5	4	9,084	10	8
4th,...	Bhurtpoor,	8,249	0	0	6	11,778	3	11	10	635	3	6	23	7,132	12	10	149	8,876	8	11	36,671	13	2	852	2	10
5th,...	Goruckpoor,	3,000	0	0	1	0	0	0	4	160	0	0	10	2,084	15	3	61	3,569	14	3	8,814	13	6	+8,814	13	6
	Total,	34,674	9	7		44,115	12	4		2,915	14	0		28,931	15	2		38,479	6	8	1,49,117	9	9	978	6	3

67,411-5-10

REVENUE SURVEYOR GENERAL'S OFFICE,
Calcutta, 2nd August, 1858.

E. W. HOPNER,
Assistant Revenue Surveyor.

H. L. THUILLIER,
Deputy Surveyor General.

TABLE F.

STATEMENT of the savings in each Class of the undermentioned surveys respectively for Season 1856-57.

Divisions.	Surveys.	Superintending Officers.	Superintending Officers and Contingent Allowances.		Assistants.		Native Establishments.		Guards.		TOTAL.	
			Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
1st.	Jubbulpoor, ...	Captain D. C. Vanrenen, ...	630	0 0	+ 731	1 9	471	10 6	370	8 9		
2nd.	Saugor, ...	Lieutenant E. H. Willoughby, ...	1,820	0 0	+ 2,461	8 2	127	5 8	+ 514	2 6		
3rd.	Bundlecund, ...	Captain F. J. Burgess, ...	2,710	6 5	6,252	7 7	+ 614	8 8	736	5 4	9,084	10 8
4th.	Bhurtpoor, ...	Lieutenant G. Hamilton, ...	463	0 0	1,901	12 1	+ 2,029	5 9	516	2 6	852	2 10
5th.	Goruckpoor, ...	Mr. J. Vaughan, ...	+ 3,000	0 0	.....	.....	+ 5,654	13 6	+ 160	0 0	+ 8,814	13 6

Divisions.	Surveys.	Excess for Superintending Officers.		Excess for Assistants.		Excess for Native Establishments.		Excess for Guards.		Balance as shewn in Table E.	173		6 5		10,604		3 8		+ 11,491		5 10		1,692		2 0		978		6 3	
		Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.		Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.
1st.	Jubbulpoor, ...	731	1 9																					
2nd.	Saugor, ...	2,461	8 2	.....	.....	.....	.....	.....	.....															
3rd.	Bundlecund, ...	614	8 8	.....	.....	.....	.....	.....	.....															
4th.	Bhurtpoor, ...	2,029	5 9	.....	.....	.....	.....	.....	.....															
5th.	Goruckpoor, ...	3,000	0 0	.....	.....	5,654	13 6	160	0 0																			

REVENUE SURVEYOR GENERAL'S OFFICE, }
Calcutta, 2nd August, 1858.

H. L. THUILLIER,
Deputy Surveyor General.

E. W. HOPPNER,
Assistant Revenue Surveyor.

PUNJAB.

BENGAL PRESIDENCY.

1st Division, Baree Doab.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Captain G. H. Thompson, 7th Regiment N. I., Revenue Surveyor, 28th August 1850.	Sick Certificate to Europe for 15 months. In executive charge of the survey of the Mooltan district, comprising the southern portion of the Baree Doab, from 1st October 1856 to 26th January 1857.	The Season of 1856-57 opened as usual with this establishment by their resuming the field operations, on the 1st of November 1856, in the southern extremity of the Doab, and continuing the survey of the Mooltan district under the direction of Captain G. H. Thompson who remained in charge only to the 26th January 1857, the date on which he proceeded to Europe on sick furlough, when the duties devolved on his Covenanted Assistant Captain Sir Edward Campbell, Bart., who prosecuted the same in pergunnah Mooltan, and the unsurveyed portion of pergunnah Mylsee, the former situated on the left bank of the Chenab river extends to nearly 30 miles south-east, and is bounded on the north and west by the river itself, by pergunnah Serrae Siddhoo on the east, and on the south by pergunnah Shoojabad, and the dry bed of the old course of the Beas. The fort and town of Mooltan is situated in this circuit. The latter pergunnah (Mylsee) lies along the right bank of the Sutlej, having pergunnahs Pak Pattun and Lodhran on its east and west, and is bounded on the north by the dry bed of the Beas along pergunnahs Hurruppa, Serrae Siddhoo and Mooltan, and on the south by the river Sutlej.	Continuation of the district of Mooltan in pergunnahs Mooltan and Mylsee, which has now been completed, thus perfecting the Baree Doab, and rendering the services of this party available for other duty on new ground, from the commencement of the ensuing season of 1858-59, as specially reported to Government in my letter, No. 16, dated the 30th ultimo.	As stated in last report, this party recessed last season at Simlah, which affords great facilities for getting up the mapping and other work; and it is proposed to do the same at this season. After the fall of Delhi, application was made to the Chief Commissioner of the Punjab, for the recovery of Captain Sir Edward Campbell's services, but unfortunately they could not be spared from military duty.
Captain Sir E. Campbell, Bart. H. M.'s 60th Rifles, Officiating Revenue Surveyor, 16th September 1853.	Officiating, from 26th January to 1st July 1857.	This compact area forming almost a square block between the Sutlej and Chenab rivers, embraces 1,914 square miles, of which 340 square miles are cultivated or fallow, 1,385 square miles culturable, 133 square miles barren waste, and 56 square miles of river Area. This was divided for accuracy of survey into 8 convenient main circuits or blocks containing 477 villages forming 570 separate hulkas with 2 river and 69 Thul or jungle tracts separately enclosed. Pergunnah Mooltan comprises 250 villages, 56 chucks, and 45 jungle tracts, of which a few were taken up the previous season, and the whole forms two thannahs, one at the sudder station, and the other at Turghur Oorf Bustee Mullook, pergunnah Mylsee contains 435 villages, 52 chucks and 58 jungle circuits, of which about one-half were included in the previous season's survey. These villages are apportioned to 4 thannahs at Loodun, Mylsee, Tibba and Kuhror with the Tuhseel at the town of Mylsee from which the town takes its name.	An approximate area of 1,174 square miles have been surveyed all of the most minute and intricate work in pergunnahs Shoojabad and Lodhran of the Mooltan district.	Lieutenant F. C. Anderson after being transferred to this survey on the 23rd November, 1857, was obliged to return to take charge of his own party in the Sind Sagur Doab, on the 21st January last, consequent on the promotion of Lieutenant Colonel Shortrede, Revenue Surveyor, and the placing of his services by the Government of India at the disposal of the Commander.
<i>Assistants.</i>				
Mr. G. H. Blyth, 27th December 1846.	Officiating, from 1st July to 30th September 1857.			
<i>Sub-Assistants.</i>				
Mr. W. Ellison, 1st November 1846.	Assisting.			
Mr. E. Loftie, 29th January 1847.	Ditto.			
Mr. E. Billon, 1st October 1855.	Ditto.			
18 Native Surveyors.		The average size of the village circuits is as large as 1,444 acres, or upwards of 2½ square miles each, whilst that of the Thul jungle, and river is 18,098 and 5,300 acres respectively. This work was brought to a termination by the		

end of April when Captain Sir Edward Campbell returned to Simlah to complete the computations and maps.

The total outlay incurred for the field and recess work, for the full season, amounts to Rs. 38,555-15-1, including the half staff salary of Captain Thompson and Sir Edward Campbell whilst on leave and all charges. This is 1,032-15-1 in excess of the authorised grant of 37,524 Rs. which will be accounted for by the local Government, who alone have the audit of the Surveyor's bills.

The average rate comes to Rs. 20-2-3 per square mile on the total area and Rs. 45-1-5 on the village circuit of the *bonâ fidê* mouzawar work only. This is higher than the results of the previous season, when the rate on the square mile was Rs. 7-2-1 lower on a much larger area effected at a larger outlay. The rate per circuit is of course large, owing to the enormous size. This great difference in the area surveyed is caused simply by the tracts of Thul or waste, which predominated in 1855-56. During the season under review the 4 main circuits constituting the Thul or waste portion, come up to 958 square miles almost exactly one-half of the total surveyed. The relative cost will therefore be Rs. 26-14-2 for the mouzawar work, and Rs. 13-6-8 for the Thul.

The comparison of the two Seasons' outturn stands as follows:—

	Square miles.	Cost.	Average rate per sq. mile.	Average per village circuit.
1855-56,.....	3,510	45,670 3 1	13 0 2	23 15 9
1856-57,.....	1,914	38,555 15 1	20 2 3	45 1 5
Difference,.....	—1,596	—7,114 4 0	+7 2 1	+21 1 8

Sir Edward Campbell had scarcely effected his arrangements for carrying out the recess duties to advantage, before he was ordered to join his regiment, H. M.'s 69th rifles then before Delhi; and on the 1st July 1857, he made over charge of the establishment to Mr. G. H. Blyth, the senior uncovenanted assistant, who continued to conduct the duties until the end of the recess. By the orders of the Chief Commissioner of the Punjab, Lieutenant F. C. Anderson, Assistant Surveyor on the Sind Sagur establishment was transferred, and joined the party on the 23rd November 1857, in time to commence the present season's field operations. Thus in the period of twelve months no less than four different Officers have had charge of this party. Such unprecedented changes, and the absence of Sir Edward Campbell especially during the greater part of the recess, added to other prevailing causes during the trying period in question, have of course had a marked effect, and retarded the work considerably. But

in-Chief, Bombay. Mr. G. H. Blyth therefore again received charge, and has continued to conduct the field work up to the present time. I am happy however in being able to state that Captain G. H. Thompson returned from furlough on the 26th ultimo, and proceeds at once to reassume charge of his survey at Simlah.

Application having been made to the Government of India for the services of young officers to be appointed as Assistant Surveyors to fill existing vacancies, in my letter, No. 11, dated the 29th March last, Lieutenant Minto Elliot, of the Artillery, a highly qualified and promising young officer, has been nominated by G. O. G. G., No. 870, dated 4th May last, to the Barêe Doab party, and will join Captain Thompson at Simlah.

Messrs. Ellison and Loftie, Sub-Assistants, have been strongly recommended for promotion to the superior grades, the former from 200 to 250, and the latter from 175 to 200 Rupees per mensem, from the 1st January last, which they appear to me to be well deserving of.

Mr. Loftie has been transferred from this survey to Sindh, in exchange for Mr. Scott.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>by the energy and ability of Lieutenant Anderson, Officiating Revenue Surveyor, who in addition to starting the new season's work on a sound and proper footing, has furnished me with the report of the proceedings for the season 1856-57, I am now enabled to complete my own review; and I am happy to state that the principal arrears have been brought up.</p> <p>The several pergunnah or main circuit maps on the one inch scale, 8 in number, together with an index, have been just received in this office; and I have much pleasure in stating that they have given me very great satisfaction. They are very superior productions, elegantly drawn, and the details as full and complete as could be desired. Those by Messrs. Ellison and Loftie, Sub-Assistant Surveyors, especially call for marked approval. Every credit is due to Sir Edward Campbell, the Officiating Revenue Surveyor for the admirable arrangements he made prior to leaving for Delhi. With a reduced establishment, and no Convenanted Assistant to help him, he effected an excellent season's work, and by his example and industry, had every thing relating to the recess duties in good train for completion by the usual time; but his own services being withdrawn at a critical period, made a great difference, inasmuch as his own superior skill as a draftsman, added to his persevering and business-like habits, would have told well. I cannot commend in too strong terms the valuable services of this promising and most excellent officer. By his withdrawal the department has lost one of its hardest working and most able officers.</p> <p>I have reason also to be satisfied with the endeavours of Mr. Blyth, during the time he has held independent temporary charge—he is pains-taking; is a good draftsman, and has a good theoretical knowledge of the duties of his profession, and is also I believe a good revenue officer.</p>		

2nd Division Sind Sagor Doab

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Lieut.-Col. R. Shortrede, 2nd European Bombay Fusiliers, Revenue Surveyor, 20th February 1851.	In executive charge of the Survey of the Leia district. On Military duty to Persia from 12th November 1856, to 20th July 1857.	The tract of country in district Leia between the Chenab and the Indus rivers, which came under the operations of this establishment which took the field under Lieutenant Anderson's superintendence during the season under review, has for its southern boundary pergunnah "Araen" of district Kanghur on the latitude of Dera Ghazee Khan, surveyed in the previous season and continues northwards along the left bank of the river Indus to an extent of 36 miles up to Darya Khan, a large village immediately opposite the military cantonment of Dera Ishmael Khan. The general area embraced may be described under two distinct heads "Thul" or "Barh jungle," and "Jhik" or low land. The "Jhik" is for the most part a rich alluvial soil left by the receding Indus. It is subject to periodical inundations, and being highly cultivated is thickly populated, and was consequently demarcated and divided off into village circuits. In breadth it varies from 8 to 12 miles from the river's edge to the western borders of the Thul. The "Thul" is but scantily inhabited; but as it yields excellent pasturage for cattle of all descriptions, certain portions of it have been included within the defined boundaries of such villages as are contiguously situated; for the most part however, the Thul has only been surveyed topographically in convenient size blocks.	Continuation of the survey of the Leia district in this Doab, of which the pergunnahs commenced in the last season, together with pergunnahs Mean-Wallah, Bhukur and Shahpoor, aggregating an area of about 4,300 square miles, have been surveyed up to the present date. It is expected that the Leia district will require another full season to complete it, and to form a junction with the topographical survey of the Jhelum district under Captain D. G. Robinson, along the south of the Salt range. With the completion of this district, the whole of the Punjab Proper will have been brought to a close; a work, considering the nature of the survey and the time employed on it, of no ordinary magnitude.	On the 12th November 1856, Lieutenant Colonel Shortrede, Revenue Surveyor, made over charge of this party to his Assistant, Lieutenant Anderson, in consequence of being placed at the disposal of the Commander-in-Chief, Bombay, for Regimental Duty on Service to Persia; from which he returned and resumed charge at Murree on the 20th July 1857, and conducted the recess duties until the establishment again took the field in the vicinity of Darya Khan. On or about the beginning of December last, Lieutenant Colonel Shortrede (having attained his Regimental rank) left Murree for Rawul Pindi, where he remained, until he was again placed at the disposal of the Commander-in-Chief, by G. O. G. G., No. 4672, dated 19th November 1857, consequent on his Regimental promotion. But in consequence of orders received from the Chief Commissioner, Lieutenant-Colonel Shortrede did not finally make over charge to Lieut.
Lieutenant F. C. Anderson, 71st Regiment, N. L., Officiating Revenue Surveyor, 10th September 1852.	Officiating from 12th November 1856 to 20th July 1857.			
<i>Assistants.</i>				
Mr. J. Kavanagh, October 1838.	Assisting.			
Mr. G. Housden, 18th February 1847.	Ditto.			
<i>Sub-Assistants.</i>				
Mr. P. J. McKeever, 8th March 1852.	Assisting.			
Mr. C. W. Campbell, 1st November 1853.	Ditto.			
Mr. G. Buttress, 1st November 1855.	Ditto.			
22 Native Surveyors.		The above includes 3 pergunnahs or tehseels, viz., "Adookot," "Leia" and "Darya Khan" forming the western portion of the Doab with two Indus river circuits belonging to Dera Ishmael Khan and Dera Ghazee Khan of the Derajat. The whole of the first named pergunnah has been completed, very nearly all of pergunnah Leia and about half the cultivated portion (or Jhik) of pergunnah Darya Khan. This area was divided into eight main circuits, and seven river circuits, the Mowzawar portion consists of 272 village circuits only, in an area of 2,060 square miles, giving the very large average size of 4847. The "Thul" or jungle sub-divided into 24 blocks or circuits, equals 1,362 square miles; and the river circuits 307 square miles, aggregating a total area of 3,729 square miles, as the out-turn of the season's work, the whole of which was conducted by Lieutenant Anderson. The expenditure has been 37,994-2-8 (including Lieutenant-Colonel Shortrede's half staff salary for 8 months whilst absent on Military duty) which yields a general average rate per square mile on the total area of Rs. 10-2-10. The proportionate cost of the regular Mowzawar and the river and Thul or Barh jungle lands, is Rs. 12-4-10, per square mile for the former, and Rs. 7-9-3 for the latter, or reckoning the Thul area in the ratio of 3 to 1, of the Mowzawar work, the total performed might be reckoned equal to 2,616, of the	Of the above area executed during the	

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.																				
		<p>same description of work which would give the general rate of 14-8-4 per square mile. This outlay exceeds the maximum grant by Rs. 47½; but the total drawn in abstracts amounted only to 35,986 and the half staff salary of the Revenue Surveyor, who was absent with his Regiment in Persia, was subsequently drawn in a separate bill to the extent of Rs. 2,007, which brought the expenses up beyond the authorized sum. Additional expense was also incurred by the circumstance of having to revise certain village boundaries in the Goozrat District, which work was tedious and entailed the special deputation of several surveying parties.</p> <p>Contrasted with the previous Season, the following results appear :—</p> <table><thead><tr><th></th><th>Sq. Miles.</th><th>Cost.</th><th>Sq. Miles.</th></tr><tr><th></th><th></th><th>Rs. As. P.</th><th>Rs. As. P.</th></tr></thead><tbody><tr><td>Season 1855-56,.....</td><td>3,620-59</td><td>49,392 0 0</td><td>13 10 3</td></tr><tr><td>„ 1856-57,.....</td><td>3,729-03</td><td>37,994 2 8</td><td>10 2 10</td></tr><tr><td>Difference,</td><td>+ 108-44</td><td>—11,397 13 4</td><td>—3 7 5</td></tr></tbody></table> <p>On nearly the same area the reduction in the mileage rate is equal to about one-fourth, or Rs. 3-7-5, which is very satisfactory. The cost per circuit is of course thrown out of the comparison, because of the peculiar nature of the country and the heavy admixture of waste lands to cause the average size of the villages to run up so high.</p> <p>Thus a very fine area of the regular Mowzawar work, has been obtained, in addition to the topographical survey of the Barrh or Thul, which causes the total outturn to be so large, and the cost consequently so low. The style of the work rendered to this office, I am happy to say, is unexceptionable in every respect. The documents forwarded by Lieutenant Anderson, consist of 10 main circuit maps, on the one-inch scale. These have fortunately reached me in good preservation, and being admirably finished with the topographical details clearly and beautifully shewn, and the village boundaries distinctly defined, have afforded me the highest satisfaction, as evincing the greatest credit, to Lieutenant F. C. Anderson, under whose effective superintendence and able management, the whole of the season's work has been brought up. The village plan volumes have been duly prepared, but cannot be transmitted at the present juncture of affairs; they are however well cared for, and will be sent down whenever a safe opportunity occurs.</p> <p>The operations of the season under review, have been based on no less than 12 Principal and three Secondary Stations of the Indus series of the Great</p>		Sq. Miles.	Cost.	Sq. Miles.			Rs. As. P.	Rs. As. P.	Season 1855-56,.....	3,620-59	49,392 0 0	13 10 3	„ 1856-57,.....	3,729-03	37,994 2 8	10 2 10	Difference,	+ 108-44	—11,397 13 4	—3 7 5	<p>present season the Mowzawar or detail portion amounts only to 617 square miles, leaving 3,592 square miles as Thul or waste, and 91 square miles of river circuits. About 1,500 to 2,000 square miles of the plains of this Doab now only remains for survey; but a proposition has been made by the Punjab Authorities, to transfer the Jaba Tehseel from Rawul Pindi to the Shahpoor district, and to have it surveyed Mowzawar by this party. The Jaba Tehseel is said to lie, for the most part, within the Salt range; and to have already come within the topographical operations of Captain Robinson, by whom the survey has been completed. I have received no intimation on this subject, except from the Surveyor; but if a second survey is needed, the expense will be very considerable; and it is far from desirable to allow the two se-</p>	<p>tenant Anderson, who had to be recalled from the Baree Doab, until the 1st March last. Lieutenant Anderson from the 23rd November, 1857 to 21st January 1858, was transferred to the charge of the Baree Doab survey; during which time, in consequence of Lieutenant Colonel Shortrede remaining at Murree and Rawul Pindi, the Field operations in the vicinity of Shahpoor, a distance of about 100 miles, had only the supervision of the Uncovenanted Assistants.</p> <p>Thus the frequent changes in the Superintendence of this party have caused considerable embarrassment, and will doubtless slightly affect the season's outturn; but I trust now that definite arrangements have been made, the duties under Lieutenant Anderson's energetic and zealous control, will go on systematically and well.</p> <p>A Covenanted Assistant has been applied for to fill a vacancy on this survey; but a suitable young Officer with the required qualifications whose services can be spared just now, has not yet been found. I</p>
	Sq. Miles.	Cost.	Sq. Miles.																					
		Rs. As. P.	Rs. As. P.																					
Season 1855-56,.....	3,620-59	49,392 0 0	13 10 3																					
„ 1856-57,.....	3,729-03	37,994 2 8	10 2 10																					
Difference,	+ 108-44	—11,397 13 4	—3 7 5																					

Triangulation now in course of prosecution under Captain Walker. The distances of all these Stations of latitude and departure from the Mooltan Meridian, have been calculated and submitted, and their direct distances one from another likewise computed; but until the data of the Great Trigonometrical Survey has been computed, no comparison can be made between the results of the two surveys.

Lieutenant Anderson during the past year has proved himself a most active and intelligent Officer; he has not only conducted the Sind Sagur survey in a superior manner for eight months, during the absence of Lieutenant Colonel Shortrede, but after being relieved of this charge, he has successfully guided and controlled the Baree Doab operations in the absence of the two Covenanted Officers of that party, and by his ability and experience, has done excellent service there, starting the work on a proper system, and furnished the narrative reports for both surveys. I can, with much confidence point out Lieutenant Anderson, as well deserving the notice and approbation of Government. It is a matter of congratulation that after rather a long service in the department as an Assistant, he has now succeeded to the independent charge of a survey.

parate and distinct surveys, to clash in going over the same ground.

trust one will be nominated shortly.

Lieut. Col. Shortrede has reported very favorably of several of the Assistants and Sub-Assistants on this establishment, and he specially recommends Mr. Kavanagh, Assistant Revenue Surveyor, for an increase of Salary to the extent of 50 Rs. viz. from 300 to 350, and Messrs. McKeever and Buttress for an increase of 25 Rs. viz., from 125 to 150 and from 75 to 100 respectively, from the 1st of November last, in which I have expressed my concurrence. This expense will be covered out of the authorised grant.

3rd Division, Derahjat.

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Captain H. C. Johnstone, 5th Regiment N. I., Revenue Surveyor, 27th May, 1853. <i>Assistant.</i>	In executive charge of the Survey of De- rahjat.	This establishment of the strength specified, re-commenced its field operations on the 1st November 1856, in pergunnah Mittunkote in the district of Derah Ghazee Khan; considerable sickness prevailed at the early part of the season, and it was not until the beginning of January following that all hands could be set to work in this difficult country. The tract of country brought under survey lies on the right bank of the Indus river, to the north and west of the portion completed during the previous season, and to the north of Asnee cantonment; embracing the remainder of the large pergunnah of Mittunkote, covering an area of 1,348 square miles with portions of pergunnah Jampoor, to the extent of 736 square miles; of British hills in front of Mittunkote, 636 square miles; and of hills across the frontier in the Khelat Territory 176 square miles; a small portion of the Sindh, 28 square miles; and about 5 square miles of the Derah Ghazee district, which happened to fall within the operations. This area aggregating 2,929 square miles, extends from the "Gungehur" Military post on the north, to the "Lehree and Kush-moor" boundary pillars on the south, which divide the Punjab from Sindh.	Continuation of the Survey of the Derah- jat, of which about 2,643 square miles of plains and hills of district Derah Gha- zee Khan, have been completed during the current season of 1857-58.	On the conclusion of the season's operations for 1856-57, the establish- ment returned to Murree for the recess duties. The services of Captain J. L. Sherwill, Assistant Sur- veyor, and Messrs. A. Foy and W. H. Patterson, Sub- Assistants, were warmly acknowledged by the Sur- veyor, who states that the hardships all had to undergo in their turn, were cheerfully borne;
Captain J. L. Sherwill, 39th Regiment N. I., 26th September, 1856. <i>Sub-Assistants.</i>	Assisting.	The description of survey in this peculiar country is strictly topographical. All the hills and the prairie tracts in front of the frontier road, have been laid down on a scale of one mile to the inch; the remaining tracts lying between the Indus and the frontier road which contain what little cultivation and signs of habitation there are, on the larger scale of two inches to the mile.	The plains of the Derah Ghazee Khan district remaining for survey at the com- mencement of the present season, were estimated at about 4,000 square miles.	and he thinks that it is not a little credit that is due to the establishment, for never once having come into collision with the inhabitants. I quite concur in this opinion, and have no doubt that the Chief Commissioner of the Punjab has appreciated the excellent management of Captain Johnstone, which has entirely prevented any disturbance with the wild tribes of the frontier.
Mr. A. Foy, 2nd July, 1847.	Assisting.	The work in the plains has been executed in the ordinary manner, arranged into ten convenient sized main circuits, the point of departure in the absence of any G. T. Survey station being the dome of "Pir Agil Mahomed's" Tomb at Mittunkote, the same as in the former season. The main roads of the country have been taken advantage of, as far as practicable, for the boundaries of both main and sub-divisions; where roads did not exist, the jungle had to be cleared, which in a country with so sparse a population proved a very arduous task.	This work, with the belt of hills in front lying to the south of the Kuttuck moun- tains, a continuation of the Suffaedkoh, will occupy the establish- ment, at its present strength, until the end of the next season of 1858-59.	
Mr. W. H. Patterson, 1st December, 1851.	Ditto.	The entire area of the river Indus including both banks, has also been included in separate circuits, and the village positions on the left bank taken up within three or four miles, for the sake of a due connection between the two surveys.		Messrs A. Foy and W. H. Patterson having been recommended for promo- tion to the next higher grades, were raised from the 1st May 1857, the for- mer from 225 to 250 Rs. as Assistant Surveyor,
Mr. H. Meany, 22nd Sep- tember, 1857.	Ditto.	It is believed that the scales employed are amply sufficient to show all that is necessary for any purpose whatever of such description of land; and the Surveyor states that every thing possible in the scale of the survey, has been recorded.		
Golam Nubbi Khan, 1850.	Ditto.	The principle adopted for the hilly ground is the same as that reported last season; small series of minor triangulation have been carried up the passes in every possible instance by the Surveyor himself, and his Covenanted Assistant Cap-		
14 Native Surveyors.				

tain J. Sherwill, two excellent and most enterprising Officers, who have succeeded in defining this difficult ground with considerable accuracy, under no ordinary obstacles both of nature, as well as of the tribes who inhabit the neighbourhood; several large triangles have been formed from the stations of the grand circuits in the plains, and from these the minor series of triangles emanated, the configuration of the hills and every feature visible being sketched and protracted in the field.

The boundary between British and Khelat Territory runs in a straight line from "Leree" Tower, in the Sindh frontier, to "Gehundaree" mountain; and from thence to the "Maree" mountain situated about 18 miles to the west of the Fort of Hurrund. To the north of Maree, the British boundary is the base of the lowest range of hills. It is intended to survey in as far as Maree on the Soleiman range wherever practicable; all the information regarding these passes being deemed valuable.

The area thus effected, amounts to 2,929 square miles, which is considerably in excess of the out-turn of last year, and fully realizes the anticipations expressed in my last report of the improvement to be expected, as the establishment was recruited to full strength, became inured to the climate, and accustomed to the peculiarity of the country and its attendant difficulties. Of this area 2,026 square miles lie in the plains, 90 square miles are river, and 813 are hills. The cost of the establishment comes to Rs. 33,030-3-0, leaving only a small balance of Rs. 45-13-0 out of the fixed annual grant, as savings to Government. This yields an average rate per square mile of Rs. 11-4-3, which is less than one-half of the rate of the previous season as will be thus seen:—

	Area.	Cost.	Rate.
Season 1855-56.....	677-63	19,271 11 9	28 7 0½
" 1856-57.....	2,928-79	33,030 3 0	11 4 3
Difference	+ 2,251-16	+13,758 7 3	-17 2 9½

or the average of two seasons together is 14-8-0, which although still high for such description of work, may be said to be approaching a moderate estimate; and it is to be hoped that in another season or two, the general average of the whole will still further be materially reduced.

To this end, a recommendation has been made to the Chief Commissioner to increase the strength of the establishment, which is of the single or smaller scale, on 33,076, to the full strength, the same as all the other surveys, viz., 37,524 per annum. True economy will be gained by this small additional outlay.

In addition however to the regular expenditure above recorded, the contingencies on this survey are unusually high, amounting to Rs. 3,935, chiefly for cutting the jungle and camel hire, which is stated to have been absolutely essential, for the conveyance of water and supplies for the several survey parties, when their work lay many miles from either; and it was found more advantageous to give such assistance, than to allow the time to be lost in travelling backwards and forwards to procure supplies; each survey party also was allowed

and the latter from 125 to 175 Rs. per mensem, under the approval of the Chief Commissioner.

Mr. A. Foy's health having severely suffered, he has been compelled to proceed to sea on Medical Certificate for 12 months under sanction of Punjab Government.

Mr. J. Cooper, a Sub-Assistant 3rd class, on probation, was found so ill adapted to the work, that he was allowed to resign his situation on the 1st June 1857.

Golam Nabi Khan, Sub-Assistant 3rd class being found unequal and unsuited to the particular style of hard work in the Derajat was transferred to the Bhurtpoor survey on the 14th February 1858. This Sub-Assistant was on leave of absence at Allahabad at the time of the rebellion at that place; he in no way came to the assistance of the British residents on that occasion, and his house was spared by the rebels: he was declared by the Magistrate to be neutral. His brother a Ressaldar of the 10th Irregular Cavalry was one of the foremost in raising the mutiny at Nowshera. These circumstances being reported to Government, Golam Nubi Khan was dismissed the service as unworthy of further fa-

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>camels to carry baggage and a tent, without which they could not have moved in such a country, so entirely destitute of the ordinary appliances.</p> <p>The results of the season's work have been furnished to this office in the several maps and records marginally cited, and I have every pleasure in stating that they have afforded me entire satisfaction. Captain Johnstone is a most painstaking and energetic officer, and has done great justice to the arduous task he has undertaken. The admirable style in which all these maps have been got up reflect much credit on the Surveyor, who has guided and controlled the entire work, and on his Covenanted Assistant, Captain James Sherwill, who has proved himself an elegant draftsman and a zealous hardworking assistant. Captain Sherwill's mode of treating the hilly tract by contour shading is very effective; he has likewise illustrated the character of the hills by some excellent sketches, which together with copious notes and remarks on their geological construction, and regarding the physical aspect of the country, renders the plans doubly valuable. This officer having now served throughout two field seasons has gained a good practical knowledge of his professional duties, and from his previous training in the Department Public Works, and his excellent temper and judgment, he may safely be pronounced qualified for independent employment, whenever the charge of a survey may become vacant. The maps produced by Messrs. A. Foy and Patterson are likewise deserving of much commendation.</p> <p>The following interesting remarks are made by Captain Johnstone in his annual report, on the general features of the country; these are intended as mere passing remarks, a complete statistical and geographical report will be furnished when the district is completed.</p> <p style="text-align: center;">EXTRACT.</p> <p>"23rd.—The "Shoree" is a large broad pass and passable for camels and cavalry right up to the Shum plain where it takes its rise. This plain lies some thirty miles to the North-west of Gehundaree peak. The boulders in many parts cover the pass, and would render the passage of artillery excessively difficult if not impossible. The same remarks apply to the Zungee and upper Shoree passes which take their rise under Gehundaree mountain. All three passes are used as roads to Kahun the capital of the Murree tribe."</p>		<p>vor and protection from a liberal Government.</p> <p>Mr. H. Meany, a youth of 19 years of age, from the Lawrence Asylum, of promising abilities, was, after examination, appointed a Junior Sub-Assistant Surveyor in September 1857 to fill a vacancy.</p> <p>Mr. E. Foy has been transferred to this survey from Sindh.</p> <p>It has been already shewn that Captain Johnstone commenced his operations with an establishment of the single or inferior strength, of the annual grant of Rs. 33,076. Three seasons having now elapsed, and the surveyor having well and cautiously felt his way, with the few assistants at his disposal, and having obtained a considerable degree of practice in the peculiar style of country beyond the Indus, is now well able to manage a larger establishment, and work it to great advantage, whereby the cost of the survey may be materially decreased. I would therefore desire to record my anxiety that a small increase should be made to the maximum grant, bringing it up to Rs. 37,524, which will ther</p>

"24th.—All the hills surveyed are of limestone formation. Gehundaree is covered with fossil remains, a box of specimens has been prepared and will in due course be forwarded. These will explain the nature of the hills somewhat. I have no hesitation in believing that could these hills be carefully examined, valuable products would be discovered. Not far from the watering place of Chahailee, we found yellow ochre and fuller's earth in large quantities. The former is much valued by the people of the Punjab as a dye. Sulphur and alum used to be produced too in many parts."

"25th.—In the passes "Peeloo" and "Farash" trees abound, and the vallies are covered with quantities of grass. The hills themselves are almost devoid of verdure; on Gehundaree, half a dozen bushes, might be counted, and it is about the greenest of them all. The whole of the tract is now quite uninhabited. Parties intent on evil may occasionally be met with, but generally no others."

"26th.—The weakness of the Muzarees, who own these hills as compared with the powerful Murree tribe, and the annihilation, as an independent clan, of the Boogties, who used to inhabit the country beyond British territory, have been the chief causes of these hills being deserted. But to show that the grazing is appreciated, I may mention that when we were surveying the hills, the Beloochees broke up their temporary encampments in the plains, and entered the passes with their flocks, trusting of course to our protection. Nothing we could say would induce them to leave. It was an anxious time, for we thought our own horses and camels quite enough temptation for lawless hill men, without having the flocks of others surrounding us."

"27th.—Though the large prairie tract from Sindh to Drigree post, is covered with good grass, yet the whole is almost destitute of water. As entering the passes is not considered safe, the Beloochees who desire this good grazing, are obliged to carry off their animals, some ten or twelve miles to water them. They thus get this necessary refreshment but once in three days. The springs within the passes are in some cases but three or four miles in, but of course cannot be frequented."

"28th.—The "Shum" plain to which I have already alluded is very fertile. It was formerly inhabited by the Boogties, but is now entirely deserted. I am inclined to think that if it was held as a military out-post in strength, it would to a very great extent protect the whole of the hills from Masee to the Sindh frontier."

"29th.—It has been already proposed to establish a line of out-posts in front of Asnee and close to the hills. It is not unreasonable to suppose that the whole prairie would soon be covered with cultivation, were this proposal carried out. Before the Bhundowalee out-post was established, between it and Rojhan, there was nothing but a jungle, now the country is covered with crops."

"30th.—The soil of the country in front of Asnee is very remarkable; after rain it becomes quite pulpy, rendering the movements of troops, either cavalry or infantry almost impossible. During the rainy season, deer even are constantly caught from their inability to proceed through the deep

be on a par with all the other surveys. It is important that the Surveyors should not be detained longer in the Derajat than is absolutely necessary, and it is most desirable that such progress should be made as will ensure a good map of the entire tract, at the earliest possible date. The difference of Rs. 4,448, will be well laid out and prove true economy in the end, and as double this sum is already saved annually from the undrawn balances on the other surveys, as will be seen from the general remarks, I trust there will be no difficulty in my recommendation being attended to; the more especially as it has already met the concurrence of the Chief Commissioner of the Punjab.

In this case I would further recommend that a second Military Assistant be appointed to this survey; because Officers of some experience in the country, and who have had a Military training, are better adapted to the rough life and usage likely to be met with in the Derajat, than Uncovenanted Assistants, who are likewise very difficult to obtain.

It has been found that native agency cannot be employed to any extent on this survey, owing to the peculiar style of work and

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>" mud. It was this peculiarity that really obliged the people in the severe rainy season of 1855, to take their flocks close up to the hills in spite of all warning. The temptation was too great for the hill men; a successful raid was made and a considerable number of cattle carried off. The plunderers were subsequently brought to account, and I imagine have never ceased to regret their temerity."</p> <p>" 31st.—Some idea of the flood of 1855 in the lower Derahjat may be formed, when Floods. " I mention that on the high road near Kin, a place some forty miles south of Mithun kote, I measured the marks on the trees, and there must have been six feet of water there. That it had really been so, was corroborated by the people of the country."</p>		<p>difficult nature of the ground and character of the inhabitants. By making Captain Johnstone's party fully efficient now, it will be available for duty elsewhere, in a corresponding degree, with other establishments, as soon as the Derahjat is finished.</p>

4th Division, Sindh.

Name and date of Appointment.	On what duty employed during the year	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Captain T. C. Blagrave, 26th Regiment Light Infantry, Revenue Surveyor, 10th August 1843.	Sick Certificate to Europe from 25th March 1856 to 26th June 1857 and on Military duty from 2nd July 1857.	<p>A very successful field season was commenced by this party, on the 22nd December 1856, the inundation of the Indus, not permitting survey operations to be commenced earlier with any degree of safety to the health of the persons employed. The work was prosecuted up to the 7th May, and by one detachment until the 27th of the same month. A general area of 3,937 square miles was accomplished notwithstanding the peculiarities of the climate, the constant and severe sickness, and the difficulty of procuring labor at reasonable rates. Out of an establishment of 242 men, 16 men died between the 19th November 1856, and 7th January 1857, and from 80 to 100 men were always sick with fever and ague succeeded with dysentery, under which most of the sufferers died. Under such disheartening circumstances the Revenue Surveyor reports that very little was done, but the dry hot weather of March soon restored health and strength, when the Surveyors and measurers worked as hard as they could have done in the Punjab. In my last report, I anticipated the vigorous prosecution of this survey under Lieutenant Macdonald's energetic superintendence, and it is highly satisfactory to find that so much has been done in a country by no means favorable to professional survey operations.</p> <p>The Rohree district, the survey of which has been partially completed, was the first which the Officiating Commissioner wished to be taken in hand; it lies on the left bank of the river Indus, and is a Deputy Collectorate of the Shikarpoor division, bounded on the north by the Buhawulpoor state on the east by the independent Rajpoot state of Jeyzulmeer, on the south by the Kyrpoor Territory belonging to Meer Ali Moorad, and on the east by the Indus river. The tract lies between the parallels of 28° 34' and 27° 20' north latitude, and the meridians of 68° 38' and 70° 10' east longitude, its greatest length north and south being 85 miles, and greatest breadth east and west 104 miles. One talooqua of this district Gotekee estimated at about 549 square miles, the survey of which was commenced, but could not be concluded; of this however the main and the village circuits were all laid down, the topographical interior details only remaining.</p> <p>The survey may be classified under three denominations, viz., mouzawar, in which the boundaries of each village have been separately defined and laid down, with all the interior details of cultivation, waste, fallow, &c., carefully noted for revenue purposes, the area of this portion amounts to 1,498 square miles in 283 village circuits. 2ndly.—Desert tracts, which have been taken up topographically only, convenient sized blocks having been enclosed in traverse circuits with the most prominent features and character of the ground delineated, precisely similar to the method pursued in the "Bar" of the Punjab. Of</p>	Completion of the survey of the Rohree district on the left bank of Indus and continuation of the survey of the Shikarpoor district on the right bank of the river in Upper Sindh. During the current season of 1857-58, an approximate area of 1,608 square miles has been completed in the talooquas of Shikarpoor, Sukhur, and Nowshura of the Shikarpoor district and in Gotekee of Rohree district, the whole being very intricate detail work.	When this party was transferred from the Punjab, the strength of the establishment was on the larger Annual grant of 49,392 Rs. and the Revenue Surveyor, Captain T. C. Blagrave, going to Europe on sick furlough, the conduct of the operations in Sindh devolved on Lieutenant Macdonald, Assistant Revenue Surveyor.
Lieutenant J. Macdonald, 18th Regiment N. I. Officiating Revenue Surveyor. 10th September 1852.	In executive charge of the survey of the Rohree District.			It was subsequently proposed by the Commissioner of Sindh to divide this large establishment and to form two from it on the reduced annual maximum; of Rs. 37,524 each, according to the scale prevailing in the department, and on the return from furlough of Captain Blagrave, there would thus have been a separate charge for Lieutenant Macdonald. The two surveys being termed the right and left bank Indus surveys in Sindh. This was approved of by the Government of India in the Home Department, as per letter No. 86, dated 19th January 1857, to the Officiating Chief Secretary to the Government of Bombay, and the arrangement
Assistant.				
Mr. W. Lane, 27th October 1838.	Assisting.			
Sub-Assistants.				
Mr. W. Bolton, 1st February 1854.	Assisting.			
Mr. J. Todd, 1st December, 1855.	Ditto.			
Mr. W. F. Kelly,	Ditto.			
Mr. E. Foy,	Ditto.			
Mr. G. J. Hodgson, 1st November 1853.	Ditto.			
Mr. R. Scott,	Ditto.			
27 Native Surveyors.				

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>this description no less than 2,391 square miles were surveyed in seven circuits. This desert survey involved clearing nearly 400 miles of line through the sandy hillocks, overgrown with brushwood, and the difficulties in procuring and conveying supplies and water to such distances, were greater than might be supposed, and it was a matter requiring much trouble and tact to arrange satisfactorily with the head herdsmen, who were not at first willing to provide the necessary labor for the purpose. Great precautions were taken in repeating the measurements and observations over the sandy desert, the surface being covered with long sloping hills. The distance of the boundary in many cases was 40 to 50 miles from the nearest well, and very great also from villages which could easily furnish supplies.</p> <p>3rdly. Rivers, which demanded triangulation; of this 48 square miles of the Indus subtending the district, have been enclosed.</p> <p>The mouzawar work is comprised in 5 talooquas or pergunnahs, enclosed in 8 main circuits, containing 283 Dehs or villages surveyed separately. The desert was divided into 7 main circuits, and the river into two, making 17 main circuits for the entire work. The villages or Dehs are very large indeed, the average being 3,388 acres, one proving to be nearly 1,200 square miles.</p> <p>The cost of the work is reported to be Rs. 51,012-7-3 as regular charges for the establishment for the 12 months, in addition to which Rs. 3,187-3-6 have been expended for contingent charges. The maximum grant for this party as authorised by Government is only 49,392 per annum, and the Surveyor does not report under what authority the excess expenditure of Rs. 1,620-7-3 has been made, his bills not having been subjected to check or audit in this department. On the above outlay, and assuming the cost of the mouzawar survey at $\frac{1}{3}$rd of the whole and the desert at $\frac{1}{3}$rd, the averages will yield Rs. 22-11-0$\frac{1}{2}$ per square mile for the former, and Rs. 6-15-4 for the latter, or a general average on the gross area of Rs. 12-15-2 per square mile. This is a moderate rate, which is likely perhaps to be still further reduced as the operations advance, it cannot be compared with the previous season, as so little was done, the establishment having been employed chiefly on civil duties, as described in my last report.</p> <p>The Indus series of the Great Trigonometrical Survey has not extended to the left bank of the river in the Rohree district as yet, but a convenient principal station at Sukkur, has been adopted as the point of departure or origin for the upper Sindh revenue survey operations, and from this all the co-ordinate distances of the latter will be calculated and recorded. As it has not been feasible to connect any other stations, masonry pillars have been built in convenient parts of the district as land marks for future connection, and identification. The triple junction stations of the revenue main circuits have been marked by raised masonry platforms 3 feet, 6 inches square, sunk 1 foot below the surface of the soil. Masonry pillars have also been erected along the boundary of H. H. Meer</p>		<p>was to have taken effect from the present season, but in consequence of the state of the country the Commissioner of Sindh has been unwilling to carry out the orders involving additional expense, and Captain Blagrove who returned from furlough on the 27th June 1857, only nominally took charge of his appointment at Sukkur, and immediately proceeded on to Lahore to join his Regiment, the late 26th N. L. in the hopes of maintaining order and discipline in it. Captain Blagrove then on the mutiny of his Regiment the very day after he joined it, accepted the command of one of the new Levies under the emergency of the period, and has ever since been doing good service in organising the 12th Punjab Infantry at Huzara. He has now obtained Sir John Lawrence's permission to rejoin the Department, and as it is obviously of much importance to retain the services of Lieutenant Macdonald in Sindh after his very successful commencement and prosecution so far of the work entrusted to him, I have proposed to transfer Cap-</p>

Ali Moorad of Khyrpoor at intervals of 100 to 300 yards, and a map on the large scale of 20 chains to the inch, showing the position of every pillar, has been lodged in the office of the Commissioner of Sindh. Along the Jeysulmeer frontier, the boundary has been marked with small stone pillars sunk in the earth and projecting from 2 to 3 feet at intervals of from 3 to 5 miles. The triple junction stations have also been marked by one large stone surrounded by three others all sunk into the sand in the above mentioned manner.

Twenty-nine observations were made to determine the azimuth, an observation being made at every main circuit triple junction point, and on these the meridians conveyed from circuit to circuit were corrected, 14 other azimuth observations were taken on village circuit lines to ascertain the approximation of error to the correction applied. These corrections together with the corrections in the linear measurements have been considerably within the percentage allowed.

The chief obstructions which most affected the work, were the difficulty of procuring suitable men as measurers, and laborers to cut the jungle, and clear the lines, and survey squads were occasionally subject to stoppage in the work, from their supplies failing them, but on the whole as much assistance was rendered by the native revenue officials and by some of the influential landowners as could have been expected.

The Hudbust maps are reported to have been uniformly excellent having been laid down by scale and compass by means of the plane table. This is accounted for, by the fact of the survey establishment having taught the local Putwarries during the preceding season, and about 70 per cent of these Hudbusts were actually prepared by the survey Mootsuddes. In the comparison with the professional village plans, the Hudbust maps proved excellent.

With regard to the Khusrah or native detail measurement, the Surveyor remarks as follows:

"Para. 22nd. Of the Khusrah survey and its usefulness in enabling a comparison to be made with the professional survey, I regret that I can say nothing which is in its favor. It was not carried out by the settlement officer with whom I co-operated, in the manner which had been deemed requisite for its successful completion and for which the men and material at the command of the settlement officer were amply intelligent and sufficient. It was resolved that a survey rather approximating to the system in vogue in the Deccan should be introduced. The Putwarees trained in the previous season, by the survey for settlement purposes, could measure with tolerable correctness and map sufficiently well for the rough purpose they were required to carry out, they were superintended by experienced men who had been invited down from the Punjab, where they had become skilled in the subordinate practical duties of the field and office work of the settlement. This previous knowledge was thrown aside and they were sent to school themselves, in order to learn a new method and system, which they were at once to carry out without having attained any real knowledge of the subject. The result was that nothing was done. One village indeed was mapped and brought forward by the settlement officer for a comparison, and the results were so different on the map and withal agreeing so closely with the figured results, that it was necessary to prove the correctness of the survey map. The settlement officer stated that his areas were obtained from his map, so were the survey's and therefore the two maps should have agreed proportionably in their

tain Blaggrave to the 2nd Nagpore survey, the charge of which is at present in the hands of the Junior Assistant in the Department, and where the operations can scarcely be said to have begun. If this arrangement is approved by Government, Lieutenant Macdonald will be left undisturbed to finish the work he has so well begun.

The Officiating Revenue Surveyor reports very favorably of his Senior Assistant, Mr. W. Lane, who is stated to have done every thing to keep up the high character he has always enjoyed in the Department. Mr. Lane is an excellent assistant, and on the transfer of the establishment to Sindh, was raised to a salary of 400 per mensem.

Mr. W. Bolton has also finished his portion of the work in very good style, and has given great satisfaction. Although young in the department he gives great promise.

Mr. Foy is a hardworking and pains-taking young man. The other junior sub-assistants of this party, are not so efficient or zealous as could be wished.

Mr. Kelly having taken three months leave of absence from the Officiating Surveyor in January last, has not yet returned to his duty. Such leave given in the height of the

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>"measurements; a proportional compass established the contrary, and showed that in the measurements of single patches of cultivation, there were differences of from 200 to 400 feet, and yet the village boundaries of the same maps agreed excellently when compared by the same proportions. It was therefore evident that the area results obtained or rather given by the settlement officer, ought not to have agreed with the survey measurements, the same ends being arrived at, in fact, when they should have differed in the ratio of the actual discrepancies on the respective maps, from which the areas had been calculated; this I brought to the notice of the Commissioner in Scinde, and assisted by Captain Day, I drew out a memorandum in which I went through the measurements N. S. E. W. of all the different patches of cultivation and fallow on the two maps, I recalculated the area of the survey patches, and took down the areas of the same from the settlement record, the discrepancies in measurement and area were placed in juxtaposition by the side of a sketch of the extracts from the two separate maps, both drawn on the same scale; after satisfying myself on this point, I reported to the Commissioner that it was my intention to reject all the settlement measurements, and trust to the survey returns only, so that our interior details have not been compared with any separate result from the settlement."</p> <p>This is a very important subject on which it is essential the local authorities should come to an understanding. It was believed that the Punjab or Bengal system of Khusrah, as well as professional survey, was to be introduced into Sindh, and unless this is carried out in its integrity, I fear there will be no greater chance of any complete and entire measurement being effected of all the province, than before our survey party was deputed. Revenue measurements of a desultory character are said to have been in progress for many years past in Sindh, but what is now wanted is a professionally checked measurement, and unless the Khusrah is conducted on the principles alluded to by Lieutenant Macdonald, and the combined operations allowed to proceed simultaneously or as near it as practicable, the advantages of the presence of a large European survey establishment, will in a great measure be lost, as far as the immediate revenue returns are concerned.</p> <p>The maps forwarded by this Surveyor and safely deposited in this office are comprised in 10 main circuit sheets of season 1856-57, scale one inch to the mile, and one sheet of the Kurrachee Collectorate surveyed in season 1855-56, the area of which 346 square miles was noticed in last report. I have great pleasure in stating that these specimens of Lieutenant Macdonald's labors are exceedingly well got up, and have afforded me very great satisfaction, they are most valuable documents, complete in every respect, reflecting much credit on the Surveyor himself, and also on his head Assistant, Mr. Lane, who surveyed and mapped a large proportion of the circuits in his usual elegant style, for which he is justly celebrated in the department.</p>		<p>Field season is altogether contrary to Departmental Rules and causes serious inconvenience.</p> <p>Mr. E. Foy has been transferred to the Deraht Survey to fill a vacancy, and because he was peculiarly qualified for the description of country met with there.</p> <p>Mr. Scott has been transferred to the Baree Doab Survey in exchange for Mr. Loftie, from the latter to the Sindh Survey.</p>

The village plans have not yet been forwarded to this office, owing to the difficulties of transit, but they are all prepared according to the new system.

The survey of the Kurrachee Collectorate having fallen on triangulated ground, a comparison of the results between the two surveys has been effected in the following distances, the error of the revenue survey executed in this instance with minor triangulation being very small.

	Names of G. T. Stations.	From G. T. Sur- vey.	From Revenue Survey.	Error of Revenue Survey.	Error per Mile.
		Feet.	Feet.	Feet	Feet.
1	Mugger Peer H. S. to N. end Base,	60481.26	60483.06	+ 1.80	0.157
2	Ditto ditto to S. end ditto,	58033.43	58031.16	- 2.27	0.206
3	N. end G. T. Base to S. end ditto,	38623.45	38621.88	- 1.57	0.215
4	Mugger Peer H. S. to Munora Light House,	73676.00	73712.56	+ 36.56	2.618
5	Munora Light House to C. Hill Station. ....	.....	47607.12		
6	C. Hill Station to S. end Base,	33895.00	33936.54	+ 41.54	6.46

These results testify the care and ability exercised by Lieutenant Macdonald in the conduct of his operations, and I have reason to commend him to the favorable notice of Government as a most energetic and indefatigable officer; under considerable difficulties he has got through a most successful season.

REVENUE SURVEYOR GENERAL'S OFFICE, }
Calcutta, 2nd August, 1858.

E. W. HOPPNER,
Assistant Revenue Surveyor.

H. L. THUILLIER, Major,
Deputy Surveyor General.

TABLE A.

General Return of Professional Work for Season 1856-57, namely, from the 1st of October, 1856, to the 30th of September, 1857, exhibiting Cost, Area, and Average Rates per Square Mile and per Circuit.

SINDH AND PUNJAB SURVEYS.

• PROFESSIONAL WORK.												
No.	Names of Superintending Officers.	Names of Districts.	Number of Pergunnahs.	Number of Main or pergunnah Circuits.	Number of Mousahs.	Number of Hulkas or Traverse Circuits.	Average size of Traverse Circuits.	Area Surveyed in		Cost of Work including Guards.	Average rate per Sq. Mile.	Average rate per Traverse Circuit.
								British Acres.	Sq. Miles.			
1	Captain G. H. Thompson, Revenue Surveyor, sick certificate, Europe, ... Captain Sir E. Campbell, Assistant Revenue Surveyor, Officiating, ...	Mooltan, Baree Doab, ... River Circuits, ... Jungle ditto, ...	2	8	477	570	1444.13	823154.48	1286.18	38,555 15 1	20 2 3	45 1 5
			...	...	...	2	18098.48	30196.96	56.56			
			...	...	...	69	5300.72	365749.68	571.48			
			2	8	477	641	1912.64	1225101.12	1914.22	38,555 15 1	20 2 3	45 1 5
2	Lieutenant-Colonel R. Shortrede, Revenue Surveyor, on Military duty, ... Lieutenant F. C. Anderson, Assistant Revenue Surveyor, Officiating, ...	Leia, ... Duryakhan, ... Adookot, ... River Circuits, ... Thul, ...	3	8	272	267	4847.30	1318465.0	2060.10	37,994 2 8	10 2 10	0 0 0
			...	...	...	7	29052.60	196368.2	306.82			
			...	...	...	29	124534.77	871743.4	1362.11			
			3	8	272	303	8344.56	2380576.6	3729.03	37,994 2 8	10 2 10	0 0 0
3	Captain H. C. Johnstone, Revenue Surveyor, ...	Derah Ghazee Khan, Derajat, ... Topographical, ... River, ... Hills, ...	10	10	None.	10	19683.38	1296833.87	2026.32	33,030 3 0	11 4 3	0 0 0
			...	4		2	14384.73	57546.93	89.90			
			...	2		4	260022.80	520045.60	812.57			
			10	16	None.	16	117151.65	1874426.40	2928.79	33,030 3 0	11 4 3	0 0 0
4	Captain T. C. Blagrave, Revenue Surveyor, Europe, sick certificate and Military duty, ... Lieutenant J. Macdonald, Assistant Revenue Surveyor, Officiating, ...	Moukawur, ... Desert, ... River, ...	5	8	283	283	3388.62	958980.34	1498.39	51,012 7 3	12 15 2	0 0 0
			...	7	...	7	218627.44	1630392.13	2391.21			
			...	2	...	2	15400.79	30801.59	48.12			
			5	17	283	292	8630.73	2520174.06	5937.72	51,012 7 3	12 15 2	0 0 0
Grand Total and Averages, ...			20	49	1,032	1,252	6394.79	8006278.18	12509.76	1,60,592 12 0	12 13 3	0 0 0

REVENUE SURVEYOR GENERAL'S OFFICE,
Calcutta, the 2nd August, 1858.

E. W. HOPNER,
Assistant Revenue Surveyor.

H. L. THUILLIER,
Deputy Surveyor General.

TABLE B.

General Statement of Expenses of Native Establishment of each Survey for Season 1856-57.

No.	Surveys or Divisions.	Superintending Officers.	Khusrah, including purtalling and contract work.			Professional Survey, including Moot-suddees, Measurers and Guards.			Total.		
			Rs.	As.	P.	Rs.	As.	P.	Rs.	As.	P.
1	Baree Doab,.....	{ Captain G. H. Thompson, Revenue Surveyor, sick certificate, to Europe, Captain Sir Ed. Campbell, Bt. Assist. Revenue Surveyor, Officiating,...	...	...	...	18,818	0	10	18,818	0	10
2	Sindh Sagor Doab,.....	{ Lieut.-Colonel R. Shortrede, Revenue Surveyor, on Military duty,..... Lieutenant F. C. Anderson, Assist. Revenue Surveyor, Officiating,.....	...	...	...	16,808	14	8	16,808	14	8
3	Derajat,	Captain H. C. Johnstone, .....	...	...	...	15,105	6	5	15,105	6	5
4	Sindh,	{ Captain T. C. Blagrave, Revenue Surveyor, sick certificate, to Europe, and Military duty, Lieutenant J. Macdonald, Assistant Revenue Surveyor, Officiating,.....	...	...	...	27,880	7	3	27,880	7	3
Total for Native Establishment, .....			...	...	...	...	...	...	78,612	13	2
Superintending Officers and Contingencies, .....			...	...	...	...	...	...	31,229	3	4
European Assistants, .....			...	...	...	...	...	...	50,750	11	6
Total corresponding with Table A, .....			...	...	...	...	...	...	1,60,592	12	0

H. L. THUILLIER,
Deputy Surveyor General.

REVENUE SURVEYOR GENERAL'S OFFICE,
Calcutta, 2nd August, 1858.

E. W. HOPNER,
Assistant Revenue Surveyor.

TABLE E.

General Statement of Sums actually drawn, inclusive of Guards, for the 4 Revenue Surveys, during the Season 1856-57, exhibiting amount short-drawn in each Class.

MONTHS.			Superintending Officers.			European Assistants.			Native Establish-ment.			Guards.			Total.		
October, 1856,			2,904	0	0	4,031	4	7	6,749	1	8	491	8	0	14,175	14	3
November, "			2,610	12	3	4,408	1	1	7,693	1	4	419	0	0	15,130	14	8
December, "			2,441	0	0	4,568	0	0	8,055	1	2	408	8	0	15,472	9	2
January, 1857,			2,465	2	11	4,519	9	9	7,842	12	9	408	8	0	15,236	1	5
February, "			2,566	0	0	4,318	0	0	7,747	1	4	409	0	0	15,040	1	4
March, "			2,566	0	0	4,343	0	0	7,100	4	1	407	13	9	14,417	1	10
April, "			2,566	0	0	4,180	8	0	6,749	2	9	311	0	0	13,806	10	9
May, "			2,566	0	0	4,238	0	0	5,277	11	8	280	13	3	12,362	8	11
June, "			2,566	0	0	4,163	0	0	4,060	6	2	276	0	0	11,065	6	2
July, "			2,446	4	2	4,291	4	1	3,914	10	2	255	0	0	10,907	2	5
August, "			2,766	0	0	3,845	0	0	3,870	9	9	255	0	0	10,736	9	9
September, "			2,766	0	0	3,845	0	0	5,379	3	4	251	8	0	12,241	11	4
Total drawn for each Class,			31,229	3	4	50,750	11	6	74,439	2	2	4,173	11	0	1,60,592	12	0
Total passed for each Class,			34,848	0	0	57,360	0	0	60,796	0	0	4,512	0	0	1,57,516	0	0
Saving to Government,			3,618	12	8	6,609	4	6	+13,643	2	2	338	5	0	+3,076	12	

Of the above Statement, the following Table exhibits the expense under each class, and the savings of each of the 4 Surveys.

No.	Surveys.	Surveyors and Contingencies.			Number.	Assistants.			Number.	Guards.			Number.	Native Surveyors.			Number.	Classies or Measurers.			Total Expense.			Total Saving.		
1	Baree Doab,	8,771	4	6	5	10,966	9	9		988	8	0	25	8,512	0	8		9,317	8	2	38,555	15	1	+1,031	15	1
2	Sindh Sagor Doab,	4,908	14	10	5	16,276	5	2		845	0	0	22	6,117	3	6		9,846	11	2	37,994	2	8	+ 470	2	8
3	Derajat,	8,712	0	0	5	9,212	12	7		896	8	0	14	3,877	0	11		10,331	13	6	33,030	3	0	45	13	0
4	Sindh,	8,837	0	0	7	14,295	0	0		1,443	11	0	27	14,252	8	8		12,184	3	7	51,012	7	3	+1,620	7	3
Grand Total,		31,229	3	4		50,750	11	6		4,173	11	0		32,758	13	9		41,680	4	5	1,60,592	12	0	+3,076	12	0

REVENUE SURVEYOR GENERAL'S OFFICE,
Calcutta, 2nd August, 1858.

E. W. HOPPNER,
Assistant Revenue Surveyor.

74,439-2-2

H. L. THUILLIER,
Deputy Surveyor General.

TABLE F.

STATEMENT of the Savings in each Class of the undermentioned Surveys respectively, for Season 1856-57.

No.	Surveys.	Superintending Officers.								Superintending Officers and Contingencies.		Assistants.		Native Establishment, &c.		Guards.		TOTAL.			
										Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.		
1	Baree Doab,	Captain G. H. Thompson, Revenue Surveyor, Sick Certificate, to Europe, ... Captain Sir E. Campbell, Bart., Assistant Revenue Surveyor, Officiating, ...								* +59	4 6	2,713	6 3	+3,849	8 10	163	8 0	+1,031	15 1		
2	Sindh Sagor Doab,	Lieutenant-Colonel R. Shortrede, Revenue Surveyor, on Military duty, Lieutenant F. C. Anderson, Assistant Revenue Surveyor, Officiating,								3,803	1 2	+2,596	5 2	+1,983	14 8	307	0 0	+470	2 8		
3	Derajat,	Captain H. C. Johnstone, .....								.....	.....	1,587	3 5	+1,652	14 5	111	8 0	45	13 0		
4	Sindh,	Captain T. C. Blagrove, Revenue Surveyor, Sick Certificate, to Europe and Military duty, Lieutenant J. Macdonald, Assistant Revenue Surveyor, Officiating,								+125	0 0	4,905	0 0	+6,156	12 3	+243	11 0	+1,620	7 3		
No.	Surveys.	Excess for Superintending Officers.		Excess for European Assistants.		Excess for Native Establishments.		Excess for Guards.		Balance as shewn in Table E.		3,618	12 8	6,609	4 6	+13,643	2 2	338	5 0	+3,076	12 0
		Rs.	A. P.	Rs.	A. P.	Rs.	A. P.	Rs.	A. P.												
1	Baree Doab,	59	4 6	.....	.....	3,849	8 10	.....	.....										
2	Sindh Sagor Doab, .....	.....	.....	2,596	5 2	1,983	14 8	.....	.....										
3	Derajat, .....	.....	.....	.....	.....	1,652	14 5	.....	.....										
4	Sindh,	125	0 0	.....	.....	6,156	12 3	243	11 0												

* The sign + signifies expenditure over authorised maximum allowance for each class.

* The sign + signifies expenditure over authorised maximum allowance for each class.

REVENUE SURVEYOR GENERAL'S OFFICE,
Calcutta, 2nd August, 1858.E. W. HOPNER,
Assistant Revenue Surveyor.H. L. THUILLIER,
Deputy Surveyor General.

C.B.S.D.-72

ANNUAL REPORT
OF THE
REVENUE SURVEY OPERATIONS IN THE NORTH-WESTERN PROVINCES,
THE
PUNJAB, AND SINDH,
FOR
SEASON 1857-58.

No. 34A.

REVENUE SURVEYOR GENERAL'S OFFICE,
CALCUTTA, 20th September, 1859.

FROM THE DEPUTY SURVEYOR GENERAL,

To C. BEADON, ESQUIRE,
*Secretary to Government of India,
Foreign Department.*

SIR,

I HAVE the honor to submit for the information of His Excellency the Viceroy and Governor General of India in Council, my Report* of the operations of the Revenue Surveys in the North-West Provinces, Punjab, and Sindh, for the past Season of 1857-58, which likewise embraces the approximate results of each Survey for the Current Season up to the month of June last, when the Field work was brought to a conclusion.

*Dated the
27th August
1859, No. 34.

I have, &c.,

(Signed) H. L. THUILLIER,
Deputy Surveyor General of India.

No. 6502.

FROM THE OFFICIATING SECRETARY TO THE GOVERNMENT OF INDIA,
To THE DEPUTY SURVEYOR GENERAL OF INDIA.

*Foreign
Department.*

Dated, FORT WILLIAM, the 10th October 1859.

SIR,

I HAVE the honor to acknowledge the receipt of your letter dated 20th September last No. 34A, submitting your Report of the operations of the Revenue Surveys in the North Western Provinces, Punjab, and Sindh, for the Season 1857-58; and in reply I am directed to communicate the observations and orders of the Governor General in Council, as follows:—

2nd.—The re-employment of one of the parties now engaged in the Province of Nagpoor, in completing the survey of the Saugor and Nerbudda Division, is sanctioned. The completion of the survey of the Bhurtpoor State, is very satisfactory.

3rd.—The Governor General in Council desires, that you will report whether in your opinion, the party now in the Derajat, ought to be sent to Oudh or to Sindh. You ask for additional Establishments for both of these Provinces; you will also have the goodness to state, whether, if the Derajat party is sent into Oudh, as well as the Sindh Saugor party, you would still recommend the organization of a new party for employment also in Oudh, as suggested in your 15th para.

4th.—The necessity for the employment of a second party in Sindh, seems open to further consideration; as the statements made in your report, are somewhat at variance with those of the Bombay Government, who are understood to have demanded an increased Establishment of Settlement Officers, in order to keep pace with the one professional party now at work. A reference will be made to Bombay on the subject, from the Home Department. His Excellency in Council agrees in your objections, to omit the revenue and other details from the present survey in Sindh, with a view to expedite its progress.

5th.—The progress made in the reproduction of the Survey records destroyed during the mutiny, is very satisfactory. His Excellency in Council, is glad to learn, that comparatively so little permanent injury will result in this important Department from the disturbances. He will be glad to learn, what measures have been taken to guard in future, against the mistake made before the mutiny, in entrusting original records to the custody of local Officers or Boards.

6th.—It is found in practice, very difficult to prevent the evil referred to in your 33rd para. *viz.*, the selection of the promising Officers of one Department, for employment on increased allowances in other Departments; but the orders of the Home Authorities upon this subject, are always enforced, when a breach of them is brought to notice.

7th.—In the 34th. and 35th. paras., you recommend the formation of a class of apprentices from the general savings of the Department; His Excellency in Council has no doubt, that this would be a very desirable measure, but as he apprehends that it will entail an actual increase of expenditure, he is unable to sanction it, in the present state of the finances.

8th.—The claims of the survivors of the Jhansi party, will be duly considered, when they come before this Government in the regular course.

9th.—His Excellency in Council has read your detailed review of the operation of each of the Survey parties, with great interest. He now desires me to express his unqualified satisfaction with the general results of the Survey operations during the year under review; considering the serious difficulties and impediments which the events of 1857-58, interposed, the outturn is highly creditable to all the Officers of the Department both Covenanted and Uncovenanted. His Excellency in Council, therefore, entirely concurs in the commendations which you have bestowed on the several Officers named in your report, and sanctions the promotions which you have recommended in the different Establishments.

10th.—Great praise is also due to you for your continued, able superintendence and direction of the whole Department; and His Excellency in Council has much pleasure in tendering to you, the cordial acknowledgments of Government for the same, as well as for this clear and elaborate Report.

11th.—You are requested to print your Report in the same way as was done last year. It will be more convenient in future years, if you will submit your report in the shape of an ordinary letter, instead of writing it upon large sheets divided into columns.

I have, &c.,

(Signed) W. GREY,
Offg. Secy. to the Govt. of India.

ANNUAL REPORT of the Progress of the several Revenue Surveys, carrying on in the North-Western Provinces, the Punjab, and Sindh, for the Season 1857-58.

No. 34, Dated, CALCUTTA, the 27th August, 1859.

REVENUE SURVEY DEPARTMENT.				
Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
Major H. L. Thuillier, Bengal Artillery, Deputy Surveyor General and Superintendent of Revenue Surveys, 5th February 1847.	Directing the Revenue Survey Operations in the three Divisions of the Bengal Presidency. In charge of the Surveyor General's Presidency Office, as well as Superintendent of the Mathematical Instrument Department.	<p align="center">GENERAL REMARKS.</p> <p>1. The general results of the Revenue Survey operations of the season 1857-58, may be termed a fair average out-turn, and on the whole, highly satisfactory; especially taking into consideration, that it was a period immediately following a great convulsion, which was particularly likely to affect the proceedings of a Department, whose avocations are of that nature which necessitate action in scattered bodies, over the length and breadth of the land. The cold season of 1857-58, was a time of great anxiety; but I am happy to state, that our proceedings were carried on in the several Districts specified, without interruption, and free from all disaster whatever.</p> <p>2. In the North Western Provinces, the same Districts as specified in the last Report, have been under survey; but the operations were suspended altogether in two Districts, Jhansee and Goruckpore, and the number of survey parties were therefore reduced from five to three. The scene of the principal and most important work, in the Saugor and Nerbudda Division, has been changed; the Saugor and Jubbulpore Districts being left half finished, and the Nagpoor Province taken up instead, two parties being employed in the same District of Nagpoor. With reference to the great extent of country both North and South of the Nerbudda remaining to be surveyed, the great interest attached to that part of the country, its importance Geologically considered, and the increasing demands for maps on account of Railway and Telegraph projects, it appears to me of the first importance, to open out this country; the more especially, as the Revenue depends on it, and as the two well trained and experienced parties were only lent to Nagpoor under peculiar circumstances, caused by the disturbed state of the Saugor Territory during the mutiny; I would strongly beg leave to recommend, that one of the Nagpoor parties be permitted to return to its old ground, as soon as proper arrangements can be made for that purpose by the Civil Authorities.</p>	The same duty.	

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>3. With such a vast area in the North West Provinces remaining to be surveyed, all of which at present may be said to be totally unknown, and with the new Province of Oudh likewise claiming our attention, I think one of the Nagpoor parties may be more profitably employed in Jubbulpoor, Hussungabad, Seonee, and Mundla; the more especially, as the two parties are now both acting together in the same District of Nagpore, which is likely to be immediately finished; and the other Districts of that Province do not appear to be of the same value, being wild and scantily populated. I have pointed out the absence of due arrangements for the future employment of the two Nagpoor surveys under the head of those Divisions, and I therefore trust that the Government may deem the time to have arrived, when the old work in the Nerbudda may be renewed, without risk or inconvenience in a political point of view.</p> <p>4. The survey of the Bhurtpoor Native State has been brought to a conclusion, and the final account with the Raj, duly rendered. This survey party has been transferred to Jhansee and the Bundela Native States, during the current season 1858-59; and is employed in recovering and putting into proper order, the survey of the Jhansee Pergunnahs executed in the unfortunate season of 1856-57, the chief part of the Records of which, were found in the Fort after the taking of that place.</p> <p>5. Of the surveys in the Punjab and Sindh, the same four parties have been at work. The Baree Doab was entirely finished in the season under review, and the Establishment transferred to the Chota Nagpoor Division under the Bengal Government. The Sind Sagur Doab, has also now been just completed at the present date, which brings the entire area of the Punjab Proper under our operations. This latter Establishment is under orders to proceed at the commencement of the ensuing season of 1859-60, to open out a Revenue survey of the Province of Oudh, first taking up the District of Pertaubghur in the Fyzabad Division. Thus an important and extensive new work is before us in Oudh, the estimated area of which is 23,738 square miles, nearly the whole of which is of the most luxuriant and rich cultivation. It will be necessary to find other qualified Establishments for deputation, to some of the other Districts of Oudh as soon as possible, if it is intended to bring the entire Province under survey within a moderate period.</p> <p>6. Only a small area of the Trans Indus territory now remains in District Derah Ishmel Khan of the Derahjat; and unless re-surveys are considered expedient in the Bunnoo and Peshawur Valleys, already sufficiently well surveyed for Military purposes, another good and well trained Establishment will be available on the conclusion of season 1859-60. Having in mind the pressing demand for Survey Establishments for many important parts of this Presidency, still almost untrodden and unknown, and of which no maps of a trustworthy</p>		

character can be obtained, it is to be hoped that the expense and serious difficulty of another survey in Bunnoo and Peshawur, may be avoided. The merits of the subject will be found discussed under the head of the Derahjat Division.

7. In Sindh, very tolerable progress is making by the single party employed; but the Province is a large one, estimated roughly to contain about 52,000 square miles of different sorts of area; and at this present average rate of getting over the ground, it appears from a recent communication from the Commissioner of Sindh, that it must necessarily occupy Lieutenant Macdonald's Establishment about 12 or 13 years more, to complete the Province. The Commissioner naturally demurs to waiting so long for what is so urgently needed, viz. a good and complete survey of the entire Province; every year he states, that they are without a good map, causes serious loss to Government; and the expense owing to this defect, is very great and of constant recurrence. Sir Bartle Frere therefore, urges me to consider how the completion of the Survey can be expedited; and he suggests whether that object might not be obtained, by omitting the Revenue details of the Interior of Villages, as such omission would not be a serious loss, and confining the survey to the Topography of the country and the boundaries of Villages.

8. The Revenue Surveyor observes, that as the proportion of cultivated land in Sindh is so small compared with its area, the difference in time would be very slight by leaving out the Revenue details, and that still it would probably take nine years before the whole Province could be thus completed Topographically. His progress in four seasons, has been 9,704 square miles; but the first Season nothing having been prepared, the area surveyed was almost nil. The ordinary average annual out-turn, may be taken at from 3,000 to 4,000 square miles including the desert tracts. The Commissioner further illustrates instances of tracts of many thousands of square miles which have been repeatedly surveyed in Sindh more or less completely; one as many as six times over in eight years, by different Departments; each only just what was needed for the work then in hand, at an aggregate expense of many times the cost of a good and complete Survey, while they are still without a good map.

9. I believe the only remedy to meet the views of the Commissioner, and which of course this Department is most anxious to do, since it is equally to our own interests, is to increase the number of working parties. In this country, we have to deal with large Provinces and immense areas, presenting great obstacles to rapid execution, and Surveyors can only perform what is within the bounds of human exertion. The extent of country still remaining to be surveyed in various parts of this Presidency, must necessarily occupy the best energies of the Department for very many years to come; and with the present allowed expenditure, it is impossible to get over the ground quicker. The Ordnance Survey of the British Islands, commenced many years before any thing was done here, is not yet finished; and altho' we cannot pretend to the completeness and uniform system of the Ordnance Survey, yet the cost of the two works is widely different. For a first survey of such a vast country where the value of the land is so disproportionate from what it is in England, we are spending about 23 Rupees per square mile; whereas the Ordnance Survey costs from 400 to 500 Rs. The great object therefore should be, to expedite as much as possible,

GENERAL REMARKS.—(Continued.)

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>a correct Topographical delineation of all the remaining unsurveyed Provinces, and to give the revenue details in those rich Districts and tracts, where they are absolutely needed for fiscal purposes. The sooner this is done, the greater undoubtedly will be the gain to Government.</p> <p>10. In the last Report, it was mentioned that the Government of India had already sanctioned the formation of another survey party for Sindh, by letter No. 86, dated the 19th January 1857, in the Foreign Department, to the Bombay Government; the two parties being termed the Right and Left Bank Indus Surveys; but that owing to the state of the country at the time of the Mutiny, the Chief Commissioner was unwilling to incur the additional expense necessary for the formation of such an Establishment, for which purpose the usual annual grant of 37,524 Rupees will be required. Perhaps the Government of India may now deem it practicable to authorise this expense, on the urgent reference made by the Commissioner of Sindh; in which case, I would propose to organise the second party, taking its nucleus from the one now employed in the Province, and expanding it gradually as opportunities offer. Mr. W. Lane, the Head Uncovenanted Assistant, is competent to conduct such a survey; and from his long experience in the Department and especially in Sindh, I should have every hope of his doing justice to an independent charge in that Province. The recruiting and training of a Survey Establishment, is a difficult matter, and can only be accomplished by degrees, since competent Surveyors are not to be found when wanted; and in the present day, it is not an easy matter to find either Europeans or Natives, willing to learn the duties for the remuneration offered. One extra party therefore, is fully as much as could be managed for Sindh in one year; and although its progress would be comparatively slow at first starting, yet I should hope the joint labors of the two parties, might eventually bring the survey to a termination in half the time estimated for it under present circumstances. By employing another party, the present objectionable practice of disjointed operations, first in Upper then in Lower Sindh, and travelling to and fro, by which so much valuable time has been lost, may be altogether avoided.</p> <p>11. With advertence to the suggestions of the Commissioner of Sindh, as to omitting the Revenue or any details from the present survey in order to expedite its progress, it appears to me, that the very circumstances alluded to by that Gentleman, of partial and incomplete surveys having been already so frequently made in Sindh, all to no purpose whatever, is the strongest argument against such a course now. I could not for a moment advise any sort of deterioration in the style of the work carried on, or omissions of any sort of Topographical features. Lieutenant Macdonald was deputed to Sindh, to carry out the system in force on this side of India, with special orders to make a full, complete, and continuous survey of the Province; and it is only by strictly</p>		

carrying out a survey embracing every thing, and making his maps as full as possible up to the competency of the scale, and taking in every part of the country in due succession, that we can hope to present the Commissioner with really good and reliable information sufficient for all purposes. A good and complete survey is by far the cheapest in the end; where certain omissions of details are authorised, there is a greater difficulty in checking Native agency, in taking up what is wanted and ordered; and it is only by having a perfect representation of the state of the country as it existed at the time of Survey, that future comparisons can be made; and this Professional work forms a basis for all subsequent calculations, and above all, acts as a strong and only reliable check against the well known practices of Ameens employed in the khusrah measurements.

12. This question has been frequently and widely discussed both for the North West and the Punjab Surveys, and it has always been decided in favor of making the Revenue Survey what it ought to be;—a record of as much detail and revenue information, as can possibly be given; which system has just been carried out to completion in the Punjab, with the greatest possible advantage. In Sindh more especially where the cultivated area is so small in proportion, a deviation from our system would, I firmly believe, produce scarcely any perceptible difference as to the time occupied in the survey.

13. The following abstract statement, exhibits what has been effected in the three divisions of this presidency, during the season under review; the details of the surveys in the Lower Provinces, having been reported on separately to the Bengal Government:

No. of Parties.	Divisions of Surveys.	Area Surveyed.	Total cost.	Average rate per square mile.	Grant allowed.	Savings to Government.
		Sqre. Miles.	Rs. As. P.	Rs. As. P.	Rs. As. P.	Rs. As. P.
5	Bengal,	5765-14	1,63,945 12 9	28 11 8	1,67,620 0 0	24,674 3 3
3*	North Western Provinces,	1161-85	94,787 15 11	81 9 3	1,12,672 0 0	17,784 0 1
4	Punjab and Sindh,	9770-33	1,47,512 11 5	15 1 6	1,57,516 0 0	10,003 4 7
12	Total for Season, 1857-58,	16,697-32	4,06,246 8 1	24 4 5	4,37,708 0 0	32,361 7 11
	Ditto for ditto, 1856-57, ...	24,535-02	4,85,893 6 10	19 12 3	4,95,232 0 0	9,338 9 2
	Difference,	—7,837-70	—80,546 14 9	+ 4 8 3	—37,524 0 0	+43,022 14 9
	Grand Total, for 12 seasons, (1846-47 to 1857-58,) inclusive,	1,71,867-77	39,28,782 12 3	22 13 9	44,75,925 15 6	5,47,143 3 3

* Of the three N. W. Province Surveys, expenses amounting to Rs. 266-8-0, on account of the late Jhameer Survey party, have been defrayed out of the savings of the other Surveys. No grant has therefore been reckoned for that District.

GENERAL REMARKS.—(Continued.)

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.						
		<p>14. The area performed, 16,697 square miles, is considerably less than it was during the preceding season, on a total expenditure of Rupees 4,05,346; and the mean average rate Rs. 24-4-5 per square mile, is in excess of the same by Rs. 4-8-3. This is caused by the diminution in the number of the North West Surveys, and by their average being altogether thrown out of all reasonable proportion by the change of ground, interruption, and loss of records entailed by the mutinies. This will be soon rectified; but for the season under review, it will be observed, the N. W. P. mileage rate of Rupees 81-9-3, is quite unusual and exceptional. The Bengal and Punjab rates, are about the proper average.</p> <p>15. Of the grants allowed 4,57,708 Rs., the sum of 52,361 Rs. has been underdrawn as savings to Government, independently of the full grant of the Jhansee party 37,524, Rs. not reckoned. Bearing this in mind, the Government may possibly not object to the formation of another party for Oudh, out of the existing Bengal and North West Establishments on the same Annual Grant of Rs. 37,524, which would replace the late Jhansee party, and only make the number of parties what they were before the mutinies.</p> <p>16. The aggregate amount of work performed and expenditure incurred in the twelve last seasons from 1846-47 to 1857-58, is 1,71,867 square miles, for 39,28,782 Rs.; which yields a mean average of Rs. 22-13-9 per square mile. The authorised outlay for the same period, was Rs. 44,75,925, leaving therefore an unappropriated balance of 5,47,143 Rs., five lacs, forty-seven thousand, one hundred and forty-three, as clear savings to Government.</p> <p>17. The precise details of expenditure and of savings, the strength of the several Establishments, the cost of each class European and Native, and the comparative results between all the Surveys, are recorded in the annexed Tabular Statements marked A, B, E, F, prepared for the Punjab, and North West Provinces, separately.</p> <p>18. In my own office, the work of compilation and reduction of the Surveyors original materials as received, has proceeded steadily, and the earliest opportunity taken, to put the same to the best practical use. Of the North West Provinces, the District maps of Jubbulpoor and Saugor, have been compiled on the usual $\frac{1}{4}$ inch scale to the full extent of the Survey, made as detailed marginally; but unfortunately both Districts are scarcely more than half finished, and the maps must remain in abeyance, until the surveys are again taken up. The Bhurtpoor District has been compiled on the same scale, and lithographed at the Press attached to the Surveyor General's Office. Copies have been freely distributed to the North West Government, and the local authorities. The Map is a very complete and excellent one, clearly and admirably printed, and will fill a large space in sheet No. 50 of the "Indian Atlas."</p> <table><tr><td></td><td>Sq. Miles.</td></tr><tr><td>Jubbulpoor,</td><td>2,194</td></tr><tr><td>Saugor,</td><td>2,355</td></tr></table>		Sq. Miles.	Jubbulpoor,	2,194	Saugor,	2,355		
	Sq. Miles.									
Jubbulpoor,	2,194									
Saugor,	2,355									

The original manuscript, and 30 lithographed colored impressions, are under transmission through the Surveyor General of India to the India House.

19. Of the late Jhansee and Bundelcund survey, the materials are not yet in a sufficiently complete or advanced form, to enable me to prepare a Geographical map. An index of all that was done by the late Captain Burgess, has been constructed; and I hope in another season or two, to be in a position to publish that survey, by the time the Jhansee Pergunnahs are surveyed. In the mean while, all that Surveyor's one inch Pergunnah separate maps, have been lithographed and distributed to the Civil and Military Authorities in those parts; and most valuable productions they are, shewing as they do, all the minutest details of the topography, forming the best possible guide to the Military police, and to all Troops in search of Rebels.

20. The Punjab surveys afford a heavy amount of work for this Office to get through: first, with the compilation of District maps on the 2 miles to the inch scale, shewing Village boundaries, which are such admirable maps for all local purposes; and then the Geographical scale maps on the $\frac{1}{4}$ inch scale; of the former, the Districts of Mozuffurghur (formerly Kanghur) and Mooltan, have been taken in hand, and are now in progress. The Kangra District map on the same scale, which owing to its peculiar intricacy and extent of Hill work, could not be published before, is now under completion, with a view to its transfer to the stone in a new style of Hill shading, by a successful process lately introduced.

21. On the Geographical scale of $\frac{1}{4}$ inch to the mile, the Mooltan division, comprising the districts of Googaira, Jhung, Mooltan, and Mozuffurghur, is in a forward state. Upwards of 8,000 square miles of this work have been mapped: the entire division, extending to an aggregate area of about 20,586 square miles. This, when completed, will form a sister map to the one of the Lahore Division, which has been issued from the Press since the last report, and represents a very large proportion of the Southern part of the Punjab Proper. The Mooltan Division map, will be lithographed at the Press attached to the Surveyor General's Office, the moment these very intricate materials can be combined and reduced.

22. The Jhung and Shahpoor district maps on the 2 miles = 1 inch scale showing Village boundaries, I regret to state, are still in abeyance, for want of the final adjustment of the boundaries, which I have as yet been unable to obtain from the local authorities. The Shahpoor district is under considerable alteration; it being in contemplation to transfer large areas to it, from both the Leia and the Jhelum districts; and these Tehseels have only just been surveyed during the current season. It will I fear, therefore, be some time before the Shahpoor map can be rendered in a fit state for publication. The adjustments for the Jhung District, ought soon to be completed.

23. A very excellent map of the Googaira district in six sections, scale 2 miles = 1 inch, has been lithographed and liberally supplied to the Punjab authorities since the last report. This is a most elaborate piece of work, and together with the Lahore Division map, is highly creditable to the labors of the Lithographic Press branch office. The District map of Jawud Neemuch on the $\frac{1}{4}$ inch scale, and a large plan of the Cantonments and Civil Station of Cawnpoor, scale 8 inches to the mile, surveyed by the late Captain Burgess, Revenue Surveyor

GENERAL REMARKS—(Continued.)

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.
		<p>in 1852 to 1854, have likewise been lithographed and distributed, in addition to many maps of the Bengal Provinces, and those noted as having been reproduced in the Tabular statement as destroyed by the rebels.</p> <p>24. From this Department also, several most useful general maps have been issued during the year, independent of the Revenue Survey materials; and I may especially note the Rajpootana and adjoining States map in 8 large sections, representing the greater part of Central India, and the field of the campaign against Tantia Topee. This laborious task was got through in a remarkably short time; and I have reason to believe, that the sheets of this map, have been found of the greatest possible service to the many Corps and Detachments traversing that wide space of country. The Rajpootana map has been extensively circulated and advertised with our other productions for general information.</p> <p>25. The great destruction of the Survey records in the North Western Provinces, the Punjab, Central India, and Behar, by the Rebels, and the desire of the Supreme Government, that I should have them replaced as soon as possible, as briefly alluded to in my last report, necessitated my drawing up a Report on the whole question, and representing the pressing want I had long labored under, of a proper Establishment for the ministerial duties of my own Office, which of late years have grown so greatly, owing to the extension of the Revenue Surveys under the three Governments; and also owing to the increased efficiency and practice of the executive branch of the Department, which has caused the progress of work to expand to so large an extent, and thereby to throw a continually increasing burden on the Superintending Office. The increased Establishment which I felt to be absolutely essential, to enable me to meet this heavy additional demand, exclusive of all current work, and to place my Office in a position to comply with the crying wants of the numerous District Officers whose records had suffered by the Mutinies, was liberally granted to me under the orders of the Government of India, Financial Department, No. 7674, dated the 31st December 1858; and I trust I have in consequence been enabled successfully to cope with the emergency, and to render essential service to many Local Authorities, by the reproduction of a vast number of records, in a very short space of time.</p> <p>26. From the month of October 1858, the work may be said to have fairly commenced. Extra Draftsmen were obtained, and the Village plans both separate and in sheets, were given out as Job work by contract. The separate plans where the details were not over intricate, have been executed in capital style at the rate of one Rupee each; whilst those District plans containing all the details of cultivation, waste, &c., with much hilly ground, could not be done for less than two Rupees each. The sheets containing clusters of congregated Villages on different scales, have been carefully estimated according to the actual amount of work in each.</p>		

27. Up to the present date, the following extent of work has been completed, examined, arranged, and bound up into volumes, with alphabetical Indices, maps, topographical references, and statistical reports, and no pains have been spared to make the records as complete as possible, and to forward them to the several Collectors of districts at the earliest possible date.

Governments.	Districts.	No. of Folio Volumes.	No. of separate Village Plans and Registers.	No. of Congregated Village Plan Sheets.	No. of Pergh. Maps lithographed.
Punjab, ...	Sealkote, ...	20	1,792	...	...
	Rohtuk, ...	...	...	20	...
	Dihlee, ...	...	...	3	...
	Goorgaon, ...	...	...	11	...
	Hurriana, ...	...	...	1	...
	Jawud Neemuch, ...	...	...	6	6
	Jaloun, ...	3	401	...	9
	Humeerpoor, ...	2	161	...	4
	Jhansec, ...	3	373	...	4
	Bandah, ...	...	...	...	11
	Allahabad, ...	...	...	...	11
	Boolundshuhur, ...	...	...	17	...
	Mozuffurnuggur, ...	...	...	13	...
	Furruckabad, ...	...	...	4	...
N. W. Provinces, ...	Budaon, ...	...	...	19	...
	Meerut, ...	...	...	2	...
	Etawah, ...	...	...	3	...
	Mynpooree, ...	...	...	7	...
	Ganges and Ramgunga River Survey on both Banks of Rivers in ...	...	...	...	Pergunah or one inch River maps of all these previously lithographed.
	Budaon, ...	...	...	...
	Shahjehanpoor, ...	...	...	...
	Furruckabad, ...	...	...	...
	Bijnour, ...	...	...	...
	Eytah, ...	...	...	...
	Mozuffurnuggur, ...	...	...	...
	Boolundshuhur, ...	...	...	...
	Meerut, ...	...	...	...	Pergunah or one inch District maps previously lithographed.
	Moradabad, ...	8	987	...	
	Beerbhoom, ...	10	1,792	...	
Behar and Bengal, ...	Shahabad, ...	1	193	...	...
	Behar, (Gyah,) ...	21	3,432	...	...
Total, ...		74	9,076	106	45

GENERAL REMARKS—(Continued.)

Name and date of Appointment.	On what duty employed during the year.	Progress and present state of the work.	On what duty proposed to be employed during the ensuing year.	REMARKS.								
		<p>28. The above statement, shews that no less than twenty five District officers have been supplied either in whole or part, according to the state of the original records found in this office; and that in the aggregate, a very large number of maps have been transcribed, and they have been sent out in a superior style, finding much favor in the estimation of the local authorities concerned, who have duly expressed their acknowledgments for the timely assistance thus rendered them. Of the 106 congregated village plan sheets on different scales, some contained entire, and others only portions of Pergunnahs; but the aggregate number of villages contained in them, amounts to 7,036, and which added to the villages on separate register sheets, make a total of 16,112 village plans actually supplied. Several of these sheets, happened to be unfinished duplicates existing in this office, and which were consequently finished up and rendered serviceable at a small cost.</p> <p>29. The expense hitherto incurred for this contract work, independent of office supervision, amounts to Rupees 8,850-10-0 as duly detailed and specified in the contingent bills noted in the margin, and which have received the sanction of Government. There remain now, about 4,200 plans of Rohilcund and Behar to be copied, which are in course of active preparation.</p> <table> <tr> <td></td> <td>Ra. As.</td> </tr> <tr> <td>1 Bill dated 25th January 1859, for ..</td> <td>3,566 4</td> </tr> <tr> <td>1 Ditto dated 18th July 1859,</td> <td>5,284 6</td> </tr> <tr> <td>Total, ..</td> <td>8,850 10</td> </tr> </table> <p>30. Although the records of the Revenue Survey forthcoming in this office of the North-Western Provinces, were so partial, yet it fortunately appears, that many of those supposed to have been entirely destroyed by the rebels, have since been discovered. From a sketch index map prepared in the office of the Board of Revenue N. W. Provinces, which has been copied in this office for transmission to the India House, shewing the extent and degree of damage done to the Revenue Survey records in the N. W. Provinces, the districts, where both originals and duplicates together with the numerical data have gone, comprise the whole of Rohilcund; (a few of the Terai Pergunnahs of Rohilcund lately re-surveyed, are also fortunately safely deposited in this office) and the central part of the Doab, excluding Agra, parts of Muttra, Furruckabad, Etawah, and Mynpooree. In certain districts in the Lower Doab, together with Humeerpoor, Jaloun, Azimghur, and Jounpore, one copy only of the records has been destroyed; whilst in Bandah, Allahabad, Mirzapore, Benares, Gazeepore, and Goruckpore, no damage has been done. Of many of the N. W. Province districts, maps on the 2 miles scale shewing village boundaries, are forthcoming, which will obviate much of the difficulty, although the loss of the area tables is a most serious and irreparable one; and should prove a lasting lesson against the fatal policy, of entrusting original survey records to Local Officers or Boards.</p>		Ra. As.	1 Bill dated 25th January 1859, for ..	3,566 4	1 Ditto dated 18th July 1859,	5,284 6	Total, ..	8,850 10		
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