

1941

# GENERAL REPORT

OF THE

# Revenue Survey Operations

OF THE

## UPPER CIRCLE,

FOR SEASON

1867-68.

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COLONEL J. E. GASTRELL, *F. R. G. S.*

DEPUTY SURVEYOR GENERAL AND SUPERINTENDENT OF REVENUE SURVEYS, UPPER CIRCLE.

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1868.

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GENERAL REPORT

OF THE

Operations of the Revenue Surveys,

UPPER CIRCLE,

AND OF THE

DRAWING AND COMPUTING BRANCH OF THE OFFICE OF SUPERINTENDENT  
OF REVENUE SURVEYS.

*Calcutta, 9th December 1868.*



NUMBER OF PARTIES.—During the season under review, 1867-68, four Survey Parties were employed in the Central Provinces, two in Oudh, one in Sindh, one in the North-Western Provinces, one in the Punjab, and one partly in the North-Western Provinces and partly in the Punjab, making a total of ten parties employed in the Upper Circle.

2. The amount of work performed by each survey, the cost and nature of that work, and the comparison of the present with the past season's results, are fully exhibited in the following Tabular Statement:—

*General Return of professional work for Season 1867-68, exhibiting area and cost of the Central Provinces, Oudh, North-Western Provinces, Punjab and Sindh Surveys, Upper Circle.*

| Divisions and Superintending Officers.  | Names of Districts.  | Number of Villages or Waste Land Blocks.                  | Average size of Villages Circles in acres. | SQUARE MILES OF AREA |                      | Total Expenditure. | REMARKS.  |
|---|--|---|--|----------------------|----------------------|--------------------|---|
|   |  |   |  | Triangulated.        | Completed in detail. |                    |   |
| 1st DIVISION, CENTRAL PROVINCES.<br>Major B. E. Oakes, Revenue Surveyor                               | Seonee   | Villages 406<br>Waste Land Blocks 65<br>River Circuits 15 | 1,178                                      | ...                  | 1,210a               | 219                | a Includes 40 square miles of District Eshungabad.  |
| 2nd DIVISION, CENTRAL PROVINCES.<br>B. B. Smart, Esq., Revenue Surveyor                               | Baepoor  | Villages 683  | 1,315                                      | ...                  | 1,329                | 60                 |   |
| 3rd DIVISION, CENTRAL PROVINCES.<br>Captain H. C. D. Tanner, Assistant Revenue Surveyor, in charge    | Nimar  | Villages 376  | 1,931                                      | ...                  | 1,135                | 75                 | In addition to the work in Nimar, this party surveyed and re-surveyed 252 of the Saugor waste land blocks, vide para. 51 of report. |
| 4th DIVISION, CENTRAL PROVINCES.<br>Lieutenant F. Coddington, Revenue Surveyor                        | Chanda   | Villages 302<br>Waste Land Blocks 64<br>River Circuits 9  | 1,103                                      | ...                  | 1,131b               | 66                 | b Includes area of environs of Kamptee Cantonments = 10.3 square miles.   |
| 1st DIVISION, OUDH.<br>Major F. C. Anderson, Revenue Surveyor   | Etawah<br>(Gonda)  | Villages 602<br>Cantonment Blocks 43                      | 932  | ...                  | 1,070c               | 109                | c Includes area of Meerut Cantonment and its environs, and the environs of Seetapore = 82.5 square miles.                           |
| 2nd DIVISION, OUDH.<br>Captain A. D. Vanrenen, Revenue Surveyor                                       | Baratch  | Villages 471<br>Forest Blocks 27                          | 603  | ...                  | 972d                 | 162                | d Includes area of Cawnpore Cantonments and Lucknow environs = 72.3 square miles.   |
| N. W. PROVINCES, ROHILKHAND.<br>J. Campbell, Esq., Assistant Revenue Surveyor, in charge              | Dacally  | Villages 601  | 441  | ...                  | 415e                 | 90                 | e Includes area of Cantonment and environs of Bareilly = 31 square miles.   |
| PUNJAB, N. W. FRONTIERS.<br>Lieutenant Colonel H. C. Johnstone, Revenue Surveyor                      | { Hazara<br>{ Peshawar   | Topographical and Revenue villages 17                     | 4,410                                      | 211                  | 1,491f               | ...                | f Includes area of Abbottabad Cantonments = 11 square miles.  |
| Captain D. Macdonald, Revenue Surveyor  | { Mahmood Khan's Tands<br>{ Shabbander                         | Villages 268<br>Sub-circuit 1<br>River Circuits 3         | 3,339                                      | ...                  | 1,464                | 407                |   |
| N. W. AND PUNJAB CANTONMENTS SURVEY.<br>E. T. S. Johnson, Esq., Assistant Revenue Surveyor, in charge | { Cantonments of Benares and<br>{ Allahabad, Delhi and Umballa | Blocks, N. W. P. 215<br>Blocks, Punjab 146                | ...  | 79                   | 61                   | ...                | g Average rate of Cantonment Survey per square mile ... 176 11 0  |
| Grand Total for 1867-68   |  | Villages and Waste Land Blocks 4,376<br>Ditto 4,376       | ...  | 10,397               | 8,476                | 14                 | * Average rate per square mile of Village Survey 49 5 4<br>Ditto ditto ... 49 8 4   |
| Ditto for 1866-67   |  | Difference ... +97  | ...  | ...                  | +1,921               | ...                |   |

\* The rate is exclusive of Cantonments and of the Punjab Survey. The latter will be given on completion of District Hazara.

*Abstract.*

| Number of Parties. | Jurisdiction.                                | Area surveyed in square miles. | Total cost.    | General average cost per square mile. | REMARKS.                   |
|--------------------|--|--------------------------------|----------------|---------------------------------------|----------------------------|
| 4                  | Central Provinces                            | 4,707                          | Rs. A. P.      | Rs. A. P.                             |                            |
| 2                  | Oudh   | 2,051                          | 2,34,906 10 10 |                                       |                            |
| 1                  | North-Western Provinces                      | 523                            | 1,23,747 4 3   |                                       |                            |
| 1                  | Punjab                                       | 1,532                          | 34,785 6 11    |                                       | For village survey 46 5 4  |
| 1                  | Sindh  | 1,464                          | 89,456 10 10   |                                       | For Can- tonments 176 11 0 |
| 1                  | Cantonments, Punjab and North-West Provinces | Included in the above.         | 44,780 13 7    |                                       |                            |
| 10                 | GRAND TOTAL                                  | 10,297                         | 5,27,676 14 5  |                                       |                            |

*Districts completed since last Report.*

| DISTRICT.             | When com- menced to be surveyed. | When finished.   | By whom surveyed.  | REVENUE SURVEY AREA IN |               | Cost, inclu- sive of contingent expenses. | Rate per square mile. | REMARKS.   |
|-----------------------|----------------------------------|------------------|--|------------------------|---------------|---|-----------------------|--|
|                       |                                  |                  |  | Acres.                 | Square miles. |   |                       |  |
| Hoshungabad           | Season. 1862-63                  | Season. 1867-68* | { Captain J. Sconce }<br>{ Major R. E. Oakes }<br>{ W. Lane Esquire, }<br>{ Capt. D. Macdonald } | 21,85,506              | 3,415         | Rs. 1,33,850                              | 39 3 1                | The area and rates here shown for Hoshungabad are for the purely Revenue Survey of the district. The hills on the south were surveyed by No. 2 Topographical Party; the approximate area of this hill tract is 836 square miles. |
| Mahomed Khan's Tunda. | Season. 1865-66                  | 1867-68          |  | 20,33,446              | 3,177         | Rs. 86,170                                | 27 1 11               |  |

\* The survey of the district was completed in 1865-66, with the exception of a small area of 40 square miles (transferred from District Chindwara) which was surveyed in 1867-68.

3. A copy of the detailed reports on the several surveys, drawn up for, and submitted to, each Local Government or Administration, is appended.

4. **OPINION OF WORK DONE.**—As compared with the results of season 1866-67, those of 1867-68 contrast favourably. There has been an increase of 1,821 square miles in total areas of all kinds completed during the year, and the rates are somewhat lower. The work of the detail, or interior surveyors, on which the accuracy of the final geographical maps greatly depends, has been carefully tested and examined; the number of miles of check surveys being shown as far as possible in the Tabular Statement above entered. The work is all well reported on for truthfulness and accuracy. The results show that the several officers and their parties have all worked steadily and well, and are deserving of commendation for their labours.

5. **DEMARCATIONS.**—Again, as remarked last year, with exception of the boundaries on Government Forest Reserves and waste lands, the demarcations have been generally well reported on.

6. **REVENUE SURVEY DRAWING AND COMPUTING OFFICE.**—The mapping on various scales and for various purposes that has been taken in hand and completed, either wholly or in part, and the general work performed in the drawing and computing branch of the Revenue Survey Office, during the year under notice, are tabulated below :—

| TITLE OF MAP.        |   | SCALE.              | REMARKS.   |
|----------------------|---|---------------------|--|
| <i>Compilations.</i> |   | <i>Miles. Inch.</i> |  |
| LOWER PROVINCES.     | { District Maunbhoom ... ..   | 4 = 1               | Completed and sent to press.   |
|                      | { District Lohardugga (Sub-division<br>Palamow) ... ..  | 4 = 1               | Half completed.  |
|                      | { District Kamroop ... ..   | 4 = 1               | Completed to the extent of materials received.   |
| CENTRAL PROVINCES.   | { District Hoshungabad ... ..   | 4 = 1               | Completed, with the exception of a small piece recently transferred from Chindwara.  |
|                      | { District Dumoh ... ..   | 4 = 1               | Completed and sent to press.   |
|                      | { District Seonee ... ..  | 4 = 1               | Half completed.  |
| SINDE.               | { Hyderabad Collectorate ... ..   | 4 = 1               | Completed to the extent of materials received.   |
| PUNJAB.              | { District Peshawur (Tulseels Khalsa<br>Khuttuk, Murdan, and Hushtnuggur) ... ..              | 4 = 1               | Completed.   |
| OUDH.                | { Oudh, Sections No. 1 to No. 4 ... ..  | 4 = 1               | Worked up to the extent of materials received.   |
|                      | { Oudh in 53 Sections ... ..  | 1 = 1               | Ten sheets projected and sent to press, making a total of 43 sheets sent to press up to date.  |
|                      | Sindh in 99 Sections (20' Latitude by 30' Longitude) ... ..                                   | 1 = 1               | Seven sheets projected and sent to press, making a total of 19 sheets sent to press up to date. Of these, sheet 13 of the Kurrachee Kohistan has been entirely re-drawn for photography.       |
|                      | District Seonee (Central Provinces) in 10 Sections, each 20' Latitude by 30' Longitude ... .. | 1 = 1               | These sheets are being re-drawn in pen and ink for re-production by photozincography. The first three have been completed, and the rest are well advanced to the extent of materials received. |

7. All the maps in progress are being clearly done in pen and ink for immediate re-production by photozincography.

*Miscellaneous Maps, Tracings, &c.*

| TITLE.   | SCALE.                | REMARKS.  |
|--|-----------------------|---|
|  | <i>Miles. Inches.</i> |   |
| Trace of Ganjam and Orissa, chart of $\Delta$ 7  | 4 = 1                 | For Revenue Surveyor, 2nd Division, Central Provinces.  |
| Skeleton map of District Manbhoom, showing pergunnah, boundaries, and principal places ...   | 4 = 1                 | For the High Court, Calcutta.   |
| Skeleton map of British Sikkim, showing topographical features, and the boundaries of estates, locations, tea and cinchona plantations ...                   | 2 = 1                 | For publication, as a key to the published map of British Sikkim.   |
| Trace of the boundary common to Oudh and the territory ceded to the Hon'ble Company by the Nawab Vizeer ...  | 1 = 1                 | For the Superintendent of Settlement in Oudh.   |
| Trace of boundary between Oudh and Nepal ...   | 1 = 1                 | For the Revenue Surveyor, 2nd Division, Oudh.   |
| Trace of the village boundaries of one main circuit map of each of the Districts Tirhoot, Monghyr, and Malda, for comparison with Ganges Dearechs survey ... | 1 = 1                 | For the Board of Revenue, Lower Provinces.  |
| Traces of maps of main circuits 1 and 2 of District Kooch Behar, seasons 1858 to 1860 ...  | 1 = 1                 | For the Revenue Surveyor, 5th Division, Lower Provinces.  |
| Line of villages on either side of the high road from Goruckpore to Gha-zeepore ...  | 1 = 1                 | For Colonel J. T. Walker, R. E., Officiating Surveyor General.  |
| Captain Sconce's boundary between Pergunnah Bilonjeh of District Gya, and Pergunnah Palamow of District Lohardugga, reduced from 1 mile = 4 inches to ...    | 1 = 2                 | For comparison with Captain Sherwill's boundary of season 1843-44, and transmission to Board of Revenue, Lower Provinces. |
| Fourteen demarcation maps of the same boundary, reduced from 1 mile = 8 inches to ...  | 1 = 4                 | For the Board of Revenue, Lower Provinces.  |
| Thanah boundaries, and names inserted on engraved sheet No. 121 of the 24-Pergunnahs ...   | 1 = 1                 | For Magistrate of Alipore.  |
| Thanah boundaries, colored, on the 1 inch maps of District Tipperah ...  | 1 = 1                 | For the Collector of Tipperah.  |
| Two sets of standard sheets of District 24-Pergunnahs, printed and colored, one set showing thanah boundaries, the other, old pergunnah divisions            | 1 = 1                 | For the Collector, 24-Pergunnahs.   |
| Trace of boundary of Districts Bancoorah and Burdwan touching on District Hooghly ...  | 1 = 4                 | For the Superintendent of Demarcation.  |
| Trace of the boundaries and principal buildings of the city and cantonments of Hyderabad ...   | 1 = 8                 | To assist the Surveyor in Sindh in the survey of the environs.  |
| Trace of Lieut. J. Macdonald's survey of Kurrachee Harbour and Cantonments ...   | 1 = 8                 | To assist the Surveyor in Sindh in the re-survey of Kurrachee.  |
| Traces of the cantonments, cities, and forts of Philor, Mooltan, Julundur, and Umritsur ...  | Various.              | For the guidance of the Surveyor in charge Cantonment Surveys.  |
| Copies of traverse data of main circuits 1 to 7, and triangulation data of the whole of the Hazareebaugh District ...  |                       | For Captain Sconce, Revenue Surveyor, 6th Division, Lower Provinces.  |
| Numerical data of the Hazara Branch Series ...   |                       | For the Revenue Surveyor, North-Western Frontier.   |

The following maps and plans, done out of office hours, for landholders and other applicants, have been examined in the Drawing Department :—

| DESCRIPTION OF MAP.   | SCALE. |         | REMARKS.  |
|---|--------|---------|---|
|   | Miles. | Inches. |   |
| Trace map of Pergunnah Muhumud-shahce, District Pubnah ... }  | 1      | = 1     | For Native applicant.                                   |
| Trace of villages on either bank of the River Gunduk, through District Sarun, about 100 miles ... } | 1      | = 1     | For ditto ditto.  |
| Trace maps of the country between Rajmelal and Colgong ... }  | 1      | = 1     | For the Executive Engineer, Nuddea Irrigation Division. |
| Trace of the River Ganges and adjacent country from Peer Pyntee to Sahib-gunge ... }                | 1      | = 4     | For the Director General of Telegraphs.                 |
| Trace of the town and environs of Rungpoor ... }  | 1      | = 4     | For the Executive Engineer, Bhaugulpore.                |
| 280 M. S. copies of village plans ...   | 1      | = 4     | For landholders.  |
| 429 ditto ditto ditto ...   | 1      | = 4     | For the Superintendent of the Rohilcund Terai.          |
| Trace map of the Ganges and bordering country from Colgong to the River Gorai ... }                 | 4      | = 1     | For the Executive Engineer, Nuddea Irrigation Division. |

8. The payments made by applicants on account of the above, amount to Rs. 902, of which Rs. 158-4 has been credited to Government.

9. Proofs of 75 lithograph and 45 photo-lithograph and zincograph maps were examined for press.

10. Two thousand seven hundred fifty-three lithograph maps colored for issue to the public.

11. Besides the above, a great deal of miscellaneous and desultory work, which it is impossible to embody in a statement, was accomplished.

12. A thorough, minute, and rigorous examination, as detailed in para. 17 of last year's annual report, was also made of the main circuit and village traverses, field books and plans, atlas sheets, general maps, areas, and all numerical data furnished by the various executives for season 1866-67. The work of the divisions marginally noted was checked and passed; and the whole work of each party was fully and carefully criticised and commented upon for the information and guidance of the officers in charge and their assistants.

|                                  |   |
|----------------------------------|---|
| 1st Division, Central Provinces. | } |
| 2nd ditto ditto.                 |   |
| 3rd ditto ditto.                 |   |
| 4th ditto ditto.                 |   |
| 1st ditto, Oudh.                 | } |
| 2nd ditto, ditto.                |   |
| Simh.                            | } |
| North-Western Provinces.         |   |
| 1st Division, Lower Provinces.   |   |
| 2nd ditto ditto.                 |   |
| 4th ditto ditto.                 |   |
| 5th ditto ditto.                 |   |
| 6th ditto ditto.                 |   |
| Upper Assam Survey.              |   |

13. LEVELLING IN CONNECTION WITH REVENUE SURVEY.—During the field season of 1868-69, levelling operations will be carried on in Oudh in connection with the Revenue Survey. The lines of levels which it is proposed to run, and which are best suited to show the general contour or slope of the country, are well depicted on the skeleton map of the Oudh District which accompanies the Oudh Survey Report. Along these lines of levels all masonry triple-junction village plat-forms, which fall on or near the line, will be invariably



selected and adopted as permanent bench marks. These being all marked prominently on the maps of the Revenue Survey, the entry of the data will be readily and easily made, showing the height of each bench mark above mean sea level. This will be determined by starting and closing all the lines of Revenue Survey levels in Oudh on the bench marks of the principal series of levels of the Great Trigonometrical Survey of India, under the superintendence of Colonel Walker, R. E., the whole of which is given in terms of mean sea level.

14. INSPECTION.—During the months of September, October and November last, I inspected the offices of the two Oudh Survey Parties, the North-Western Province Survey, the North-West and Punjab Cantonments Survey, and the Central Province Revenue Survey, at the Stations of Nynee Tal, Dehra Doon, Mussooree and Jubbulpoor. I found all the parties well organised and in good order. My inspection of the mapping and computations of the various field-books and board plans, and of the check lines of survey, was exceedingly satisfactory. I was especially pleased with the comparisons I made of the check lines and interior detail survey in the two Oudh parties.

15. CALCUTTA OFFICE.—I am glad to be able again to report most favourably of the assistance I have received from the head Assistants and their subordinates, of the correspondence, and of the drawing and computing, branches.

J. E. GASTRELL, *Colonel,*  
*Supdt. of Revenue Surveys, Upper Circle.*

# REPORT OF THE Revenue Survey Operations

## OF THE PROVINCE OF OUDH For Season 1867-68.

### 1ST DIVISION OUDH.

Major F. C. Anderson, S. C., Surveyor, 1st Grade.

ASSISTANTS.

- Lieutenant D. C. Andrew, S. C., Assistant Surveyor, 1st Grade.
- Mr. C. W. Campbell, Civil Assistant, 3rd Grade.
- „ G. R. Buttress, Sub-Assistant, 2nd ditto.
- „ J. A. Swyny, ditto, 2nd ditto.
- „ H. T. Hanby, ditto, 3rd ditto.
- „ G. W. Jarbo, ditto, 4th ditto.
- „ J. R. Scott, ditto, 4th ditto.
- 29 Native Surveyors, &c.

This Party left recess quarters early in October 1867, and on the 15th of that month camps were formed for the survey of District Gonda, leaving the remaining tracts of District Kheree, lying in the most malarious part of northern Oudh, to be taken up later in the season.

2. TRACT SURVEYED IN DISTRICT GONDA.—The tract surveyed in District Gonda consists of a portion of the Gonda Khas Tehseel, south of the Koanee Nuddce, situate approximately between north latitude  $27^{\circ}10'$  and  $27^{\circ}25'$ , and east longitude  $81^{\circ}50'$  and  $82^{\circ}20'$ .

3. TRACT SURVEYED IN DISTRICT KHEREE.—The portion of District Kheree completed, lies north of the work of 1866-67, between north latitude  $27^{\circ}55'$  and  $28^{\circ}30'$ , and east longitude  $80^{\circ}55'$  and  $81^{\circ}10'$ , and extends from the Kowriali, or Ghogra River up to the Nepal Frontier, here defined by the Mohan River.

4. ADDITIONAL WORK.—In addition to this, the Survey was completed of 108 linear miles of the Provincial boundary between District Kheree of Oudh and the North-Western Provinces, besides the Cantonments, Civil Station, and City of Meerut, and the environs of the Cantonments of Seetapoor. These will be noticed in detail hereafter.

5. OUT-TURN OF THE SEASON.—The entire out-turn of the season consists of 653 villages, 43 Cantonment, and 9 Forest, blocks, aggregating an area of 1,078.63 square miles, thus distributed:—

| PERGUNNAHS AND DISTRICTS. | Number of villages. | Area in square miles. | Total Area.     |
|---------------------------|---------------------|-----------------------|-----------------|
| <i>District Gonda.</i>    |                     |                       |                 |
| Pergunnah Gonda           | 459                 | 359.26                | 359.26          |
| <i>District Kheree.</i>   |                     |                       |                 |
| Dhowrehrah (part of)      | 68                  | }                     | 656.87          |
| Ferozabad (ditto)         | 10                  |                       |                 |
| Sironuggur (ditto)        | 30                  |                       |                 |
| Bhoor (ditto)             | 42                  |                       |                 |
| Khyreegurb (ditto)        | 44                  |                       |                 |
| <i>Cantonments.</i>       |                     |                       |                 |
| Meerut                    | .....               | 38.44                 | } 62.50         |
| Sectapoor (environs)      | .....               | 24.06                 |                 |
| <b>TOTAL</b>              | <b>653</b>          | .....                 | <b>1,078.63</b> |

6. **HEAVY FOGS.**—The Surveyor remarks that “the earlier months of the cold weather of 1867-68 were remarkable for the fogs that prevailed throughout Oudh for days together, and overhung the country until 1 and 2 P. M. While they lasted it was impossible to carry on survey operations, and thus December, and a great portion of January, usually good working months, were lost.” The villages in Gonda, moreover, proved to be much smaller, and the detail work more intricate, than had been anticipated.

7. **THE SURVEY OF DISTRICT KHEREE NOT COMPLETED.**—These causes combined to retard the work in District Gonda, and in spite of every exertion the Survey was not free to enter District Kheree till the beginning of February 1868, too late, however, to complete the District, of which there still remain 150 square miles in Pergunnah Khyreegurh. There is, besides this, an area of over 80 square miles appertaining to the Pullia Illaqua recently transferred from District Shahjehanpoor of the North-Western Provinces to District Kheree. A preliminary topographical survey was made of this Illaqua in 1866-67 “for the purpose,” states the Surveyor, “of connection with the maps of the Shahjehanpoor District, but since its late transfer to Oudh, and sub-division into 34 villages, a complete re-survey of it has become indispensable.” This remaining area will be accordingly taken up during the season 1868-69.

8. **DEMARICATION AND MAPS.**—“The Thakbust maps were, as a rule, good. The demarcation on the ground was imperfect, and in many instances differed from the Thakbusts. This was chiefly the case in the two Gonda main circuits, by far the larger portion of which belongs to the Gonda Rajah, who farms out his villages to contractors, most of whom, having only a temporary interest in the holdings, appear to give but little attention to the conservation of their boundary pillars. Where the existence of a wrong demarcation could be clearly traced to the negligence and carelessness of the contractor or zemindar the cost of re-survey was defrayed at his expense, under the sanction of the Financial Commissioner’s letter of instructions, No. 3188, dated 18th July 1867. This system of exacting pecuniary compensation from the zemindar for the cost of extra labor entailed on the Professional Survey, has an exceedingly good effect, and is in fact the only means that could have been devised for impressing upon the Native mind the importance of preserving boundary marks. The money thus realized has been credited to Government in the monthly Bills of the Revenue Survey Establishment, and during the course of the operations now under report aggregated Rs. 432-5-2.”

9. **VILLAGES ADJOINING FOREST RESERVES.**—The unsettled state of boundaries of villages adjoining Government Forest Reserves caused no small trouble and loss of time. The Surveyor says “even now, many revisions must be anticipated, for the village demarcation has been frequently carried across cultivation, and land lately thrown out of cultivation, portions of which now lie within forest limits.”

10. **DETAIL SURVEY.**—The Detail Survey was most minute, and conducted under the strict supervision of European Assistants, who were constantly out in the field inspecting the work of the Native plane-tablers, and carrying check lines across their sections.

11. **CHECK SURVEY.**—Check Survey lines from 10 to 20 chains broad and 50 miles in length, were run across main circuits by the Revenue Surveyor and his Assistants, and minor check lines, aggregating 58 miles in length, were carried by Sub-Assistants through the work of every Native Surveyor. The comparison of these check surveys with the board plans was in every case satisfactory.

12. **SETTLEMENT DETAIL SURVEY.**—In District Kheree the Professional and Settlement Detail Survey proceeded *pari passu*, and the Detail areas were furnished by the Revenue Surveyor to the Settlement Officer. “In District Gonda, Settlement operations had not commenced. A Settlement Officer has, however, been lately appointed, and during the ensuing cold season (1868-69) arrangements will be made for the simultaneous working of the two establishments.”

13. CONNECTION WITH GREAT TRIGONOMETRICAL SURVEY.—The Kheree circuits, of the season under review, were connected with those of the preceding season by means of three Tower Stations\* of the north-east longitudinal Series, situated in the former season's work, and three† in the latter. The subjoined Tabular Statement shows the direct distances between them as compared with Great Trigonometrical Survey data :—

| Great Trigonometrical Survey Stations. | DISTANCES IN FEET.            |                 | Difference. | Error of Revenue Survey per mile in feet. |
|--|-------------------------------|-----------------|-------------|---|
|  | Great Trigonometrical Survey. | Revenue Survey. |             |   |
| Kutia to Sydara ... ..                 | 55346·9                       | 55331·8         | — 15·1      | 1·4                                       |
| Ditto to Asognpur ... ..               | 56133·6                       | 56111·9         | — 21·7      | 2·0                                       |
| Ditto to Daorara ... ..                | 55210·0                       | 55164·1         | — 45·9      | 4·4                                       |
| Daorara to Chelua ... ..               | 56195·2                       | 56152·1         | — 43·1      | 4·1                                       |
| Ditto to Asogapur ... ..               | 62571·1                       | 62537·0         | — 34·1      | 2·9                                       |
| Ditto to Lakoon ... ..                 | 67035·0                       | 67013·7         | — 19·3      | 1·5                                       |
| Lakoon to Chelua ... ..                | 60077·4                       | 60053·4         | — 24·0      | 2·1                                       |
| Average error ... ..                   | .....                         | .....           | .....       | 2·6                                       |

14. The work in District Gonda was based on two Tower Stations of the Gurwani Meridional Series. The following is the result of comparison between the Great Trigonometrical and Revenue Survey data :—

Kopa.  
Gurunnagar.

| Great Trigonometrical Survey Stations. | DISTANCE IN FEET.             |                 | Difference. | Error of Revenue Survey per mile. |
|--|-------------------------------|-----------------|-------------|-----------------------------------|
|  | Great Trigonometrical Survey. | Revenue Survey. |             |                                   |
| Kopa to Gurunnagar ... ..              | 67,613·9                      | 67534·5         | — 79·4      | 6·2                               |

15. MEERUT CANTONMENTS.—A minute Survey was made of the Meerut Cantonment, the Civil Station and their environs, on the large scale of 12 inches to the mile. The grand round was sub-divided into 37 blocks for convenience of survey, and the work was connected with two \*Great Trigonometrical Survey Towers of the Great Arc Series. The comparison with the Great Trigonometrical Survey side has not been furnished by the Surveyor.

\* Saini.  
Dhobri.

16. BENCH MARKS.—All the Bench Marks which could be identified were connected by traverse. They consisted of 13 laid down by the Department of Public Works, and one Great Trigonometrical Survey Bench Mark on the surface of the stone slab opposite the north pillar of the west central doorway of the Meerut Church.

17. SEETAPOOR CANTONMENTS.—The environs of the Sectapoor Cantonments, and Civil Station, were surveyed on the same large scale, and all alterations that had taken place within the limits of the Cantonment since the Survey of 1864-65 were carefully recorded, and the plan revised up to 1st May 1868.

18. PROVINCIAL BOUNDARY REVISED.—As stated in paragraph 10 of the Annual Report for 1866-67, arrangements were made to lay down and revise the boundary between Oudh, and Rohilkund of the North-Western Provinces; Mr. John Kavanagh, on the part of the Oudh Government, and Mr. Brett, Assistant Magistrate and Collector, (who took the place of Mr. H. M. Rogers,) on the part of the North-Western Provinces Government, were appointed to this duty in January 1868. They started from "a disputed point, the Surveyor states, "on the boundary common to the districts of Hurdui and Shahjehanpooor, and worked

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northwards to the tri-junction of Rohilkund, Oudh, and Nepal; and it was not till after April that all the boundary disputes were adjusted. As the work progressed Thakbust maps of the revised boundary were sent to the Revenue Surveyor from time to time, but they came in slowly, and the last was not received till the 27th August 1868."

19. This revision of boundary affects 59 villages of District Kheree, the areas of which will have to be re-adjusted.

20. DEFICIENCY OF PERMANENT MARKS.—The Provincial boundary being now finally settled and surveyed, it is of the first importance that it should be made permanent without loss of time, in conformity with the sanction referred to in letter No. 812A, dated 26th August 1867, from the Junior Secretary to Government, North-Western Provinces, to the address of Major Anderson. On this subject the Surveyor remarks, "along the 108 miles of boundary between Rohilkund and the Kheree District about 31 masonry pillars only have been erected, exclusive of the tri-junction masonry platforms. The erection of a permanent demarcation between two provinces, the land tenure of which is held under such different rulings, is of the utmost importance."

21. PROGRAMME FOR 1868-69.—The Survey Party left recess quarters on the 20th October 1868, to resume the survey of District Gonda, of which Turrufgunj Tuhseel, lying north of the River Ghogra, will come under survey. When this work is well advanced towards completion a part of the establishment will be detached to finish off the small area remaining in District Kheree. The estimated area stands thus, viz. :—

|  | Sq. miles, |
|--|------------|
| Tubseel Turrufgunj, District Gonda ... ..    | 820        |
| Pergunnah Khyreegurh, District Kheree ... .. | 150        |
| Illaqua Pullia, District Kheree ... ..       | 80         |
|  | —          |
| TOTAL ...                                    | 1,050      |
|  | —          |

22. ENVIRONS OF FYZABAD.—A Party will also be detached for the survey of the environs of Fyzabad Cantonments, two miles all round, and estimated at 25 square miles, to complete the plan, and to revise it up to date.

23. LEVELING OPERATIONS.—On receiving the sanction\* of the Governor General in Council to the formation of Leveling Parties, in connection with the Revenue survey operations in Oudh, I addressed the Chief Engineer, Irrigation Branch, Public Works Department, on the best means of meeting the wishes and carrying out the suggestions of the Secretary to the Government of India, Public Works Department,† in "districts in which irrigation works exist, or are contemplated, or are likely to be taken up." Further, to run series of levels across districts not yet contoured, and to combine the results of the leveling operations about to be undertaken by the Revenue Survey with those already completed or about to be prosecuted by the Irrigation Department, by supplementing their lines of levels.

24. The Chief Engineer was at once furnished with maps of Oudh, and that officer marked off the lines of levels proposed to be undertaken by his department. These lines bear "at right angles to the general water-shed between the main rivers of the province at an average distance of ten miles apart"; and the Superintendent having intimated that it would be of material assistance to his department if the series of Irrigation Levels were supplemented by the Revenue Survey running lines mid-way between, and parallel to, those indicated by him, "these lines being connected at their extremities by a longitudinal series running down the main Rivers on either flank, and down the River Goomtee in the centre"; orders have been issued to the Surveyor to run his lines accordingly.

\* Financial Resolution No. 724, dated 30th June 1868.

† No. 93, E. I., dated 11th June 1868, to the Secretary to Government, Home Department.

25. An outline map is attached, showing the lines of levels to be thus run throughout the Province between the Ghogra and Ganges Rivers. The series north of the Ghogra has not yet been determined.

26. It has been decided, as no Great Trigonometrical Survey Levels have yet been run to the west of Oudh, to commence at the eastern extremity of Oudh, using as a basis the Great Trigonometrical Survey Bench Marks given in the "Tables of heights along the Grand Trunk Road from Cawnpore to Allahabad," published under the direction of Colonel J. T. Walker, R. E., Superintendent, Great Trigonometrical Survey, working between the Irrigation Series which runs through the Province from south-west to north-east at intervals of ten miles, starting from, and closing upon, the Great Trigonometrical Survey Bench Marks along the right bank of the Ganges, and finishing off at the junction of District Furruckabad (North-Western Provinces) and Hurdui (Oudh) on the Ganges, about 15 miles south-east of Furruckabad. The number of linear miles of levels to be undertaken by the Revenue Survey Department between the Ganges and Ghogra Rivers is estimated at 2,500. Two Sub-Assistants' Parties have been trained and equipped under the direction of the Revenue Surveyor, Major Anderson, and I hope to see the Revenue Survey leveling operations throughout the Province completed in season 1869-70.

27. The Revenue Surveyor, with one exception only, records his high appreciation of the merits and services of his Assistants. Speaking of his two senior Assistants, to whom were entrusted the charge of camps, he says :—  
*Personnel.* "Lieutenant Andrew and Mr. C. W. Campbell have taxed to the utmost their own executive powers, and have exercised the strictest vigilance over their subordinates, from whom they have received the fullest support that can be yielded by obedience, industry, combination, and the desire of each to obtain the approbation of his superior."

28. The Surveyor's descriptive narrative will be found in the Appendix.

2ND DIVISION, OUDH.

Captain A. D. Vaurenen, S. C., Surveyor, 2nd Grade.

ASSISTANTS.

- Lieutenant A. F. Cumberlege, S. C., Assistant Surveyor, 2nd Grade.
- Mr. W. H. Patterson, Civil Assistant, 2nd Grade.
- " W. Street, Sub-Assistant, 2nd Grade, died 2nd June 1868.
- " H. Wray, ditto, 3rd Grade, transferred from 2nd Division, L. P., on the 1st October 1867.
- " W. Bourne, ditto, 3rd Grade, transferred from 2nd Division, C. P., on the 11th November 1867.
- " L. Evans, ditto, 4th Grade, transferred to 2nd Division, C. P., on the 25th October 1867.
- " T. Patterson, ditto, 4th Grade.
- " S. O. Madras, ditto, 4th Grade, appointed 6th July 1868.
- 34 Native Surveyors, &c.

29. For reasons which will be given hereafter, the Surveyor found it impossible to complete the programme sketched out in paragraph 29 of the Annual Report for 1866-67.

30. COMMENCEMENT OF FIELD WORK.—The party took the field early in October 1867, and returned to recess quarters in May 1868, two-thirds of its strength having been employed in the survey of District Buraich under the immediate control of the Revenue Surveyor, and the remainder (detached, under Mr. W. H. Patterson, Assistant Surveyor) in completing the environs of Lucknow and surveying the cantonments of Cawnpore.

31. AREA IN DISTRICT BURAICH.—The area surveyed in District Buraich was 899-35 square miles of Tuhseel Nanpara, distributed among the Pergunnahs marginally noted, and subdivided into 471 villages and 27 forest blocks. The separate areas of Pergunnahs and forest blocks cannot be given, as their limits are not yet finally adjusted.

- Pergunnah Bhinga.
- " Churda.
- " Nanpara.
- " Dhurmanpore.

|                                     |   | <i>Square Miles.</i>                     |        |
|-------------------------------------|---|--|--------|
| <b>TOTAL AREA.</b>                  | { | To this area in District Buraich of      | 899-35 |
|                                     |   | Add environs 2 miles round Lucknow       | 41-14  |
|                                     |   | And cantonments and environs of Cawnpore | 31-14  |
| Making the total area of the season |   | 971-63                                   |        |

32. LIMITS.—The tract under review in District Buraich lying between  $27^{\circ} 40'$  north latitude and  $\frac{81^{\circ} 06'}{82^{\circ} 05'}$  east longitude is bounded north by Nepal, west by District Kheree, south and east by the old work of 1865-67 of District Buraich.

33. DETAIL SURVEY.—The survey of villages and forest blocks was on the scale of 4"=mile, and the Surveyor expresses his entire confidence in its accuracy, which was tested by 74 miles of check survey (done by European agency) passing through the work of every Native Surveyor to detect chain errors in the detail work of villages. "The interior Surveyor was ordered to set up, on some centrally situated eminence (generally a large tree) a flag, which he was told to intersect whenever he set up his plane table." This plan answers well in open country.

34. GREAT TRIGONOMETRICAL SURVEY TOWERS.—The only Great Trigonometrical Survey Tower within the season's work is Dadaora of the north-east longitudinal series. This principal station was connected with those situated in the circuits of 1866-67, and the following is the favorable result of comparison between Great Trigonometrical Survey and Revenue Survey direct distances, in feet:—

| GREAT TRIGONOMETRICAL SURVEY TOWERS. | DIRECT DISTANCES. |               | Error of Revenue Survey in feet. | Error per mile. |
|--------------------------------------|-------------------|---------------|----------------------------------|-----------------|
|                                      | G. T. Survey.     | Reve. Survey. |                                  |                 |
| Dadaora to Atkonawa ... ..           | 70990.9           | 70977.4       | - 13.5                           | 1.0             |
| „ Anarkali ... ..                    | 53310.4           | 53293.4       | - 17.0                           | 1.6             |
| „ Tilakpoor ... ..                   | 64949.8           | 64926.8       | - 23.0                           | 1.8             |
| „ Newada ... ..                      | 65666.4           | 65702.9       | + 36.5                           | 2.9             |
| Average where the error is ... ..    | +                 | ...           | ...                              | 2.9             |
| „ „ „ ... ..                         | ...               | ...           | ...                              | 1.5             |

35. DEMARCATION.—With the exception of the boundaries of villages bordering on Forest Reserves, the demarcation was well in advance of the Survey, and the Thakbust maps were delivered as soon as the professional Party took the field. Great attention is paid in Oudh to the erection of marks at tri-boundaries of villages. "At nearly every village tri-junction the usual pucca masonry platform has been erected, and wherever practicable this has been made a Survey Station." It is to be regretted, however, that the best materials have not been used, and that many of the platforms are already "in very great disrepair, although perhaps built only a few years." The demarcation maps are spoken of as excellent.

36. NEPAL FRONTIER BOUNDARY.—The survey of the boundary common to Nepal and District Buraich is complete. The Surveyor reports the boundary pillars intact, except two in the Chuckia Reserve, and one in the Dumar Reserve, but these can be rebuilt in their true positions, as their foundations have not been obliterated.

37. Three discrepancies occurred between the present survey of the boundary and that made by Major F. C. Anderson, one of the Boundary Commissioners, in 1860. These were duly reported to the Financial Commissioner of Oudh by Captain Vanrenen, and the question having been submitted to the Chief Commissioner for orders, that Officer has directed that the boundary, as now surveyed by Captain A. D. Vanrenen, shall be upheld.

38. SURVEY INCOMPLETE.—There is still a small area remaining to complete District Buraich, *viz.*, Pergunnah Toolseepoor, transferred since publication of last Report from District Gonda, and estimated at 122 square miles, and 22 square miles of the Bhingra Forest Reserve, noticed in para. 19 of last Report, in all about 144 square miles.

39. DEFECTIVE DEMARCATION.—The circumstances which prevented the completion of this small area in Pergunnah Bhingra were quite beyond the Surveyor's control. Towards the

close of the field season (April 1868), the Extra Assistant in charge of the demarcation reported to the Surveyor that the boundaries of ten villages contiguous to the Government Forest Reserve in Bhinga were liable to alteration, and the Survey was accordingly postponed, pending final adjustment of these boundaries.

40. **DISPUTED LAND.**—In addition to this difficulty, the Rajgurh Singha jungle tract in Pergunnah Churda, Tuhseel Nanpara, was disputed by three claimants, and the Surveyor was obliged to survey three different lines of boundary laid down by the disputants, who are described by the Surveyor as—

1st.—The Government Conservator of Forests.

2nd.—The Maharajah of Bulrampoor.

3rd.—The Kuzulbash Nawab, Talookdar.

These conflicting claims were still unsettled when the Survey Party left the field in May 1868.

41. **LIMITS OF RESERVES ERRONEOUSLY DEFINED.**—With regard to the villages abutting the Bhinga Forest Reserve, the Surveyor states that “the Conservator in erecting his boundary marks directed his men to heap up large mounds of earth with stakes driven into their centres, at equal distances of 200 feet apart, without reference to sinuosities of boundaries of the contiguous villages, as shown in the Thakbust maps. These large mounds of earth in places quite misled our men, and in very many cases remeasurements had to be made to enable our boundaries to agree with the correctly demarcated line as shown in the Thakbusts.”

The Assistant Superintendent of Settlement admits\* that the “demarcation around all the forests in Buraich District was rendered defective by certain arrangements of the Conservator of Forests. He ordered masonry pillars to be erected 200 feet apart on the boundaries I had laid down, but the natives entrusted with the duty of marking these points were careless in adhering to the boundary and made many pillars wide of it.”

42. **WORK REMAINING IN DISTRICT BURAICH.**—These boundaries in Pergunnahs Bhinga and Churda will be taken up, as soon as it is safe to enter the forests, during the present field season of 1868-69, by a small Party to be detached from District Bijnour under a Sub-Assistant.

43. Pergunnah Toolseepoor has been allotted to Major F. C. Anderson, whose Party is employed in District Gonda.

44. **KHUSREH COMPARISON.**—Comparison was made in the field of the detailed areas of villages, and the result is alike satisfactory and creditable to the Settlement and Professional Branch. The Surveyor remarks: “The subordinates of each department being well aware that this rigorous check of their work was to be instituted were doubtless kept on the *qui vive*, and took care to omit no details. The results proved that the details had been recorded without omissions by both parties, and generally accurately. No discrepancies worth mentioning were discovered except in one village. \* \* \* \* Slight differences occurred in the items of cultivation, and of land fit for cultivation, owing probably to the difficulty our Native Surveyors experienced in obtaining a true report as to the number of years which had elapsed since the ground was cultivated; also occasional differences in recording a patch of ground as *bush* or *high grass*, but the general comparison uniformly agreed.”

45. **CO-OPERATION OF AUTHORITIES.**—The Surveyor cordially acknowledges the co-operation of the Civil and Settlement Officers.

46. **ENVIRONS OF LUCKNOW.**—The plan of the cantonment, city, and civil station of Lucknow was completed by the addition of the environs 2 miles all round, on the scale of 8 inches=1 mile. All the alterations and additions made within cantonment limits since the survey of 1862-63 were recorded on a separate plan and submitted to this Office for the revision of



the final plan under preparation for the Secretary of State for India. This survey which demanded the utmost care and nicety to fit the new work into the old was executed with precision and skill by the Assistant to whom it was entrusted.

47. CANTONMENTS OF CAWNPOOR.—An elaborate and a most minute survey was also made of the cantonment, civil station, and city of Cawnpoor on the large scale of 12 inches = 1 mile. The plans of Lucknow and Cawnpoor have all been lodged in this Office, and are excellent specimens of field sheets.

48. ASSISTANTS.—The Surveyor expresses himself well satisfied with the exertions of his Assistants, and specially mentions Lieutenant Cumberlege, and Messrs. W. H. Patterson, W. Bourne, and T. Patterson.

He further reports that “the native Surveyors, Computers, and Draftsmen have worked well.

49. PROGRAMME FOR 1868-69.—This Party will this season be employed in District Bijour of the North-Western Provinces, as stated in para. 30 of the Annual Report for 1866-67.

50. The Surveyor’s description of the country under review will be found in the Appendix.

51. The general maps of District Buraich have been received, and have been very clearly and neatly drawn by Lieutenant Cumberlege, Mr. W. H. Patterson, and Mr. H. Wray.

SUPDT. REVENUE SURVEYS’ OFFICE ;  
CALCUTTA,  
The 18th November 1868. }

JAMES E. GASTRELL, *Colonel.*

*Supdt., Revenue Survey Upper Circle.*

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## APPENDIX.

*Description of Country surveyed in District Gonda, season 1867-68, by MAJOR F. C. ANDERSON,  
Revenue Surveyor, 1st Division, Oude.*

The general features of that small portion of the Gonda District that came under survey during the field season of 1867-68, may be described as an almost uninterrupted plain of cultivation, and land lately cultivated, diversified by scattered mango topes, tanks and large jheels, which overflow their banks during the rains.

2. **NULLAHS.**—The two main circuits into which it was divided for survey purposes are intersected by nullahs running from north-west to south-east, of which the largest is the Kohanee, the next is the Bisooe, and the smallest is the Munowr, a streamlet that rises out of the marshes lying along the borders of main circuits Nos. 1 and 2. The Kohanee is fed by the Perar and Jaydah Nullahs, which take their rise in the north-east corner of main circuit No. 1, and are fordable till within four or five miles of their confluence with the larger stream, where crossing becomes dangerous. It is dotted with small islands covered with the broad-leaved willow, and is enclosed on both sides by a heavy belt of tree and bush jungle. The scenery along its undulating banks is very picturesque; the water is deep, slimy, very sluggish, and in some parts full of leeches, which rise in shoals to the surface where agitated. The Bisooe is generally fordable and is fed by the Dhowka, which rises out of the Sohela Tal, a large sheet of water full of wild fowl, and covering an area of 1,232 acres. As is natural to a country so covered with water, malarious fevers are very prevalent, and the Survey Camp suffered much, more especially the line cutting parties employed in the neighbourhood of the Kohanee, who were prostrated to a man, and did not rally for some time.

3. **ROADS.**—The four principal thoroughfares are common district roads, level with the surrounding country, except where raised over swamps. They connect Byram Ghât and Gonda with Bulrampore, and Gondah with Buraich and Utrowla. The line from Gonda to Bulrampore has seven bridges, the other three are not bridged at all.

4. **TEMPLES.**—Many small temples are to be found all over the country, but the only notable ones that were met with are in the villages of Arrah, Dhonopore and Tirra. The population is large and mostly Hindoo. The khurreef crops are chiefly rice.

5. **KHEREE DISTRICT.**—The three main circuits of the Kheree District surveyed in season 1867-68 lie between the Rivers Chowka on the south-west, the Kowriahi or Ghogra along the east, and on the north the Mohan, the mid-stream of which defines the boundary between British and Nepalese territory. The two distinctive features of this tract of country are the high ground in main circuit No. 12, on which grow forests of sâl, beyond reach of the floods and the low lands subject to inundations, caused by the commingling of all the numerous jheels and marshes which feed the many small streams that flow through main circuits 10 and 11 southwards, into the Duhowr. This Nuddee takes its rise in the Kufara swamp, and is increased by the Hurdhooa, Dhowree, Buha and Sooknee Nullahs, which have their origin in the jheels between the Kowriahi and Chowka. The Sohelee or Sarjoo flows from west to east, and taking a course midway between the Mohan and Chowka falls into the Kowriahi, 5 miles below its junction with the Jowrha Nuddee. The Kowriahi and Chowka are nowhere fordable at any time of the year. Both rivers are infested with alligators. Above the junction of the Mohan and Kowriahi the Mahasser fishing is very superior.

6. **SOILS AND PRODUCE.**—In the low lands in and round about the Dhowrera Pergunnah, the soil is very rich; in those parts of Bhoor and Khyregurh which came under observation, it is hard and stiff. The khurreef crops are principally Indian corn, joar, and rice; and the rubbee, dâll (urhur), barley, turmeric, tobacco, castor oil and lahee which is exported raw, and yields a description of mustard oil. Tobacco is chiefly cultivated in the Dhowrera Pergunnah, turmeric in Bhoor and lahee in that of Khyregurh. These products are carted away as far as Delhi, Lucknow,

and other large marts. Throughout the northern portion of the Kherce District, catechu is largely manufactured from the acacia catechu called here the Khyre tree. This avocation is chiefly followed by people of a very low caste, denominated from their occupation Khyrees. The rough method pursued by them is to chip out with axes the dark brown heart of the wood; these shavings are soaked and boiled in large earthen vessels filled with water. The light chips rise to the surface, and are thrown away, the water is evaporated by repeated boiling, leaving a sediment which is the catechu. This is made into cakes, dried, and sold to the exporters. Wheat is scarce, and when met with is found intermixed with the barley. Dhowrera is famous for its breed of bullocks, which are sought from a great distance for draft and agricultural purposes.

7. **BAZARS AND FAIRS.**—The only bazars held are insignificant; the best are those noted on the maps at Dhowrera, Kuffara and Muttera. The only fairs are those of Leelonath and Millelee, the one held at Kuffara in March and the other at Goheria in May.

8. **ROADS.**—Roads are much required in the eastern and northern parts of the Kherce District. There is but one throughout the 656 square miles surveyed during the season under review. It runs from Muttera to Nighasun, thence to Palia, and is in fair order, though entirely unbridged. The line has been well chosen, avoiding the swamps and jheels in the neighbourhood of Simree.

9. **POPULATION.**—The population is scanty, and chiefly Hindoo, though a few Mahomedans are to be found in the large villages of Kuffara, Dhowrera and Maharajgunj. In consequence of the general unhealthiness of the district few men of position and with means sufficient to permit them to consult the dictates of their own will have ever resided within its limits. During the Oudh Nuwabee the Chukladars of this part of the country resided in Khyrabad and Muhumdee, and round them gathered all the influential and moneyed men. This accounts for the absence of any towns, many large villages, dwelling houses, fairs and markets over so extensive an area; whereas across the border in the more healthy tracts of the Buraich District, a general appearance of comparative affluence marks the presence of resident proprietors. The Bôt and Tharoo, two classes peculiar to the northern parts of the Kherce District, are climatized, and make good cultivators; but the bad water and malarious atmosphere are most injurious to other tribes, who, when driven there by force of circumstances, become fever-stricken, splenetic, and dropsical. By a pernicious policy on the part of Rundhoo Subae, the late Raja of Khyregurh, the Tharoos have been allowed to emigrate to the Nepalese bank of the Mohan, where they are more lightly assessed, and land is offered to them on more favorable terms. Eventually they will be sufferers, as, once established on the Nepalese border, the assessment will be raised, and they will not be allowed to return to British territory.

10. **HISTORICAL.**—Originally, two races held pre-eminence in these parts, the Binjaras, who ruled in the Khyregurh Pergunnah and northwards, and the Bisen Thakoors to their south. The former have been ousted within the last 50 years by the Hill tribes to which belongs the family of the present Rajah of Khyregurh. The Bisens have been superseded within the last 200 years by the Jangra Thakoors, of which clan the present Rajahs of Esanuggur and Bhoor are members.

During the mutiny of 1857 the fugitives from Shahjehanpore and Muhumdee, escaping towards Lucknow, sought the protection of the Dhowrerah Rajah, but he being pressed by the Lucknow Durbar, gave them up to their enemies. For this disloyalty to British rule, the Rajah was tried and hung; his estates were confiscated, and a portion of them comprising 17 villages containing 43 square miles was made over to Captain John Hearsay of the old Oudh Contingent for good service rendered to the British Government. This estate has been sold by Captain Hearsay to Colonel Boileau, late of the Bengal Cavalry, who is now the proprietor and has built a good bungalow at Muttera, but is at present residing in England.

F. C. ANDERSON, *Major,*  
*Revenue Surveyor, 1st Grade, Oudh.*

*Description of Country surveyed in District Buraich, Season 1867-68, by Capt. A. D. VANRENEN, Revenue Surveyor, 2nd Division, Oude.*

1. **TRACT OF COUNTRY SURVEYED—DESCRIPTION, &c.**—The tract surveyed contains the larger part of the Nanpara Tuhseel, or these Pergunnahs contained in it:—Bhinga, Churda and Dhurmanpore; that portion of the country lying along the right bank of the Raptce, and along the Bhukla Nullah, is well cultivated, and the soil seems very rich; in the spring of the year, it looks like one large green field of waving grain in ear, here and there open, where the village sites are located; and about them

are to be seen the large groves of trees, for which this part of India is so famed. To the north and along the Nepal boundary line we come to part of the ill-famed Terai, with its deadly climate, in certain seasons of the year; and which, now that timber has become so valuable, is carefully conserved and has been made over to the officers of the Forest Department. To the north-west this belt of forest covers nearly the whole of the Dhurmanpore Pergunnah, and only about the chief town itself do we meet with any open ground, which is rather low and seems to have been caused by the receding of the Kourialla River. This open ground is one sheet of cultivation, and has a most picturesque appearance, being green throughout the year, with a background of dense forest growing on the heights. The lower Himalayan ranges are distinctly visible, and on clear days the distant snowy range, with its rugged and lofty peaks, can be seen, making a beautiful view. The villages have mostly a desolate appearance; they are nearly all built of mud, with very few pucca houses, and in many places, are mere clearances in the jungle.

2. RIVER KOURIALLA.—The River Kourialla here forms the boundary between Kheree and Buraich, it is navigable throughout. When there is a demand for grain in the country lower down, numerous boats are freighted and sent up to the towns of Kheree and Buraich along its banks; a great deal of timber is likewise rafted down to Buhram Ghaut, now one of the largest sal timber marts in the country. The navigation ceases at the Golah Ghaut, a short distance from the boundary line. Where it leaves the hills, there is a beautiful fall called "Sheesh-Panee" in the Nepal territory, which is visited by pilgrims and visitors. Like other great rivers flowing through low alluvial tracts, it is divided into many streams, communicating in the rainy season by numerous off-sets with the parent stream and with each other.

3. GIRWA RIVER.—The Girwa River is one of its tributaries here; it is a prettily wooded stream; its bed is covered with large boulders, near where it enters British territory, the Futteghur Gun Carriage Agency Station; during the cold weather months an Overseer selects sissoo timber suitable to the requirements of the manufactory, which is then floated down the Girwa and Kourialla in rafts, and sent across country to Futteghur, where it is stored for many years, and thoroughly seasoned before being made into Gun Carriages. Near this, there is a ford during the cold weather admitting of the passage of camels and baggage animals; but as the water is very cold, the current very rapid, and the bed very rough, care must be taken that they have only light loads, and have men near at hand to help them up in case they stumble; about a quarter of a mile lower down, there is a ferry where there are always several boats plying to and fro.

4. RIVER SARJOO.—The River Sarjoo here is a large stream in the rains, and overflows its banks; it is likewise constantly shifting its bed: as this stream and the Girwa pass through valuable timber forests belonging to us and Nepal, they are largely used to float down timber into the Kourialla, which they both join soon after debouching into the plains. Mr. Bourne thus describes the other smaller streams, *viz.*, the Bhada, Chooka and Bubuyee: "They present a very unusual appearance to the eye in the dry weather, looking in fact like long strips of jheels; trees of considerable size, tiger-grass and reeds grow in their beds throughout their entire length and breadth. The inhabitants do not drink the water of any of them on account of its deleterious effects on the system; possibly owing to the presence of decayed vegetable matter in the water, and further say, that no person can continue to drink long of the water and live." Every village has a number of wells from which the drinking water is obtained. Near the forests they are often square shaped, frames of timber being used to keep their sides from falling in, and some of these appear to have lasted a number of years.

5. ROADS.—The only road of importance is the one from the Kourialla river to Nepalgunj through Nanpara, which is embanked and bridged in places, and on which there is a great traffic during the dry months, the exports from Nepal being sal timber, spices, and its valuable iron; and the imports being cotton and woollen cloths. The other roads are mere village paths; on those leading from large villages, carts can be used during the dry months; when the local funds admit of it, I believe, a new road is to be made from Nanpara to Mookkepoor, where there is a police station, and which is the last one at this end of the district.

6. CROPS, &c.—The usual crops common to this part of the country are raised, and except when the rains fail, the harvests are so good as to have obtained for Oude the name of the "Garden of India," although this applies more to the other districts, Buraich being for Oude a poor one. The dews are very heavy, and which must afford considerable nourishment to the crops. Excepting in the small vegetable gardens about the villages, irrigation is seldom applied to the fields in Buraich.

7. **THE WANDERING TRIBE OF BUNJARAHS.**—In the Dhurmanpore Pergunnah there are several villages of Bunjarahs who have good grazing for their large herds of pack bullocks in the jungles so near at hand, and nearly all the salt trade along the edges of the Terai is carried on by them.

8. **JUNGLE CROPS MUCH INJURED BY WILD ANIMALS.**—So much of the country being covered with jungle, it affords great shelter to all the deer tribe and wild pig, who do great mischief to the crops, and although the fields on the jungle side are protected by high thorny hedges, and are likewise carefully watched day and night by the cultivators themselves, perched on some platform in a tree, or raised on an eminence, yet these animals often break through the hedges, and destroy in a few hours the produce of months of toil. Mr. Bourne states: "That he has seen a field of wheat, of an area of 30 to 40 acres, so over-run and destroyed by these animals, that the owner had to turn in his own cattle to graze upon what remained, evidently considering that it was no longer worth his while to hope for a harvest." The general disarmament of the country must likewise have tended to the increase of wild animals, as now the possession of a gun and the purchase of gunpowder entail many formalities, and many would sooner dispense with their guns than undergo them.

9. **FORESTS.**—So many of our most valuable forests having been made over to Nepal after the mutiny, and as the demand for the valuable kinds of timber is daily increasing, the forests which we still possess are carefully attended to by the officials of the Forest Department, and all over them are located small posts of chupprassees, who see that the rules laid down by Government are carried out, and that the young trees are not injured by the villagers. During the cold weather months, or as soon as the forests can be visited without risk of getting fever, they are inspected by the European officers of the department. I have heard timber merchants and others, more than once remark, that our being able to send to market a few valuable logs now and then, has a most salutary effect on the Nepalese Government, who otherwise would have the entire monopoly of the trade, as they now own, beyond comparison, the finest forests, and where alone sál timber of the largest scantling can be procured.

10. **BURAICH FORESTS: EIGHT KINDS OF TREES ORDERED FOR CONSERVATION.**—The forests of Buraich, having been the nearest available, all the large trees, I am told, were cut down before annexation; and in passing through them, I noticed that all the trees seemed to be of young growth, and the forests would not be productive for many years to come. At the time of survey the following six kinds of forest trees were ordered for conservation:—

1. Sál—*Shorea robusta*.
2. Sisso—*Dalleergia sissoo*.
3. Toon—*Cedrela Toona*.
4. Ebony—*Diospyras melanoxylum*.
5. Dhao—*Conocarpus latifolia*.
6. Assana—*Terminalia tomentosa*.

In August last these two trees were added to the list, *viz.*:—

7. Khair—*Acacia catechu*.
8. Tikooce, or Huldoe—*Nauclea cordifolia*.

11. **RESTRICTIONS PLACED ON VILLAGERS ABOUT CUTTING TIMBER SEVERELY FELT BY THEM.**—The restrictions placed on the villagers near the forests, who for years previous had been allowed to roam the woods at large, cutting down almost what timber they required, and grazing their cattle, have caused much grumbling and dissatisfaction, and some new rules, I am informed, are to be shortly issued, allotting them a certain area of forest for fuel (the eight reserved woods not to be cut,) and grazing purposes in proportion to the size of the village, which I have no doubt will make them quite contented.

12. **AN ABORIGINAL TRIBE "THE THAROOS."**—On the edges of many of these forests, and on the Nepal boundary, we met with an aboriginal tribe called "Tharoos," and they put me in mind of the Gonds, Sherrius, &c., inhabiting the jungle, surveyed by me in Central India. They are in many respects very like their Central India brethren, in physical appearance almost alike, but they are much more industrious, as the fields they cultivated, with their numerous water-cuts for irrigation, show, and altogether more settled and less savage. They keep almost exclusively to the Terai and forest, living where no one else can live. The new forest rules have been severely felt by these shy and timid people; and as by the transfer of the Oude Terai, the great mass of them have

now become subjects of the Nepal Government, a great many of our Tharoo villagers dissatisfied with the restrictions placed on them about cutting wood in, and roaming about, the forests, have left our territory and joined their brethren in Nepal, and if I am rightly informed, a welcome is given them by the Nepalese officials. The people from the plains give them a bad name, and say that they are afraid to enter the Tharoo villages in small parties for fear of being bewitched, as these wild men believe in hoots and familiar spirits. Mr. Thomas Paterson thus writes of them, after surveying a number of their villages: "The Tharoos left the country in a mass for Nepal, after the annexation; all that now remains of the industry of these people are the numerous canals cut for irrigation purposes; these intersect the country in all directions; they are now dry, and are not used by the few who remain. A whole village of these Tharoos came out to see the survey operations; they were quite anxious to do something for us, if only to assist in pulling the chain: they owned large herds of buffaloes, which obtained good pasturage in the adjoining deserted villages. They were a wild-looking lot of fellows, plain-spoken, and of independent bearing; the natives who affected to treat them with contempt said they were of no particular caste, would eat anything from a dead rat upwards; large herds of antelope abound here, and mix quite freely with the cattle." He likewise describes the devastation caused by the deer and wild animals to growing crops, and states "that they have to be watched all night, and that small sheds are erected in the fields at intervals of two hundred feet apart, two upright pieces of wood are let in the ground, from which a large stone is suspended, and by means of strings attached to them, and pulled by men in the sheds, they act like clappers, making a noise and frightening away the animals from the young grain in the fields."

13. FORESTS ABOUND WITH GAME.—These forests abound with all the large species of game: tigers, leopards, the deer kind, wild pig, &c., and are the scene of those enormous haunts, or battues, we see described in the histories of the Kings of Oude; even now they are still visited by European parties after shikar, and by the large and wealthy talookdars, such as the Rajahs of Kupoorthulla and Bulrampore, who come about the beginning of the hot weather, as water becomes scarce, with numerous elephants, and have generally good sport; and whilst we were in the field, we heard of many tigers having fallen; although they are still numerous, yet they seldom attack men, and for some years past no report has been received by our officials of their having injured any one; this immunity is doubtless attributable to their being so well supplied with food from the herds of deer and other large animals, which are in such numbers in the forests, it is said, that the tiger has a preference for the flesh of the wild pig; some well authenticated anecdotes are likewise told of the fearless way in which the cattle-keepers, with only a stick in their hands, go up to them and frighten them off when they have pounced upon any of their herds.

14. RUINS OF MUD FORTS STILL VISIBLE: LAWLESS STATE THE COUNTRY WAS IN IN FORMER YEARS.—The ruins of numerous mud forts are still to be seen, which reminds one of the lawless state in which this country was before and about the time of annexation of the province; when numerous bands of robbers and dacoits, under such noted leaders as Fuzul Allee and others, who, having good hiding places in the Terai, would issue from it into the open country, and rob and murder the people; and at one time Fuzul Allee actually threatened Buraich, compelling the Europeans there to take refuge in the jail, which was the only place admitting of defence.

15. CHOLERA OF 1867.—Whilst visiting the Dhurmanpore Pergunnah many sad tales were told me of the fearful mortality caused by that dire disease cholera in the spring of the preceding year, 1867, which had more than decimated the villages on the edge of the Terai. The disease first broke out in Maharejah Jung Buhadoor's large camp, after he had entered the lower hills, and whilst marching to the plains to attend some marriage ceremony of his family. From this it gradually spread to the Nepal villages on the boundary, and first appeared in our territory at the large village of "Bhurtapore" on the Kourialla River. At the villages of "Lal-bojha" and "Boojhia," which are quite near each other, the head-men give a sad and detailed account how the disease was brought to their village from Bhurtapore by a shepherd who, having taken his flock to graze in the better pastures there, had in alarm fled back to his village. A day or two after his arrival the plague showed itself, and to it nearly one-third of the people of the village fell victims. Cholera had not been known in this somewhat isolated part of the country for ten or twelve years previous. In the forests about here thousands of cattle are sent from the southern parts of the district for the sake of the grass. The keepers in charge of them were likewise attacked by this disease, and so many died from it that a friend who had been here a

this time told me that the herds were roaming about quite wild, and unattended, their owners not being able to procure substitutes to take charge of them, so terror-stricken were the people. As the hot weather came on, the disease spread through the district, and it raged with great violence at Burnich itself. Although there were solitary cases of it in the villages we were surveying, I am thankful to add none of our establishment were attacked, and before it became worse the camp broke up.

16. LOCAL IMPROVEMENTS DISCUSSED.—The only local improvements, I could suggest, would be more roads to open the northern parts of the district, and which will be perhaps made hereafter when the local funds permit it. The people are very backward with irrigation, and the numerous streams which traverse the district in all directions may be made of use hereafter by masonry weirs being built across them to store up the water, and give them thus the means of applying it to their fields; this project has, I believe, been very ably discussed by Mr. J. Anderson, the present Deputy Commissioner, an old Canal Officer; and when the country becomes more peopled hereafter, it may be worth-while to carry out such costly projects, which would doubtless be of great benefit. When the settlement is over, schemes of improvement for the development of the country will, I have no doubt, be taken in hand by the people themselves.

17. VILLAGERS READY TO ASSIST.—The villagers were invariably ready to assist us; the Assistant's camp being often-times visited by the head-men. Along the Raptée and in the Churda Pergunnah there are several talookdars who, having, as Government servants in the Army, and Civil Departments, done good service in the mutiny, were rewarded by having villages bestowed on them. Some of them have built fine pucca bungalows and bazars, and their more advanced ideas will be a good example to the other landholders; amongst those who deserve particular mention is the Nawab Nessar Allee Khan of Allahabad, Honorary Assistant Commissioner, formerly in the Educational Department, Punjab, and a son of the Kuzulbash Nawab, who aided in the release of the Cabul prisoners, also Heera Sing, a pensioned Rusaldar of Fane's Horse, who did distinguished service in the mutiny, and last China Campaign, and who entertains extensive ideas of irrigation and other projects to improve his talooka.

18. DESCRIPTION OF VILLAGES.—Of the villages, I can say but little; few of them are of any note; here and there, where the local talookdar resides, they have some local importance. Near the jungles many of them are constructed of timber and wicker-work—most combustible materials, as the villagers have found to their cost, and which they will give up now that restrictions are placed on cutting timber. The large villages for these parts are Rampoor, Dhobuhahar, Churda Khas, Hurkhapoor and Bhurthapoor. At Moteepoor it is intended to build a new pucca police station-house. At present the police are stationed in mere wicker-work sheds to the north of the town.

LANDOUR; }  
The 26th October 1868. }

A. D. VANRENEN, *Captain,*  
*Revenue Surveyor, 2nd Division, Oude.*

# REPORT OF THE Revenue Survey Operations

OF THE  
CENTRAL PROVINCES,  
For Season 1867-68.

FIRST DIVISION, CENTRAL PROVINCES.

1. WORK STARTED.—The establishment\* left recess quarters at Jubbulpoor on the 25th November, and resumed the survey of District Seonee on 10th December 1867. Field work continued uninterruptedly till 25th May 1868.

\* Major R. E. OAKES, S. C., Revenue Surveyor, 2nd grade.  
ASSISTANTS.

- Lt. W. H. Wilkins, S. C., Asst. Rev. Surveyor, 1st grade.
- Mr. F. Grant, Civil Assistant, 4th grade.
- " G. Roe, Sub-Assistant, 2nd ditto.
- " T. W. Reilly, ditto, 2nd ditto.
- " E. Little, ditto, 3rd ditto.
- " G. B. Young, ditto, 4th ditto.
- 3 Native Surveyors, &c.

2. DISTRICT HOSHUNGABAD COMPLETED.—

In addition to the tract surveyed in Seonee, a small strip lying south-east of District Hoshungabad and lately transferred to it from District Chindwara was also taken up and completed.

3. AREA IN DISTRICT SEONEE.—The portion of District Seonee brought under survey contains parts of Tubseels Seonee and Kuttunghee, and is situated approximately between North Latitude  $21^{\circ}45'$  and  $22^{\circ}24'$ , and East Longitude  $79^{\circ}20'$  and  $80^{\circ}18'$ , and comprises an area of 1169.68 square miles contained in—

|   | Square miles.           |
|---|-------------------------|
| 479 Villages ... ..                                       | 881.86                  |
| 41 Waste land blocks ... ..                               | 181.40                  |
| 18 Reserved forest plots ... ..                           | 101.65                  |
| and 15 Weingunga and Pench River Circuits ... ..          | 4.77                    |
|   | 1169.68                 |
| AREA IN DISTRICT HOSHUNGABAD. { 16 Villages } Area ... .. | 39.95                   |
|   | { 7 Waste land blocks } |
|   | GRAND TOTAL ... 1209.63 |

4. SCALE AND CHARACTER OF DETAIL SURVEY.—The entire tract, cultivated and waste, was surveyed on the full village scale of 4 inches=1 mile. The forest reserve is a narrow strip running between cultivated lands, and the Conservator expressed a wish to have it surveyed on as large a scale as possible. The detail survey, the Surveyor states, "has been carried out with considerable minuteness; all the details of cultivation, waste, and fallow, have been scrupulously surveyed, and the accuracy of the survey has been tested by a thorough purlal embracing each man's survey, and running through no less than 150 villages and waste land blocks. The check survey (aggregating 218½ linear miles) was performed by four European Assistants and one Native Surveyor, and was carefully examined by myself and Mr. Grant. I consider the purlal satisfactory, proving the accuracy of the work."

5. CONNECTION WITH GREAT TRIGONOMETRICAL SURVEY.—The Seonee work of 1867-68 was connected with three principal, and six secondary, stations of the Jubbulpoor



meridional series, and the direct distances by Great Trigonometrical Survey and Revenue Survey data (furnished by the Surveyor) are tabulated below :—

| GREAT TRIGONOMETRICAL SURVEY STATIONS. | DISTANCES IN FEET.               |                    | ERROR OF REVENUE SURVEY. |           | REMARKS.                               |
|--|----------------------------------|--------------------|--------------------------|-----------|--|
|  | By Great Trigonometrical Survey. | By Revenue Survey. | Difference.              | Per mile. |  |
| * Sarandi to * Kariapahar ... ..       | 134,160                          | 134,102            | -58                      | 2.3       | Those marked * are principal stations. |
| * Kariapahar to *Sirrajharri ... ..    | 162,350                          | 162,446            | +96                      | 3.1       |  |
| * Sarandi to *Sirrajharri ... ..       | 127,136                          | 127,274            | +138                     | 5.7       |  |
| * Sirrajharri to Dalal ... ..          | 100,932                          | 100,953            | +21                      | 1.2       |  |
| * Kariapahar to Dalal ... ..           | 94,645                           | 94,683             | +38                      | 2.1       |  |
| * Kariapahar to Seonee ... ..          | 64,585                           | 64,716             | +131                     | 10.7      |  |
| Seonee to Amliwara ... ..              | 44,970                           | 44,999             | +29                      | 3.4       |  |
| Manori No. 2 to Amliwara ... ..        | 88,899                           | 89,047             | +148                     | 8.8       |  |
| Khammaria to Manori No. 1 ... ..       | 93,709                           | 93,601             | -108                     | 6.1       |  |
| Seonee to Manori No. 2 ... ..          | 80,884                           | 80,974             | +90                      | 5.6       |  |
| Amliwara to Dalal ... ..               | 78,597                           | 78,692             | +95                      | 4.6       |  |
| Amliwara to *Kariapahar ... ..         | 108,537                          | 108,695            | +158                     | 7.7       |  |

6. REVENUE SURVEY TRIANGULATION.—The truth of the linear distances of the boundary survey was further checked, in the wildest and most hilly part of the district, by eight Revenue Survey minor triangles, connected with the Great Trigonometrical Survey triangulation.

7. DEMARCATION AND MAPS.—The thakbust maps were lodged with the Surveyor before he took the field, and he reports that they agreed remarkably well with the professional survey in the case of old settled villages, but no fewer than 176 discrepancies occurred in other villages. On this subject the Surveyor reports as follows: "These discrepancies were found almost entirely along the forest and other waste lands, where the resumption by Government of uncultivated waste had necessitated a total re-arrangement of the boundaries. Previously to taking the field I had requested the District Officer to ascertain that the boundary pillars had been erected along the waste lands, and as this request was complied with, I did not anticipate any difficulty. It was only after the survey of these boundaries had been completed it was discovered, that although the pillars had been put up they did not agree with their position as shown on the thakbust maps. In some cases the differences were trifling, but in many a totally different run of boundary existed in the field to that shown on the thakbusts, which was the one adopted in making the settlement. At first it was very difficult to account for these discrepancies. \* \* \* \* It is worthy of remark that most of the incorrect boundaries give more land to the malgoozars (or land-holders) than they are entitled to by hudbust or settlement demarcation." In other words, the malgoozars removed, or misplaced, the boundary marks to suit their own views. These discrepancies, however, caused great trouble, and keeping part of the establishment out until August added considerably to the cost of the survey.

8. The matter was reported through the Deputy Commissioner to the Chief Commissioner, who "at once directed a thorough purtal of all boundaries along waste lands in the unsurveyed portions of the district to be carried out, and all necessary alterations to be made at the expense of malgoozars."

9. Similarly in the survey of the Hoshungabad villages, the revision of incorrect boundaries delayed the completion of the work, and the Surveyor was unable to complete the area calculations of these villages till the beginning of December 1868.

10. WASTE LAND LIMITS.—All the Revenue Survey Theodolite Stations in the waste lands have been marked by heaps of stones, and these marks will be kept up by the Forest Department. The Conservator has been furnished with a chart, showing these stations around reserves.

11. **DEMARCATON CHART.**—The Surveyor has furnished the Settlement Officer with a demarcation chart of village trijunction platforms, showing where they are of masonry or mud, and where they are missing or in disrepair. This chart will enable the Settlement Officer to erect platforms where they are deficient, and substitute masonry for mud.

12. **PILLARS BUILT FOR FUTURE CONNECTION.**—He has also provided for future connection, by other surveys, between District Seonee and the adjoining unsurveyed districts Chindwara, Mundla, and Balaghat, by building masonry platforms at triboundary stations, and by erecting small pillars over the nearest theodolite station on either side thereof all along the outer boundary. These permanent marks were pointed out to the village authorities, who were desired to keep them in order.

13. **SETTLEMENT DETAIL SURVEY.**—The khusrah or settlement detail survey was made between 1861 and 1864. Any satisfactory comparison between it and the professional survey was therefore out of the question.

14. **ASSISTANTS.**—The Surveyor reports on the efficiency and zeal of all his Assistants, especially noting Lieutenant Wilkins and Mr. Grant. The native subordinates are also mentioned favorably.

15. **MORTALITY.**—Ten measurers died of fever and dysentery during the season, towards the close of which cholera broke out in the villages along the Nagpoor and Jubbulpoor road ; but owing to the timely precautions taken by the Surveyor, in withdrawing his parties from the infected tracts, the number of deaths reported is fortunately small. Two men were attacked in Seonee and died ; five were attacked after return to recess quarters at Jubbulpoor, of whom two died.

16. **ASSISTANCE RECEIVED.**—The Surveyor expresses himself as “greatly indebted to the Deputy Commissioner of Seonee for the promptitude with which the re-adjustment of the boundary was directed and carried out, and without which it would have been perfectly impossible to bring up the season’s work in a complete form.”

17. **PROGRAMME FOR 1868-69.**—The area now remaining for survey in District Seonee lies directly south of the work reviewed, and consists of a portion of Tuhseel Kuttunghee and a tract of Odegaon transferred from District Chindwara to Tuhseel Lucknadowd of District Seonee. In addition to this, District Nagpoor will be completed by the survey of a tract recently transferred to it from Tuhseel Kuttunghee, District Seonee. The total estimated area is 950 square miles, which should be completed this season, 1868-69. The party will then commence the survey of District Chindwara.

#### 2ND DIVISION, CENTRAL PROVINCES.

18. **COMMENCEMENT OF FIELD WORK.**—The establishment\* started on the 11th November 1867 to resume the survey of District Raepoor of the Chutteesgurh Division, and field work commenced early in December.

- \* Mr. R. B. SMART, Revenue Surveyor, 3rd grade.  
ASSISTANTS.  
 Mr. E. J. Jackson, Probationary Assistant Surveyor.  
 „ J. S. Penberton, Sub-Assistant, 2nd grade.  
 „ W. S. Buttress, ditto, 2nd ditto.  
 „ L. J. S. Evans, ditto, 3rd grade, transferred from the 2nd Division, Oudh, from the 25th October 1867.  
 „ A. Hutcheon, Sub-Assistant, 4th grade.  
 „ J. McHatton, ditto, 4th ditto.  
 30 Native Surveyors.

19. **POSITION OF TRACT.**—The tract surveyed forms the central portion of the Chutteesgurh plateau between

$21^{\circ}08'$  North Latitude and  $81^{\circ}46'$  East Longitude, and embraces Pergunnahs Lowun and Seerpoor, and a portion of Raepoor.

20. **AREA.**—The area surveyed consists of 1228·60 square miles. Of this 560 villages, including 15 waste land blocks and 100 villages lying within Colonel Saxton’s work, and comprising an area of 1047·28 square miles were surveyed in detail, and skeleton boundary survey was also made of 23 reserved forest blocks, lying within the tracts previously surveyed topographically by Colonel Saxton in 1864-65, on the 1 mile=1 inch scale, covering an area of 181·32 square miles.

21. After surveying the boundaries of the forest reserves Mr. Smart testifies to the correctness of the hill work done by Colonel Saxton's party.

22. **DETAIL AND CHECK SURVEY.**—The detail survey has been carefully and minutely made, and shows, in addition to the geographical features, all the details of cultivation, waste and fallow. The Revenue Surveyor took an active part in inspecting his field parties, and each of his assistants visited the native surveyors twice a month, "inspected the field books, "tested the chains, and examined a portion of the work." 80 miles of check survey were run.

23. **STATION OF RAEPOOR.**—The Civil Station of Raepoor was also surveyed under the superintendence of Mr. E. Jackson, Assistant Surveyor, on the large scale of 16 inches=1 mile. The Surveyor reports that "the work was duly tested and found to be excellent." The altitude of the Civil Station of Raepoor above sea level was determined by boiling point thermometer. Boiling point, mean of four observations ... 210°40

Approximate height for 210°40 ... .. ft. 83600

Temperature of air, 93°10

H. =  $836 \div 660 = 1.26$

94.37 Multiplier ... 1.129

Height of Raepoor, above sea level ... .. 943.84 feet.

24.—**CONNECTION WITH TOPOGRAPHICAL TRIANGULATION.**—The operations of the Great Trigonometrical Survey of India have not yet extended to the District of Raepoor, but the Superintendent, Colonel Walker, is now about to run a series of triangles across the district to give the Revenue Survey party true fixed points to base its minor detailed operations and mapping upon; and to check any accumulation of chain or instrumental errors, which might otherwise pass undetected. A good connection was made with 10 stations of No. 3 Topographical party (Central Provinces and Vizagapatam Agency Survey), under Colonel Saxton, and 20 other conspicuous objects, such as temples, remarkable trees, and buildings, were fixed for future connection by the Great Trigonometrical Survey. "All the triple junction platforms of masonry, throughout the season's work, have been adopted as theodolite stations, thus securing numerous permanent stations which will admit at any time of a perfect connection with any future survey."

25. **SHEETS DRAWN TO MARGIN.**—The congregated village maps have been filled up to margin, and drawn especially for photographic reduction.

26. **PERSONNEL.**—The Surveyor expresses himself generally satisfied with the exertions of all his Assistants, and he especially mentions Mr. W. E. Buttress' zeal.

27. **DEMARCATIION AND MAPS.**—The demarcation in the field and the thakbust maps, which were so well reported of last season, were, during the season under review, found in some parts defective and unsatisfactory. "The demarcation in the waste land villages," the Surveyor reported, "was entirely omitted," and when the party commenced survey their boundaries existed on paper only.

This was brought to the notice of the Deputy Commissioner and Settlement Officer in the beginning of the year, and measures were at once adopted to remedy the defect, but unless all is duly prepared before the professional party takes the field loss of area must inevitably result, no matter what exertions may be subsequently made by the demarcation establishment.

28. **PROGRAMME FOR 1868-69.**—The area to be surveyed during the current season lies immediately south of the Civil Station of Raepoor and west of river Mahanuddy. "The Settlement Officer has intimated that he is prepared to deliver the thakbust maps and village lists."

29. The geographical and statistical remarks furnished by the Surveyor, on the tract of country surveyed, are appended.

3RD DIVISION, CENTRAL PROVINCES.

Captain H. C. B. Tanner, Staff Corps, Assistant Revenue Surveyor in charge.

ASSISTANTS.

Lieutenant H. S. Hutchinson, Staff Corps, Assistant Surveyor, 2nd grade, transferred from North-West Frontier Survey, from 1st November 1867.

- Mr. H. L. Pemberton, Civil Assistant, 4th grade.
- " P. H. W. Brady, Sub-Assistant, 2nd grade.
- " A. M. Lawson, ditto, 2nd ditto.
- " J. H. Barter, ditto, 3rd ditto.
- " C. W. F. Scyers, ditto, 3rd ditto.
- " R. L. Thompson, ditto, 4th ditto.

32 Native Surveyors, &c.

30. NEW FIELD OF SURVEY.—In compliance with the programme indicated in para. 37 of the Annual Report for 1866-67, this party, having completed Tuhseel Bijragogurh of District Jubbulpoor, entered upon the survey of District Nimar.

31. COMMENCEMENT AND DURATION OF WORK.—The march from recess

quarters at Saugor commenced 2nd November 1867, the new field was reached about the end of the month, and work was fairly started on the 10th December 1867, continuing uninterruptedly to the end of May 1868.

32. TRACT SURVEYED.—The portion of Nimar which fell under survey extends south of the river Nerbudda, between the Chota Tawa River and the main road from Boorhanpoor to Mhow, to the northern limits of the Tuhseel of Boorhanpoor, being bounded on the west by His Highness Holkar's territory, and east by the Chota Tawa River, and the line of the Great Indian Peninsula Railway from Bombay to Jubbulpoor.

33. AREA.—The area surveyed consists of—

|     |                                       |            |                           | Square miles.                |
|-----|---------------------------------------|------------|---------------------------|------------------------------|
| 324 | British villages                      | ...        | ...                       | 609.85                       |
| 52  | Waste land blocks and Indore villages | ...        | ...                       | 524.83                       |
|     | <u>Total</u>                          | <u>376</u> | Traverse Circuits and ... | <u>1134.68</u> square miles. |

34.—STATION AND TOWN OF KHUNDWA.—The civil station and town of Khundwa have been surveyed on the large scale of 16 inches=1 mile, but as extensive additions and alterations are in progress, the plan will not be published till these have been inserted.

35.—BOUNDARY SURVEY IN ADVANCE.—Two skeleton circuits were also surveyed in advance, and the contained villages have been traversed and plotted, to enable the Surveyor, on the commencement of the field season of 1868-69, to supply his detail survey parties with fixed points whereon to base their work, and in the meantime the new boundary survey will be vigorously pushed on, and the polygons traversed and plotted to keep pace with the detail surveyors. This is an excellent system when practicable.

36.—DESCRIPTION OF COUNTRY SURVEYED.—The area effected in spite of serious natural obstacles reflects great credit on the Surveyor and his assistants. The Surveyor remarks: "I believe that more difficult country does not exist. The general face of the region between the Sathpooras and the Nerbudda is almost truly level, and the slight eminences that do occur are perfectly flat and covered with a jungle the growth of which is primeval. I had also a more serious difficulty to contend with, namely an atmosphere which at that season of the year is not only loaded with minute particles of dust, but rendered still more opaque by the smoke of ever-burning bush fires. Often the view was restricted to a few miles, and it was but seldom after the middle of April that even heliotropes could be observed. I also had to carry on my work in the very hottest time of the year in a country sterile and desolate, where roads and even footpaths do not exist, where water is scarce, and where the traveller seeks in vain for some shelter from the burning rays of the sun."

37. STYLE OF COUNTRY.—The well cultivated and settled portions lay around Khundwa about 12 miles south and east, extending to Holkar's boundary on the west, and

northwards to the skirts of the heavy jungle which covers the low hills south of the Nerbudda river. There is also open cultivated land south of Asseergurh, skirting the Taptee about 2 to 5 miles along the northern, and 6 to 8 miles along the southern bank of that river. The central and southern tracts are for the most part a mass of low hills of uniform height, and covered with dense scrub and jungle.

38. **SCALE AND CHARACTER OF SURVEY.**—It was decided that the general features of the bill and forest tracts should be surveyed topographically on the half scale of 2 inches to the mile. The boundaries of villages interspersed among them being surveyed as usual, drawn on the full scale of 4 inches to the mile, showing details of cultivation, streams, roads, &c., but without hill features, as these interfere with and obscure the village boundaries.

39. **CLASSIFICATION OF FOREST TRACTS.**—The Revenue Surveyor with the assistance of the Settlement Officer divided the jungle tracts into two distinct classes: 1st. Those that have grants and settled villages scattered about in them here and there. These villages are separately demarcated, though they sometimes run over among the hills. 2nd. Those that are almost uninhabited and are at present unprofitable wastes. The latter tracts may be roughly described as lying east of a line drawn nearly north and south, from the junction of districts Nimar and Hoshungabad on the Nerbudda river, to the village of Manjroth south of and near the Taptee river.

40. **DETAIL SURVEY.**—The Surveyor reports that the detail survey was made with care and accuracy. Purlals or check lines were carried through the work by European agency; the Native survey parties were constantly visited by the Surveyor and his assistants, and their plane table sections examined on the spot. 75 miles of check survey were run.

41. **TRIANGULATION.**—The Great Trigonometrical Survey operations have not been carried over District Nimar, the great arc series running about 70 miles east of Khundwa, and the Khanpisura series about the same distance west; the Surveyor endeavoured therefore to effect a junction north-west, between the secondary triangulation of the Hyderabad Topographical Survey, which extends from Asseergurh eastward along the Sathpoora range, and the great arc series. He commenced this work about the middle of March, and by the end of May had succeeded in fixing and observing at eight principal stations, when he was obliged to abandon the idea of connection with the great arc series, the country being "quite flat and devoid of undulating hills, and the jungle everywhere excessive." The Surveyor then proceeded to the south-west of Asseergurh to try and effect a junction with the great arc series at Argaon and Dunwar Great Trigonometrical stations; but the season was too far advanced, and he was obliged reluctantly to leave that part of the triangulation to be completed during the present season.

42. **SURVEY OF THE NERBUDDA RIVER.**—It was found impracticable to run a series of minor triangles down the Nerbudda river, "owing to the whole of the flat topped hills in this region being exactly of the same height, and all covered with forest jungle." The survey of the Nerbudda was the most difficult part of the season's work, "and the manner in which it was carried out by Mr. A. Lawson, notwithstanding the difficult natural obstacles he had to surmount, reflects the greatest credit on him." The tract is very malarious and unhealthy, and the assistant's health, I regret to state, suffered greatly in consequence, whilst several of his measurers died of jungle fever.

43. **DEMARICATION.**—The professional maps were in all cases compared with the settlement demarcation maps, and ready assistance was received from Lieutenant Forsyth, the Demarcation Officer, in the adjustment of discrepancies and rectification of mistakes in boundary lines. The *Patels* often misled the Surveyors by pointing out obsolete boundaries; and "the Waste Land Rules that entitle a *Patel* to only a certain proportion of jungle, made a revision of boundaries necessary in the more jungly tracts."

44. **FOREST BOUNDARY.**—The forest tract had been demarcated by the Forest Department, and the boundaries have been every where surveyed professionally.

45. KHUSRA.—The *khusra*, or settlement detail survey, was made either one or two years prior to the professional party taking the field, no useful comparison could therefore be made between the two measurements.

46. WASTE LANDS.—“During the past season,” says the Surveyor, “we have met with large blocks of waste land, some that have at one time formed parts of villages, and have under the late settlement been excluded therefrom, and others that do not seem for many years either to have been under cultivation, or to have been inhabited. These tracts lie principally in the northern half of the tract surveyed. We have divided them into a few large polygons to suit our requirements. It is contemplated, however, by the Settlement Officer to sub-divide them into small lots. This can be done with great facility when he is in possession of our four inch maps. He will then lay down convenient boundaries to effect the necessary sub-division, and we can then enter them on the sheets lodged in the Head Quarter’s Office. The waste land we have surveyed during the past year is however small in area compared with the extensive masses of forest and scrub that will fall under our operations during season 1868-69. The Settlement Commissioner, through the Secretary to the Chief Commissioner, in his letter as per

No. 22 of 25th January 1868.

“margin, directed the Settlement Officer to divide all the waste in Nimar into rectangular blocks to be marked at the corners by masonry pillars ; but on my pointing out that this would involve great labour and expense without corresponding gain, it was decided that it would be sufficient to demarcate only such arable land as would probably find purchasers, omitting from demarcation large tracts of unprofitable and barren waste. The Settlement Commissioner approved also of the plan of using our maps of next season as a guide in laying down the permanent boundaries of such waste lands as it might be desirable to dispose of under the Waste Land Rules.”

47. DIFFICULTIES IN SURVEYING INDORE VILLAGES.—Considerable difficulty has been experienced in dealing with the villages of His Highness Holkar, which are intermixed with those of the British Government, in District Nimar, and the Surveyor states that he met with some difficulty in obtaining permission to survey them topographically, whilst the boundaries were nearly all in dispute.

48. BOUNDARY BETWEEN INDORE AND THE CENTRAL PROVINCES.—The line of boundary between Indore and District Nimar was also undefined at the time of survey, and the Deputy Commissioner of Nimar\* informed the Surveyor: “The adjustments of the numerous boundary disputes with His Highness Holkar are at present suspended owing to the non-settlement of the question of exchange of territory, and which will alter the greater part of the frontier” of the Central Provinces on the Nimar District.

49. ACTION TAKEN BY THE CHIEF COMMISSIONER.—The Chief Commissioner was at once addressed by this Office on this subject, and in reply† stated that “measures had already been taken to have the boundaries between British and Indore territory correctly laid down at the beginning of the coming cold season (1868-69) ; the Agent, Governor General for Central India having proposed to depute an European Officer for the settlement of these boundaries, who will be met on the part of the Central Provinces by the Settlement Officer, Nimar. It is hoped therefore that the matter may now be brought to a satisfactory conclusion.”

50. DELAY IN SUBMISSION OF RECORDS.—Pending this rectification of the frontier boundary, the records of the Nimar villages bordering on Indore will be retained by the Surveyor for completion.

51. SAUGOR RESERVES.—The original number of waste land plots to be surveyed in District Saugor was 344, as stated in para. 38 of the Central Provinces’ Annual Report

\*Docket No. 1052 of 11th July 1868, from Deputy Commissioner, Nimar, to Captain Tanner, Revenue Surveyor.

† No. 2491, dated 6th August 1868, from Secretary, Chief Commissioner, to Deputy Surveyor General.

for 1865-66, but these were added to at various times, and the number now stands at 514, which, however, may undergo still further alteration. Three hundred and sixteen waste land plots were surveyed in 1866-67, but 85 of these had to be re-surveyed the following season, owing to discrepancies in boundaries, leaving 231 as the number compared and passed in 1866-67. In 1867-68, 252 plots were surveyed and passed, including the 85 above mentioned. The total number surveyed, compared with hubbusts and passed as correct to close of season 1867-68, amounts to 483 waste land plots, the area of which is 462,375 acres=723.24 square miles. There still remain 31 plots, the boundaries of which require to be revised and reconciled to complete the waste lands survey in Saugor.

ABSTRACT.

|  |     |     |     |           |
|--|-----|-----|-----|-----------|
| Total No. of plots received for survey | ... | ... | ... | 514       |
| No. completed in 1866-67               | ... | ... | 231 |           |
| No. ditto in 1867-68                   | ... | ... | 252 |           |
| Total completed up to date             | ... | ... | ... | 483       |
| No. remaining for adjustment           | ... | ... | ... | <u>31</u> |

52. MAPS DRAWN TO MARGIN.—The 4 inch=1 mile sheets are drawn up to margin for photography and will be reduced by the Surveyor himself to the  $\frac{1}{4}$  scale; this will save the labor of drawing the 1 mile=1 inch maps, and will ensure the greatest accuracy.

53. PROGRAMME FOR 1868-69.—In addition to the interior survey of the two skeleton circuits (mentioned in para. 35) which contain an area of 293 square miles, the following portion of Nimar will be taken up during the ensuing season of 1868-69, viz., the large unsettled tracts lying principally to the east of Bamgurb and Piplod from the Hoshungabad boundary, south-east as far as the boundary of West Berar, and south down to the Taptee River.

54. OUTTURN CONTEMPLATED.—Altogether the Surveyor contemplates effecting an out-turn of 600 to 700 square miles of village survey on the full scale of 4 inches=1 mile in addition to what may be done on  $\frac{1}{4}$  scale. The open country lies principally around Boorbanpoor, south of Asseergurb, and along the margin of the Taptee River.

55. VILLAGES WITH FOREST TRACTS.—The isolated villages scattered in the forest tracts will be mapped in skeleton form on the scale of 4 inches=1 mile.

56. PERSONNEL.—The Surveyor speaks in high terms generally of all his Assistants, European and Native, and again specially eulogizes Mr. Lawson.

4TH DIVISION CENTRAL PROVINCES—1867-68.

57. NARRATIVE.—The first portion of the establishment marched out of recess quarters

Lieut. F. CODDINGTON, S. C., Revenue Surveyor, 3rd grade.

ASSISTANTS :

Lieut. H. L. Smith, S. C., Asst. Revenue Surveyor, 2nd grade.

Mr. E. C. Barret, Sub-Assistant, 2nd grade.

„ J. U. T. Coxen, ditto, 2nd ditto.

„ G. F. C. Burret, ditto, 3rd ditto.

„ J. Newland, ditto, 3rd ditto.

„ W. Johnson, ditto, 4th ditto.

21 Native Surveyors, &c.

at Kamptee on 25th November 1867, the remainder followed on the 1st December, and a week after the whole party assembled at the rendezvous in the field, 100 miles from Kamptee, for the division of camps and the allotment of work. Field work was vigorously prosecuted for 6½ months, exclusive

of the time occupied in marching from and to recess quarters, and by the 26th June 1868 the whole party had returned to Kamptee.

58. POSITION OF TRACT.—The programme proposed in para. 53 of the Annual Report for 1866-67 was carried out with the exception of a small area in Tuhseel Moolh lying north of the junction of the rivers Wurda and Weingunga.

The country surveyed, consisting of Tuhseel Moolh of Chanda is situate between North Latitude  $16^{\circ}46'$  and East Longitude  $76^{\circ}07'$ , and lies south of Tuhseels Berhamporee and Wurrora  $20^{\circ}22'$   $80^{\circ}02'$ ,

surveyed last season. On the east runs the river Weingunga, on the west the river Wurda, separating it from Berar, on the south is the unsurveyed part of Tuhseel Moolh.

59. AREA.—The total area for the season is 1132·58 square miles, apportioned as follows:—

|   | Square miles.  |
|---|----------------|
| 302 Villages ... ..                       | 552·00         |
| 64 Waste land blocks ... ..               | 527·89         |
| Rivers Weingunga and Wurda ... ..         | 36·29          |
| Kamptee environs, 1 mile all round ... .. | 16·40          |
| Total                                     | <u>1132·58</u> |

60. CHARACTER AND SCALE OF SURVEY.—The waste land blocks were surveyed on the same scale as the villages, *viz.*, 4 inches=1 mile, “and,” adds the Surveyor, “with equally “minute detail. The whole of the details of forest cultivation, &c., have been surveyed “throughout the whole tract; the whole of the geographical features have been accurately “taken up, with the exception of a few small nullahs, penetrating into very thick forest, as it “would have added much to the expense of line clearing, without any adequate advantage.”

61. CONNECTION WITH GREAT TRIGONOMETRICAL SURVEY.—The survey is connected with three\* principal stations of the Jubbulpoor meridional series, and the following table shows the ratio of error of the Revenue Survey as compared with the Great Trigonometrical Survey direct distances:—

\* Ambagurh.  
Rajuli.  
Diwai.

| NAMES OF GREAT TRIGONOMETRICAL STATIONS. | DIRECT DISTANCES IN FEET.        |                    | Difference in feet. | Error in feet per mile of Revenue Survey. |
|--|----------------------------------|--------------------|---------------------|---|
|  | By Great Trigonometrical Survey. | By Revenue Survey. |                     |   |
| Ambagurh to Rajuli ... ..                | 147752·45                        | 147600·10          | -152·35             | 5·44                                      |
| Rajuli to Diwai ... ..                   | 158164·87                        | 158102·88          | - 61·99             | 2·06                                      |
| Diwai to Ambagurh ... ..                 | 175838·14                        | 175848·12          | + 9·98              | 0·29                                      |
| Average where the error is—              |                                  |                    |                     | 3·75                                      |
| " " +                                    |                                  |                    |                     | 0·29                                      |

62. FIXED MARKS AND CONSPICUOUS OBJECTS.—The Surveyor reports all the Great Trigonometrical Survey Towers to be in good preservation.

All the village tri-boundary platforms of masonry have been used as theodolite stations, and as all the intermediate boundary marks are large stones, no necessity existed for building any special reference marks. The following buildings were also connected by traverse:—

Mankali temple in the town of Chanda.

European Officers' tomb in the village of Kosara.

Palebarsa temple in the village of that name.

Bhaezgaon temple in the village of that name.

63. INITIAL MERIDIAN.—The work is referred to the meridian passing through a station of the Hyderabad Topographical Survey on one of the bastions of the Wurrora Fort, selected by Major Macdonald in 1865-66 as the origin of survey for District Chanda.

64. CHECK SURVEY.—The detail survey was tested by 66 miles of check survey run by the European Assistants, and proved on comparison to be “good and trustworthy.” No re-survey was required in any instance.



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 65. **DEMARICATION.**—The demarcation was well advanced, and the boundary maps were all lodged with the Surveyor previous to survey. The few cases of discrepancy between the professional and hubbust maps were at once adjusted on reference to the Demarcation Officer, and the comparison completed in the field.

66. **SETTLEMENT DETAIL SURVEY.**—"The khusreh or settlement detail survey, says the Surveyor, "altogether preceded the professional, and the whole district settlement has been finished."

67. **CHARACTER OF COUNTRY.**—The country is described as covered for the most part with dense jungle interspersed with small teak and bamboo. The only tracts under cultivation are those lying west of the town of Chanda, between the Wurda River and the high road from Nagpoor to Seroncha, and south-east between the Weingunga River and the Moolh Nuddy.

68. **CLIMATE.**—Regarding the climate the Surveyor states: "It is much to be regretted that the insalubrity of the country will not admit of our taking the field at an earlier date, which, if possible, would permit of a sufficient area being accomplished before the great heat of the year sets in, in April and May, but so bad is the climate in these jungle parts that the hot weather is really the most healthy time of the year. By the District Officers and others it is not thought safe to enter these jungles on account of fever before December or January; so that the whole establishment has to suffer inconvenience and exposure annually during the whole hot weather. These fevers when once taken into the system are most difficult to get rid of, and several of our men who took fever early in the year were laid up the greater part of the season."

69. **MORTALITY.**—Two head tindals and five chainmen or measurers of the party died of jungle fever during the season, and several others suffered from *coup-de-soleil*.

70. **WORK HINDERED BY TIGERS.**—Considering the unhealthiness of the tract, its densely wooded character, and the uniform large scale of survey used throughout, the outturn of the season is highly creditable to the management and energy of the Surveyor. No small obstruction was occasioned by the depredations of tigers which infest the district. A tigress reported to have killed 127 people, stopped the traffic for many weeks on the road between Moolh and Chanda, until the brute was shot by Lieutenant Coddington near the village of Kelzur.

71. **PERSONNEL.**—The Surveyor remarks in the highest terms of all his Assistants but one, who has since resigned his situation.

72. **AREA REMAINING FOR SURVEY.**—By the Surveyor's estimate there now remains an area of about 1,260 square miles to complete the khalsa or village land portion of District Chanda. Of this area about 385 square miles lie above the ford of the Weingunga and Wurda in Pergunnah Ghatkool, and the remainder east of the Weingunga along the southern boundary of District Bhundara.

73. **PROGRAMME FOR 1868-69.**—It is proposed to complete the above area during this season. There will then remain (according to the Settlement Officer's Report) an area of about 5,660 square miles, consisting of 22 zemindarees, "the greater portion of which is dense jungle and sparsely populated, and therefore unfit for ordinary village survey." Whether this portion of the country will be transferred from the Revenue to the Topographical Branch of the Survey Department has yet to be decided. But I doubt much if the land be sufficiently valuable or cultivated to warrant its being surveyed in detail by the Revenue Branch, and believe it will be better to include it with the Topographical Survey of the wild country of Bustar to the east, the Revenue Survey taking up the boundaries of zemindarees, if required so to do, and making skeleton plans for the use of District Officers and for entry on the Topographical maps when completed.

74. **KHALSA AND ZEMINDAREE LANDS.**—The Surveyor defines the term *khalsa land villages* to mean ordinary village lands under Government, and *zemindaree* lands as tracts of land under native rule, and made over originally to zemindars who are absolute masters of their estates which they hold in perpetuity under a fixed tenure and pay but a nominal revenue for, to the British Government. These large zemindarees all lie south-east of the district between the River Weingunga and the confines of the Bustar Dependency. Zemindaree villages are sometimes intermixed with khalsa villages, and the Surveyor reports that several of these villages fall within his operations of the present season (1868-69), and have been demarcated for survey by the Settlement Department. The Surveyor has been instructed to survey them on the same scale as the Government villages with which they are interlaced, *viz.*, on the scale of 4 inches=1 mile.

J. E. GASTRELL, *Colonel,*

SUPDT. REVE. SURVEY'S OFFICE,  
CALCUTTA,  
*The 21st November 1868.*

*Supdt., Revenue Surveys, Upper Circle.*



## APPENDIX.

*Description of country surveyed in District Seonee, season 1867-68, by CAPTAIN R. E. OAKES, Revenue Surveyor, 1st Division, Central Provinces.*

**POSITION ON MAPS.**—The season's work, 1200 square miles odd, extends over a tract lying between the parallels of 21°45' and 22°24' and meridians of 79°26' and 80°16', and comprises portions of Tehselees Seonee and Kuttenghee of District Seonee. It is bounded on the north by the surveyed portion of Seonee and by the Weingunga River; on the east by the Weingunga which divides Seonee District from Mundla and Balaghat; on the south by Bhundara and by the unsurveyed portion of Kuttenghee, and on the west by the Chindwara District.

**TOPOGRAPHICAL FEATURES.**—From the Chindwara boundary on the north, the Seonee Plateau (the highest in the district) extends as far as the forest lands to the south, in a continuous open and highly cultivated plain; the soil light and in places sandy; from Seonee Khas it is broken up by slight hills and jungle tracts interspersed with open patches of cultivation for about 8 miles in a south-easterly direction, when there is a descent into a second plateau also highly cultivated extending as far as the Forest Reserves of Sonaiwance and the Oogleo Pergunnah. Both of these are highly cultivated and produce good crops of wheat, the pulses, and, where irrigation is resorted to, sugarcane; this latter is however small and poor.

**FOREST AND JUNGLE.**—Bordering the lower plateau is a continuous belt of forest and bamboo jungle which stretches continuously from the north-east along the hilly and sloping edges of the plateau, taking a course to the west from Sonaiwance and dividing the high lands of the district from the low lands in the Weingunga Valley.

**VALLEY OF WEINGUNGA.**—The Weingunga Valley is a vast plain of rice cultivation during the rains and is justly celebrated for the excellent quality of its rice which is exported towards Nagpoor and the Deccan; the rice crop is succeeded by toor, a pulse which is grown in great quantities as an article of food for the inhabitants.

This valley is plentifully supplied with tanks and streams which appear to hold water throughout the year; the valley to the south of Sonaiwance opens out into an extensive plain which stretches away towards Bhundara and the Nagpoor country.

The descent from the high land to the Weingunga Valley is gradual and imperceptible in the north-east, and reaches the valley by a cart track through the villages of Doonda Seonee, Burghat, Tuctoon, and Soon, some miles south of the point where the Weingunga takes an abrupt turn from west and east to north and south.

**ROADS AND TRACKS.**—All roads south of this descend by passes more or less abrupt, but two are easily practicable for the small carts of the district, and can be traversed by bullock coaches, buggies and others springed conveyances, as they are bridged; one of them, the Seonee and Kuttenghee road, is partially metalled, and at slight cost could be converted into an excellent road: the bridges are principally wooden structures.

The principal roads in the district are; the great Deccan road which joins Jubulpoor and Nagpoor; it runs through the tract under discussion from the village of Nukghir in a southerly direction through Seonee; it is an excellent road, bridged and metalled throughout, with Staging and Road Engineers' bungalows at convenient distances.

Encamping grounds have been marked out at every march, and mangoe topes planted within the last few years. There are also wells dug at each encampment.

The telegraph wire on iron and wooden posts follows the course of the road, only leaving it right and left when the road deviates from a straight line. The road of next importance is the Kuttenghee road which is bridged and partially metalled (wooden bridges). It leads from Seonee Khas to Kuttenghee, where there is a tehselee and public garden; there are two passes of fairly easy

gradient, the one near the village of Dalol descending into the lower plateau, the 2nd where it descends from the high lands into the Kuttenghee plain ; both these ghats require repairs, but a few thousand rupees would put them in very good order. They are rather steep in places, but perfectly practicable for spring 2-wheeled conveyances and for laden district carts.

The road from Seonee to Balaghat passes through Burghat to Lallburra ; it is practicable for country carts, and descends into Kuttenghee plain by a good pass which is bridged in places with masonry bridges ; the road is unmetalled.

All other descents to the plain are only practicable for pack bullocks and foot passengers. The Seonee and Chindwara road leaves the Seonee District in the village of Koka ; it is an unmade road.

**RIVERS.**—There are several rivers running through the season's work, the principal one, the Weingunga, rises on the Seonee plateau, in the village of Purtapore, flows north to the village of Purtapore, where it turns to the west and again runs north between steep banks as far as Chupara in last season's work, where it is deflected to the east, which course it pursues as far as the village of Potalpanee in the north-eastern end of the present season's survey, where it turns sharply to the south and skirts the Seonee District, dividing it from Balaghat as far as the Bhundara Boundary.

After it debouches into the Kuttenghee plain, the bed is generally sandy with an occasional barrier of rock as in the village of Peepuree in the south-east of the district, where the river rushes through a small opening with a fall of a few feet.

It is not navigable, but timber could doubtless be floated through great part of its course during the rains. It abounds in mahaseer and other fish, and like all rivers in these provinces, is infested with muggers in the deep kloonds and reaches of still water.

In many places the scenery of the river is very picturesque especially before it leaves the high lands, where its course is between very high rocky banks. In the village of Portalpanee the bed lies between rugged perpendicular sides of upwards of 150 feet in height.

The Pench River borders the present season's work for only a very short distance on the south-west, where I found its bed sandy and shallow, and about 176 yards across. The Hirree rises near Dhobee Surrie and runs in a north-easterly direction through the district to its junction with the Weingunga in the village of Koorsarra ; it flows through very rugged rocky banks in the latter part of its course before it descends into the Kuttenghee Valley.

Besides these, several minor streams flow through the district.

**FORDS.**—There are fords on the Weingunga at Kurpuria Chickly, at Khoorsarra, at Gooreya, impracticable for carts. In waste land Goreya there is a ford practicable for country carts. There are no ferries for large boats.

**TANKS.**—The principal tanks are to be found in the villages of Seonee Khas, Aree Mohgaon, Purtapore, Lall Burra, Panderwane, Sookturra ; they are generally formed of natural hollows and banded at one end ; most of them are stocked with fish, and are covered with wild fowl in the cold weather.

**TOWNS AND VILLAGES.**—The principal towns and villages are Seonee Khas, Wara Seonee, the Tola of Pandurwane, locally called Lall Burra, Kuttenghee Khas, Jam Nugpoora, Nawurgon, Hiljee Mohgaon, Bugowlee, Hutnapore, Khumuria, Jellore, Kaleeroth Munjeepeet, Astha Ruttianpore, Nukeewara, Agurwara, Oomarla, Dondewara, Pandurwane, Surreka Kuttenghirree, Khoorseepur (local name Oglee) Mohburra Jurekha, Chapara, Seonee Khas ; the civil station of the whole district is a town containing a population of 8,026 which is divided as follows :—Hindoos 7,511, Mussulmans 515.

The site of the city and civil stations occupies portions of 3 villages. The latitude and longitude of Ramchunder Patail's house has been determined by the Great Trigonometrical Survey, Latitude 22°-05'-32"-78, Longitude 79°-35'-07"-56". There is a very fine tank with a good carriage drive all round, which adds greatly to the appearance, and probably to the salubrity, of the station.

## ( iii )

The public buildings are, a good market, Deputy Commissioner's Kutcherry, which is also the treasury, the jail, the telegraph office, the police lines, and hospital, the dispensary and dāk bungalow.

There are also public gardens and a very fine swimming bath.

The climate of Seonee is very superior to that of Jubbulpoor and Nagpoor, and certainly much more healthy. It would no doubt be often visited as a sanatorium by invalids if there were any houses available, which unfortunately there are not.

The principal buildings in the native town are: The mosques and temples and the house of the Nowab (Jagheerdar of portion of the Oagle Talooka), a large brick edifice with enclosed gardens, greatly needing repairs. The principal trades of the town are manufactures of tusser silk and dyeing.

A market is held daily in Boodwaree Bazar, and once a week in Bhyroogunj. Although Seonee is, I believe, comparatively free from fever and malarious diseases, it was visited during the season of 1867-68 by cholera in a severe form; the scourge appears to have been propagated by, if it did not originate with, the numerous gangs of workmen employed on the great Deccan road, and was probably caused by the impurity of the water they drank; except at the halting stages there are but few wells along the road, and the workmen are compelled to use the stagnant water of the nullahs for drinking and washing purposes. In a season of drought, as this has been, the pools become scarce and shallow and the water absolutely poisonous, and a fertile cause of sickness which might, no doubt, be greatly mitigated by having wells sunk every few miles, say at each dāk stage of 5 miles.

The cost would add but little to the charge of keeping the road, and the benefits would be incalculable and lasting.

The principal grain and cattle market of the district is Wara Seonee, a village in the south-eastern corner of the Kuttenghee tehseelee; a perpetual market is held here, and most of the exports from Seonee are disposed of to traders, whence they are conveyed south by Bjarras' bullocks and country carts. There are a pukka market place, a thannah, and a dispensary.

Kuttenghee Khas is a small village but rising into importance, it is the head-quarters of the Sub-division of that name, and has a tehseelee and public garden.

Lall Burra is a place of importance, a market is held there twice a week. There is a pukka market place and a police thannah. It is celebrated for its cloth manufacture. There is a thannah and distilleries at Gourjholā, otherwise unimportant. There is also a thannah at Arce and Kharee.

**ANNUAL FAIRS.**—Annual fairs are held at the source of the Weingunga in the village of Puttappoor in November, at Beesapore in February, at Suroka, the junction of Weingunga and Hirree rivers, in November.

The following list shows the villages at which markets are held:—

|                       |     |              |                          |
|-----------------------|-----|--------------|--------------------------|
| MARKETS.—Donguria ... | ... | ...          | Market once a week.      |
| Gopalgunj...          | ... | ...          | Ditto.                   |
| Kalulporee            | ... | ...          | Ditto.                   |
| Kohka ...             | ... | ..           | Ditto.                   |
| Jam                   |     | once a week, | in a pukka market place. |
| Nugpoora...           | ... | ...          | twice a week.            |
| Lohara ...            | ... | ...          | once a week.             |
| Nilgee ...            | ... | ...          | Ditto.                   |
| Newurgaon             | ... | ...          | Ditto.                   |
| Mohgaon ...           | ... | ...          | Ditto.                   |
| Moosmee               | ... | ...          | Ditto.                   |
| Jagpoor ...           | ... | ...          | Ditto.                   |
| Bagowlee              | ... | ...          | Ditto.                   |

**CROPS.**—The high lands are generally well cultivated and yield good crops of wheat, gram, kodo, kootkee, jugnee, tillee, oorud, masoor, rice, theora, and, near the villages where irrigation is resorted to, vegetables and sugarcane.

In the low lands rice and toor are the principal produce.

**FOREST PRODUCE.**—The jungles and forests of this portion of the district are principally bamboo, mohwa, saj, ebony, dhamun, saleya, chiroongee, and teak.

The saj and teak are the timber trees; of the former many fine trees are to be found, but the teak is scarce and generally stunted. Under the forest rules, however, young trees are springing up and promise a fair supply in course of time; a teak garden has been planted near Seetaghirroo in the Sonaiwanee Diospyras reserves and young plants appear to be thriving; there is a very promising belt of fine young trees along the Weingunga river, in the waste lands of Goroyra, but years must elapse before they attain their full growth.

Mohwa.  
*Bassa Satifolia*.  
 Saj.  
*Pentapetes Tomentosa*.  
 Ebony, Tondee.  
 Diospyras.  
 Dhamun.  
*Gremia Elastica*.  
 Saleya.  
*Bosnellia Thurifera*.  
 Chiroongee.  
*Buchanania Satifolia*.  
 Teak.  
*Tectona Grandis*.

The bamboos are generally of the smaller kind, but in places along the Weingunga clumps of the large description are met with; these attain to a girth of 18 inches.

The mohwa is valued for its flower, which yields the common spirits of the country, on distillation; it is also dried and extensively used as an article of food by the Gonds and poorer classes of the people. An oil is also prepared from the seed, which I understand is used in the adulteration of ghee. The wood makes a fair building material, but is not used for that purpose in the district, though I have seen it cut into roofing timbers in Oudh.

The ebony grows to a good size, but is little used owing probably to its weight and excessive hardness. I have seen logs of the heart or black wood about 12 or 14 feet long, straight, and about two feet in circumference. The white wood of young trees is much used for shafts and frames of carts for which it is invaluable on account of its toughness and elasticity.

The dhamun or Indian Sance wood attains to a considerable size; it is remarkably springy and elastic and is used for shafts, banghy poles, and other implements in which its peculiar properties are desirable.

The saleya is one of the commonest trees in the jungle, its wood is useless for anything but burning. It yields a resin very similar to the gunda barosa, Venice Turpentine, which exudes from the trunk, if previously cut and wounded with an axe. The incense, loban, is also obtained from this tree. The gunda barosa is procurable in all the bazars, and is considered a useful application to ulcerous sores.

The chiroonjee is very abundant, and produces a very pleasant fruit like a small plum, it is called *achar* by the villagers. The kernel is much used in native cookery, and is procurable in every bazar and known by the name of chiroonjee.

Fibres and oils may be reckoned amongst the jungle produce, many good specimens of these were shown at the Jubbulpoor exhibition.

Tusser cocoons and shell lac are collected and sold by the Gonds and inhabitants of the jungle tracts. Honey is also abundant.

Kutta (catechu) extracted from the khair wood (acacia catechu) a very abundant shrub in parts of the district, can also be procured in all bazars; besides the above are many other products of less importance which it is unnecessary to mention here. Grass for fodder and thatching purposes is procurable in any quantity.

The soil in the northern portion of the season's work is black cotton in the vicinity of the trap formation, and is evidently the result of its disintegration.

In the south and south-east the soil is light and sandy as might be expected, as the formation is principally gneiss and of granitic origin. The rugged outline of the granite formation in the south presents a striking contrast to the comparatively smooth flat topped hills to be met with throughout the north of the district, where the trap and laterite is the principal geological features of the country.

It is remarkable that the stone chips found so abundantly in the vicinity of Jubbulpoor are also met with but in less numbers in several places on the Seonee plateaus, notably in the vicinity of Lucknadow in the work of season 1866-67.

The survey of District Seonee will be completed during season 1868-69, and I propose with next annual report of the operations to submit a more extended report of the whole District.

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## APPENDIX

*Description of Country surveyed in District Raepoor, season 1867-68, by R. B. SMART, Esq., Revenue Surveyor, 2nd Division, Central Provinces.*

The tract of country surveyed, in the district of Raepoor, during the past season, is situated in the heart of the Chutteesgurh plateau, and may be divided into two divisions, the western and eastern, separated by the Malnuddy River.

**GENERAL DESCRIPTION.**—The country to the west of the river is undulating, and in many places it is rocky and stony, and has an average elevation of 900 feet above the sea level, and wherever cultivated, good crops of rice are produced and beyond the demand of consumption on the spot, the exportation of grain has consequently been comparatively very great, and the price of grain is cheaper than in other districts of the Central Provinces. But on the whole the land has a poor soil, and is much neglected. In the rainy season there is some pasture, but in the dry season it is exceedingly parched and dismal. Extensive tracts are alleged to be incapable of cultivation. The most productive soil is the black clay in the lowlands; it is most retentive of moisture and good crops can be reared on it. The red soil is not very uncommon and often contains calcareous nodules, so that it is necessary to have a field well dressed, and it requires more irrigation. The plateau is almost destitute of wood, and fuel has to be obtained from long distances. Certain it is, that the want of trees has caused a material alteration not only in the entire face of the district, but in the supply of water. In addition to this cause of the declining water-power of the country, it is necessary to mention the rapidity with which the land is cleared of rain almost as soon as it falls. The proportion of forest and woodland required for an agricultural country, in order to ensure a regular and sufficient rain-fall without violent storms is estimated by Rentsch at 23 per cent. Wells are sunk to the enormous depth of 70 feet, before water is obtained. The want of good water, during the hot months, is most seriously felt by all, and much suffering inflicted; the wells dry up, and drinking water is procured from tanks covered with rank vegetation, and deadly epidemics are not unfrequently prevalent. The well waters look clear and sparkling and pleasant to the taste. The sparkling arises from the carbonic acid gas they contain, and the cooling taste from the large quantities of carbonate of lime held in solution, and dissolved by the carbonic acid.

**INHABITANTS.**—The generality of the inhabitants are Chumars of the Sutnami tribe, who were originally hide-tanners and leathier-sellers by profession, and have settled down upon the land in large agricultural colonies, and established a religion of their own. The darkest superstition prevails amongst them, and the greatest difficulty is experienced in preventing them from maltreating and murdering old women for witchcraft. The Judicial Commissioner in his annual report for 1866 writes that "this belief still retains its hold on the minds of the people. It is always a matter of difficulty, and one requiring time to eradicate religious superstition; but the severe punishments awarded by our Courts in all cases in which superstitious belief has resulted in violence to individuals have not been without effect." This year, the Free Church Mission has sent one of its members to labor among them. Education and religious training will alone raise these people from their dark superstition. If they are not all converted, they will grow up happy, useful, and moral men and women. The Educational Department have established several schools, but they are not in a flourishing state. A desire for English education has not shown itself, and little can be accomplished as long as the school masters are ignorant of the Chutteesgurhee language. Hindoostanee is understood only by the Mowzadars and a few of the chief men of the villages. The village of Bhundar, which is 35 miles north-east of Raepoor, on the boundary of Pergunnahs Raepoor and Lown, is the present seat of the Sutnamee Gooroo Agur Dnss, but the people do not look upon him with that reverence that they did on his predecessors. Adultery is looked upon by the Chumars as the greatest sin, but the following remark taken from Captain Twysford's account of the Sutnamee Chumars on the practice of "Sutloke Churna," proves that the men show no concern when their wives commit adultery. "When the wife (bride) comes home, she visits all her husband's relations, and respectable people of the village. Both bride and bridegroom go to the Bhundaree to learn the five names (Punchnam,) and she is willingly left to the Gooroo, or Bhandaree, as the case may be, for a night. The Chumars consider it improper for them to know their wives carnally before the Bhundaree or Gooroo has had connection with them." The following was mentioned to me by the Mowzadar of Rohasee village. On the death of the husband, the widow is considered impure till he knows carnally the first five men who go to her. She is then eligible for re-marriage.

The following is a short table of Chutteesgurhee words:—

| CHUTTEESGURHEE. |              | Oordoo.           | English.       |
|-----------------|--------------|-------------------|----------------|
| English.        | Hindee.      |                   |                |
|                 |              |                   | A.             |
| Chandais,       | बांडईस       | چھوڑ دینا         | Abandon.       |
| Hairna,         | चेरना        | گھٹنا             | Abate.         |
| Boothee,        | बत्ती        | سکنا - قابل       | Able.          |
| Heth,           | हत्त         | عبادت - پوجنا     | Adore.         |
| Tengra,         | टेगरा        | زنا کار           | Adulterer.     |
| Peechkat,       | पोचकाट       | نکار - حجت        | Altercation.   |
| Amerbo,         | अमरबो        | نزدیک آنا         | Approach.      |
| Tungia,         | टंगीया       | کلہاڑی - تبر      | Axe.           |
| Chinah,         | चोन्हा       | واقف ہونا         | Acquainted.    |
| Sungwaree,      | संगवारो      | همراه             | Accompany.     |
| Puraijana,      | परायजाना     | روپوش ہونا        | Abscond.       |
| Teewah,         | टीवा.        | اقرارنامہ         | Agreement.     |
|                 |              |                   | B.             |
| Toora,          | दूरा         | لڑکا              | Boy.           |
| Dusna,          | दसना         | بچہ ہونا          | Bedding.       |
| Budee,          | बदो          | ملامت             | Blame.         |
| Peela,          | पीला         | طفل               | Baby.          |
| Sooghur,        | सुधर         | خوب صورتی         | Beauty.        |
| Puheelay,       | पहिले        | اگے               | Before.        |
| Munth,          | मंठ          | درمیان            | Between.       |
| Kuriya,         | करीया        | سیاہ              | Black.         |
| Burda,          | बरदा         | بیل               | Bullock.       |
| Boda, Haila,    | बोदा-हेला    | بہینسا            | Buffaloe.      |
| Purroa,         | पर्ववा       | بازا              | Do. calf.      |
| Pothee,         | पोथी         | کتاب              | Book, small.   |
| Gurunth,        | गरन्थ        | کتاب              | Do. large.     |
| Bhaee,          | भाई          | بھائی             | Brother.       |
| Murduniya,      | मरदनीया      | حجام              | Barber.        |
| Khoodia-Cheria. | खुदीया-चरीया | چغل خور           | Backbiter.     |
| Goodee,         | गुदी         | مغز - بھیجا       | Brain.         |
| Bherbhoongia,   | भरभुंगीया    | دیوالا            | Bankrupt.      |
| Dhekna,         | ढेकना        | گھنڈل - مکھون     | Bug.           |
| Philphillee,    | फोलफीली      | تینری             | Butterfly.     |
| Kútri,          | कुनरी        | کٹی               | Biteh.         |
| Dulleea,        | डलीया        | ٹوکرا             | Basket, large. |
| Chureea,        | चवीया        | ٹوکری             | Do. small.     |
| Kunheea,        | कन्हीया      | پشت               | Back.          |
| Koorae,         | कुरारी       | چوب               | Beam.          |
| Tharrun,        | थारन         | پشتہ              | Buttress.      |
| Khurrab,        | खरब          | خراب              | Bad.           |
|                 |              |                   | C.             |
| Hooth Kuraweh,  | ऊनकरावे      | پکارنا            | Call to.       |
| Bader,          | बादर         | ابر - بادل - بدلی | Cloud.         |
| Dager,          | दागर         | بچھڑا             | Calf.          |

| CHUTHESGURHEE.        |               | Oordoo.                        | English.    |
|-----------------------|---------------|--------------------------------|-------------|
| English.              | Hindee.       |                                |             |
|                       |               |                                | C.          |
| Tam, ..               | ताम           | ताभ्या                         | Copper.     |
| Bilae, ..             | बोलाही        | بلي                            | Cat.        |
| Peechly, Geh, awe, .. | पीकलोगेहचाव   | پيچيلے آنا                     | Come-after. |
| Kootikurna, ..        | कुटोकरना      | نکزلے کرنا - چیرنا - قیمة کرنا | Chopping.   |
| Mirhee, ..            | मोरही         | صرچا                           | Chili.      |
|                       |               |                                | D.          |
| Kupat, ..             | कपाट          | دروازہ                         | Door.       |
| Mutwar, ..            | मूतवार        | مقوالا                         | Drunk.      |
| Konda, ..             | कादां         | گڈگا                           | Dumb.       |
| Jhoora, ..            | झूरा          | سوکھا                          | Dry.        |
| Doormuth, ..          | दूरमत्त       | جھگڑا                          | Dispute.    |
| Seeth, ..             | सोत           | شینم - اوس                     | Dew.        |
| Bhygni, ..            | भेयगय         | होचका                          | Done.       |
| Kookoor, ..           | कुकर          | کٹا - سگ                       | Dog.        |
| Chena, ..             |               | آپلي                           | Dung (dry). |
| Murgaees, ..          | मरगाईस        | موا                            | Dead.       |
| Matee, ..             | माटो          | خاک                            | Dust.       |
|                       |               |                                | E.          |
| Ninghnya, ..          | नोधगघ         | گھوسنا - داخل ہونا             | Entered.    |
| Gar, ..               | गार           | انڈا                           | Egg.        |
| Binowry, ..           | बोनेरो        | پلک                            | Eyelid.     |
| Khoosoo, ..           | खुम्          | خارش                           | Eruption.   |
| Loorhkee, ..          | लूरखी         | سرکي                           | Barring.    |
| Bhoocaan, ..          | भूईचां        | زمین                           | Earth.      |
| Sanj, ..              | संज           | مسائچہ                         | Evening.    |
| Oothee, ..            | वुतो          | مشرق                           | East.       |
|                       |               |                                | F.          |
| Burpaila, ..          | बरपेला        | زبردستی                        | Forcible.   |
| Cookree, ..           | कुकरो         | سرغي                           | Fowls.      |
| Sindroop, ..          | सोदरूप        | بچہدرا                         | Foal.       |
| Dada or Baba, ..      | दादा. या बाबा | باپ                            | Father.     |
| Dhoodhra, ..          | धुधग          | کھاسا                          | Fog.        |
| Bisurdariss, ..       | बोसुदारीस     | بھولنا                         | Forget.     |
| Gor, ..               | गोर           | پانوں                          | Feet.       |
| Agi, ..               | आगो           | آتش - آگ                       | Fire.       |
| Kekhree, ..           | खेखरो         | لومڑي                          | Fox.        |
| Kuppar, ..            | कपार          | پیشانی                         | Forehead.   |
| Dolee or Khar, ..     | डाली. या. खार | کھیت - مزغ                     | Field.      |
| Peesan, ..            | पीसान         | آٹا                            | Flour.      |
| Sugah, ..             | सगा           | دوست - عزیز                    | Friend.     |
|                       |               |                                | G.          |
| Tooree, ..            | टूरो          | لڑکي                           | Girl.       |
| Khuder, ..            | खदर           | گھانس                          | Grass.      |
| Bunay, or Aen, ..     | बने, या, बोन  | اچھا - بہتر                    | Good.       |

| CHUTHEESGURHEE. |           | Oordoo.         | English.       |
|-----------------|-----------|-----------------|----------------|
| English.        | Hindee.   |                 |                |
|                 |           |                 | G.             |
| Bhugwan, ..     | भगवान     | خدا             | God.           |
| Buraee, ..      | बुराही    | بکری            | Goat, she.     |
| Bokra, ..       | बुकरा     | بکرا            | Do. he.        |
| Soan, ..        | सान       | سونا            | Gold.          |
| Lassa, ..       | लासा      | گوند            | Gum.           |
| Sukelbo, ..     | सकेलबो    | جمع کرنا        | Gather.        |
| Topuk, ..       | टूपक      | بدوق - توپ      | Gun.           |
| Flurka, ..      | फरका      | پھاٹک - دروازہ  | Gate.          |
| Mummohowat, ..  | ममछवत     | خوشبو           | Good-smell.    |
|                 |           |                 | H.             |
| Kooriya, ..     | कुरीया    | مکان            | House.         |
| Dumkee, ..      | दमकी      | ٹیکڑی           | Hill.          |
| Ghoda, ..       | घोडा      | گھوڑا           | Horse.         |
| Mudrus, ..      | मदरुस     | شہر             | Honey.         |
| Kens, ..        | केन्स     | بال             | Hair.          |
| Moorh, ..       | मूर       | سر              | Head.          |
|                 |           |                 | I.             |
| Kunther, ..     | कन्तर     | سود             | Interest.      |
| Musiyany, ..    | मसीयानी   | دوات            | Inkstand.      |
| Goodee, ..      | गुडी      | مسافر خانہ      | Inn.           |
| Muees, ..       | मूस       | روشنائی - سیاہی | Ink.           |
|                 |           |                 | J.             |
| Gowria, ..      | गवरीया    | گارڑی           | Juggler.       |
| Kolia, ..       | कुलीया    | گیدڑ            | Jackal.        |
| Bunraj, ..      | बनराज     | جہازی           | Jungle, large. |
| Jharee, ..      | झारी      | جہازی           | Do. small.     |
| Goodgoodain, .. | गुवगूडचैन | مزاح - مسکری    | Joking.        |
|                 |           |                 | K.             |
| Koochy, ..      | कुचो      | چابی            | Key.           |
| Chakee, ..      | चाकी      | گھٹنا - زانو    | Knee.          |
|                 |           |                 | L.             |
| Lobry, ..       | लवरी      | جھوٹ            | Lie.           |
| Munth, ..       | मूढ       | شراب            | Liquor.        |
| Mungta, ..      | मंगटा     | زچہ - مانگٹا    | Loom.          |
| Khutwa, ..      | खटवा      | کھنڈا           | Log of wood.   |
|                 |           |                 | M.             |
| Duwka, ..       | डुवका     | آدمی            | Man.           |
| Battoor, ..     | बाटूर     | بہت             | Much.          |
| Wusha, ..       | वमचा      | دوا             | Medicine.      |
| Goosunya, ..    | गुसुन्या  | مالک            | Master.        |
| Buhiya, ..      | बुहीया    | دوانہ           | Mad.           |
| Chunda, ..      | चुनडा     | چاند - ماہ      | Moon.          |
| Dayee, ..       | दायी      | والدہ - ماں     | Mother.        |

| CHUTHEESGURHEE.   |           | Oordoo.           | English.        |
|-------------------|-----------|-------------------|-----------------|
| English.          | Hindee.   |                   |                 |
|                   |           |                   | M.              |
| Maycha, ..        | मेहा      | मोजेपिन           | Moustaches.     |
| Chocho, ..        | बबू       | मोचुन्दरी         | Muskrat.        |
| Bendree, ..       | बेन्दरी   | बन्दर - बोर्ने    | Monkey.         |
| Jantha, ..        | जांता     | चकी               | Mill.           |
| Soondur, ..       | सुन्दर    | खوب صورت - خوشنما | Man, Handsome.  |
| Pundhra, ..       | पण्डरा    | गुरा              | „ Fair.         |
| Mundul, ..        | मनदल      | दولت مند          | „ Rich.         |
| Kungal, ..        | कंगाल     | غریب              | „ Poor.         |
| Bulwala, ..       | बलवाला    | قوت مند           | „ Strong.       |
| Dhoomra, ..       | धुमरा     | مضبوط             | „ Stout.        |
| Sookra, ..        | सुकरा     | دبلا - حقیر       | „ Thin.         |
| Dhahurwa, ..      | धहर:वा    | توچھا             | „ Squint-eye.   |
| Bootra, ..        | बुटरा     | چھوٹا - کوتاہ     | „ Short.        |
| Doongwa, ..       | डुंगवा    | اوچھا             | „ Tall.         |
| Koondwa, ..       | कुन्दवा   | گنکا              | „ Dumb.         |
| Bhupra, ..        | बपरा      | چپ - خاموش        | „ Quiet.        |
| Koorwa, ..        | कुर:वा    | لنگڑا             | „ Lame.         |
| Bahira, ..        | बहिरा     | بہرا              | „ Deaf.         |
| Sunkra, ..        | सकरा      | صبح               | Morning.        |
|                   |           |                   | N.              |
| Tankee, ..        | टांकी     | کھپلا - میخ       | Nails (Iron).   |
| Bhongra, ..       | भंगरा     | نہینا             | Nostril.        |
| Muzhniya, ..      | मुझनीया   | دوبہر             | Noon.           |
| Bhundar, ..       | भण्डार    | شمال              | North.          |
|                   |           |                   | O.              |
| Goondhlee, ..     | गुंधली    | پیاز              | Onion.          |
| Oppoo, ..         | वोपु      | اوپیم             | Opium.          |
|                   |           |                   | P.              |
| Moondaysa, ..     | मुंडेसा   | تکھ               | Pillow.         |
| Khulenee, ..      | खलेनी     | جیب               | Pocket.         |
| Thupolee, ..      | थपोली     | پانچا             | Paw.            |
| Munjoor, ..       | मनजूर     | مور - طاؤس        | Peacock.        |
| Burha, ..         | बरहा      | مور               | Pig.            |
| Woopkann, ..      | वपकाना    | کھینچنا           | Pull.           |
| Chongee, ..       | चोंगी     | چلم               | Pipe (Tobacco). |
| Buraech Baree, .. | बुराईवारी | ٹانڈہ پانگا       | Pan-garden.     |
|                   |           |                   | R.              |
| Dahur, ..         | डाहर      | راستہ             | Road.           |
| Nudiya, ..        | नदीया     | ندی               | River.          |
| Soortawun, ..     | सूरतावन   | آرام              | Rest.           |
| Punjree, ..       | पंजरी     | پھلی              | Rib.            |
| Woozarna, ..      | वुझारना   | صغانا             | Rub-out.        |
| Chytra, ..        | चैरा      | برو               | Reed-grass.     |
| Moondree, ..      | मुंदरी    | انگڑی             | Ring.           |

**PRINCIPAL HILLS.**—The most remarkable hills are the following, with their elevations above the sea level :—

| HILLS.          | Above the Sea level. Feet. | Latitude. | Longitude. |                                      |
|-----------------|----------------------------|-----------|------------|--------------------------------------|
| Murpar ... ..   | 1,580                      | 21 26 7   | 82 26 10   | Extracted from Colonel Saxton's map. |
| Ganjimal ... .. | 1,516                      | 21 23 29  | 82 23 32   |                                      |
| Hardi ... ..    | 1,424                      | 21 23 20  | 82 30 08   |                                      |
| Bamandei ... .. | 1,284                      | 21 23 5   | 82 32 42   |                                      |
| Mandi ... ..    | 1,500                      | 21 27 39  | 82 31 54   |                                      |
| No. 1 ... ..    | 1,420                      | 21 17 34  | 82 25 12   |                                      |
| No. 2 ... ..    | 1,551                      | 21 26 2   | 82 33 50   |                                      |

**RESERVED FORESTS.**—The reserved forests are situated at the south-eastern portion of this tract (Pergunnah Lown); their limits are not permanently demarcated, but the "people of the country understand the rules and make no attempt to trespass into, or in any way to injure, the reserves." The timber is too far from roads and markets to repay any attempts to work it. No trees are felled save under the special direction of the officer in charge, and the right to collect miscellaneous forest produce, such as gums, fire-wood, lac, wild silk cocoons, bamboos, and grass, is annually leased out. The strictness of the rules has been relaxed in favor of the Bunjaras (pack bullock owner) travelling through the forests. The reserves consist principally of sāl (Shorea robusta) trees. Amongst these sāl trees are found a sprinkling of ebony trees, muhooa, surrie, dhaora, saja, seesum, tewsa, kurna, dhamun, and a few others. Bamboos are only found on the hills to the northward.

**RIVERS.**—The Mahanuddy river is the receptacle of all the numerous streams that flow westerly. The following are the principal ones: Dauli, Balumdi, Kusmi, Sukla, Makmala and Naini. The Kantara and Muraedoa flow easterly into the Jong river. The water shed has an elevation of 955 feet above the sea level.

#### CIVIL STATION OF RAEPOOR.

**RAEPOOR.**—Raepoor, the sudder station of the District of Raepoor, is situated in the centre of the Chutteesgurh plateau, in latitude  $21^{\circ}14'$  north, longitude  $81^{\circ}41'$  east, and has an elevation of 943·84 feet above the sea level.

It contains about 30 bungalows and 4,934 huts, with a population of 13,887 souls; of this number only 227 are agriculturists.

As the head-quarters of the Chutteesgurh Division, the public buildings are, the Court civil and criminal, of a Commissioner, Deputy Commissioner's Court, Jail, Charity Hospital, Protestant Church, and School of Arts.

A Regiment of Madras Native Infantry is stationed here. This regiment is under the orders of the Brigadier General commanding the Kamptee Force.

The roads about the station are very good and well bridged.

\* The Bhoora tank is the most ancient in the place, and is said to have been formed nearly 500 years ago.

The Maharajee tank was originally a swamp, a bund was built about 100 years ago by Maharaj Danee. The construction of this bund changed the swamp into a fine tank. To the south of the tank is a temple to Ramchundra built and endowed A. D. 1775, by Bimbajee Bhonsla, Rajah of Raepoor.

The Khoko tank is the most substantial in the place, and was built by Kodnud Sing, Kumaishdar of Raepoor, about 40 years ago.

| CHUTHEESGURHEE. |          | Oordoo.            | English.     |
|-----------------|----------|--------------------|--------------|
| English.        | Hindee.  |                    |              |
| Dour,           | डार      | डोय - رسي          | Rope.        |
| Purwa,          | परवा     | چهپر - كلبه        | Roof.        |
|                 |          |                    | R.           |
|                 |          |                    | S.           |
| Lowree,         | लवरो     | چهپري - لکڑي       | Stick.       |
| Pukhna,         | परवना    | پنهر - سنگ         | Stone.       |
| Khilna,         | खीलना    | سينا               | Sewing.      |
| Tant,           | टांट     | مضبوت              | Strong.      |
| Soaj,           | सोज      | سيدها              | Straight.    |
| Chundaynee,     | चदेनी    | ستاره              | Star.        |
| Koosiyar,       | कुसीयार  | گنا - آرنك         | Sugar-cane.  |
| Soorooj,        | सूरज     | آفتاب              | Sun.         |
| Koodar,         | कूडार    | نال - نهر          | Stream.      |
| Dhodgee,        | धाडको    | چهپره              | Do. small.   |
| Buhinee,        | बहुनी    | همشوره             | Sister.      |
| Roop,           | रूप      | چاندي              | Silver.      |
| Milkee,         | मिलकी    | اشارا کرنا         | Suggest.     |
| Pyra,           | पैरा     | پيرال              | Straw.       |
| Panāin,         | पनयां    | چوني               | Shoes.       |
| Bhadain,        | भादेन    | چهپل               | Sandals.     |
| Rapn,           | रापा     | پهپاوزه            | Spade.       |
| Machowlee,      | मचौली    | موزه - صچيا        | Stool.       |
| Kotee,          | कोटी     | کوٹھي              | Store-house. |
| Kurchul,        | करकल     | چهچيا              | Spoon, Iron. |
| Noon,           | नुन      | نمك                | Salt.        |
| Māhur,          | महूर     | مورچي - چمار       | Shoe-maker.  |
| Rawut,          | रावत     | چوپان - گرزیه      | Shepherd.    |
| Bhoorthee,      | भूरती    | مغرب - - مورج است  | Sun-set.     |
| Ruxhown,        | रखवान    | جنوب               | South.       |
| Khurra,         | खरा      | استاده - كهرا      | Standing.    |
| Bnesa,          | बईसा     | نشست               | Sitting.     |
| Busath,         | बुसान    | بدبو               | Stinking.    |
|                 |          |                    | T.           |
| Rookh,          | रूख      | درخت               | Tree.        |
| Chandny,        | चडेनी    | تندو - ڈیرہ        | Tent.        |
| Thuriya,        | तरीया    | نابل               | Tank.        |
| Jhokna,         | झोकना    | لینا               | Take.        |
| Makhoor,        | माखूर    | تنباکو             | Tobacco.     |
| Tonta,          | टोटा     | حلق                | Throat.      |
| Tahanleh,       | ताहले    | نب                 | Then.        |
| Gootiyana,      | गोटियाना | بول چال            | Talk.        |
| Sirto,          | सौरतु    | سچا                | True.        |
| Umraec,         | उमराई    | باغ                | Top.         |
| Dubree,         | डुवरी    | ڈبرہ               | Tank, small. |
| Rendheca,       | रंधीषा   | باتوئي - دريدہ دهن | Talkative.   |



| CHUTHEESGURHEE.                    |                               | Oordoo.                   | English.                                |
|------------------------------------|-------------------------------|---------------------------|---|
| English.                           | Hindee.                       |                           |   |
| Ek munkah la mardaris gown ma, ..  | एक मनुष्यास्य मारणकारी गंवना, | گاؤن میں ایک شخصی مار گیا | A man has been murdered in the village. |
| Khurka churaee bur la jath hun, .. | खरका चुराई बुरले जामवन,       | گورو کو چرانے لیجانا ہوں  | Taking the cattle to graze.             |
| Kithee iek dooreea jaba, ..        | कीती ऐक दुरोया जावा,          | تم کہا تک جاو گے          | How far are you going ?                 |
| Thaen lurwa hus, ..                | तैलर वास,                     | تم احمق آدمی ہو           | You are a stupid man.                   |

**MINERALS TRAP.**—The most predominant rocks appear to be of the nature of whin or trap, compact limestone and coarse sandstone. The trap rocks are devoid of any visible stratification. The rock is going fast into decay and in some places the decomposed mass has lost all traces of its origin, and has become a dark brown soil.

**LIMESTONE.**—The limestone is seen to advantage in the beds of streams and particularly in the Mahanuddy river, where immense slabs are exposed in horizontal strata; the grains being perfectly impalpable, and the fracture conchoidal, while it emits fire when the rock is struck with a hammer. It is in general of a blue or dark grey colour. When it is burnt the lime has an earthy appearance, and it is never perfectly white. From the earthy appearance of the lime, it is believed the rock contains a large quantity of clay (argillaceous limestone), although it makes a strong resistance to the hammer. An inferior kind of magnesian limestone is to be seen a few miles to the north of Raepoor.

**CLAY.**—A few feet below the surface soil, a clay very like khari or geru, occurs of various parallel layers of different colors, but generally of an earthy white. It is a little harder than chalk, and has a soft greasy feel, nor does it adhere to the tongue, but which on exposure to the air becomes somewhat hard. It is used by the natives to whitewash the walls of their houses and huts, and adds to the appearance of the country. Pregnant women eat it in small quantities and boys rub it with water into a white liquid with which they write on boards of leaves.

**PRODUCTIONS.**—The productions are, rice, sugarcane and a little cotton. Rice and cotton are the principal articles of export; hardware and English piece goods are among the imports. The traffic is carried on by country carts and pack bullocks, and commences in November, carrying the grain stored from the preceding harvest. Empty carts are driven from distant markets for the purpose of conveying the grain.

**RIVERS.**—The principal and only river is the Mahanuddy. It takes its rise near the village of Seehava and enters the district a little to the south-west of Dhuntary and runs through Pergunnahs Dhuntary, Raepoor, Seerpoor and Lown, till it receives the Seonath river at the north-east extremity of the district; the river then flows to the eastward, and after passing Sumbulpoor and Cuttack falls into the Bay of Bengal near Pooree. After a long and winding course and before its junction with the Seonath, it receives numerous tributary springs. The following are the principal ones: Soondhoor nullah, Surgee nullah, Sukwa nullah, Koorar nullah, Naince nullah, Sukma nullah, and Balumdi nullah. The bed of the river is rocky, exposing extensive beds of blue limestone in horizontal strata, containing from December to May, many fine pools of clear water, although nearly stagnant. The river is fordable during the dry months of the year, but during the rains the channel is filled and has a rapidity that is eminently unfavorable to commercial utility. The junction of Mahanuddy and Seonath has an elevation of 770 feet above the level of the sea. The fall is 4.75 feet in one mile.

#### EASTERN DIVISION.

**GENERAL DESCRIPTION.**—The tract of country to the east of the Mahanuddy consists of hills and forests; the valleys are watered with clear streams, but the country is grossly neglected, and almost in a state of savage nature. On the Mahanuddy the culturable waste is generally interspersed with rice cultivation. The hills are of comparative little elevation, and although their sides are perhaps still more abrupt than is usual towards the east, their summits are level. Towards the west the gradual slopes are rocky, on which are scattered tufts of long grass and stunted bushes of the most parched appearance. The eastern sides are very difficult of access, in some places the perpendicular wall rises to the very summit, and at the bottom the surface consists of confused fragments of rock, generally, however intermixed with a good deal of soil, and covered with trees and bamboos, neither grow to a magnificent size. In the dry season everything however is parched and dismal, nor is their savage ruggedness enlivened by the clear and winding streams. In the rainy season the verdure of the trees and the roaring of the torrents swollen to a tremendous power, must render these recesses truly magnificent, but then they are the abode of disease, and from the enlargement of the torrents are scarcely penetrable.

| CHUTHEESGURHEE.                         |                             | Oordoo.                                 | English.                                  |
|---|-----------------------------|---|---|
| English.                                | Hindeo.                     |   |   |
| Chatringee, ..                          | बनरेगी                      | چھانا                                   | U.<br>Umbrella.                           |
| Woohy, ..                               | वहै                         | قي                                      | V.<br>Vomit.                              |
| Kala Baree, ..                          | कासा. बारी                  | نرکاري                                  | Vegetable garden.                         |
| Bootha, ..                              | बुना                        | کام                                     | W.<br>Work.                               |
| Dowkee, ..                              | डवकी                        | عورت - مستورات                          | Women.                                    |
| Gura, ..                                | गरा                         | هوا - باو                               | Wind.                                     |
| Kaber, ..                               | काबर                        | کيون                                    | Why.                                      |
| Shakhee, ..                             | साखी                        | گواهي - شاهدي                           | Witness.                                  |
| Sooyin, ..                              | सूरिन                       | دايي - دوده پلائي                       | Wet-nurse.                                |
| Alchee, ..                              | ऐलची                        | زخم                                     | Wound.                                    |
| Rengat, ..                              | रेंगांत                     | بيدل چلنا                               | Walking.                                  |
| Bheethee, ..                            | भीतो                        | دبوار                                   | Wall.                                     |
| Khootar, ..                             | कुटार                       | تئي                                     | Do. enclosure.                            |
| Bhoorthee, ..                           | भूरती                       | مغرب                                    | West.                                     |
| Bureat, ..                              | बुरैट-बजौर                  | دهري - گازر                             | Washerman.                                |
| SHORT SENTENCES.                        |                             |   |   |
| Ja ga, ..                               | जागा                        | جاو                                     | Go.                                       |
| Aeh lala, ..                            | अहेलाला                     | او                                      | Come.                                     |
| Agoer la, ..                            | अगोरले                      | ذره تهرهرو                              | Wait a little.                            |
| Hooth kurroo, ..                        | उतकरो                       | پکارو                                   | Call out.                                 |
| Kaes ga, ..                             | कदीसगा                      | اچي                                     | I say.                                    |
| Chongee bhur, peeboo,                   | चांगीभरपोबो                 | چنگائي بهرومين بيدينگا                  | Fill a pipe, I shall smoke.               |
| Gorh doha bur panee da nonee, ..        | गोरघुनावरपानीदेनोनी,        | اي بيدي مجھي اپے پايون<br>دهونے پاني دو | Daughter, give me water to wash my feet.  |
| Kooch ka ha bur hai tho ka ha da ba, .. | कुच काहावरहरेलोकच-<br>देवा, | کچھ کہناھونوکھو                         | Have you any thing to say to me ? Say it. |
| Panee bur ja huthun thuraeea, ..        | पानीभरजानहनतरीया,           | تالاب سے پاني بهرلائے<br>جانے هين       | Going to fill water from the tank.        |
| Kown maer thaen jath huss, ..           | कौनमेरतयंजातहस,             | کس طرف تم جانے هر                       | Which way are you going ?                 |
| Bearee ka buckuth bahees, ..            | बीयारीके बखतभरस,            | کہانے کاوقت هو                          | It's time for meal.                       |
| Munkah jhugra kur-huthun, ..            | मनखेभगराकरनचन,              | لوگ جهگرتے هين                          | Men are quarrelling.                      |
| Thaen buheea hus, ..                    | तयं बहीयाहस.                | تم ديوانے آدمي هو                       | You are a mad man.                        |
| Mo lah uskut lagis, ..                  | मोहले असकटलागीस,            | میں نهکاھون                             | I am tired.                               |
| Eh hur kooch hae niee jah na, ..        | ये हरकुच है नीजाना,         | وہ کچھ نهہین جانتا                      | He knows nothing.                         |

Amba tank is supposed to be about 200 years old, and was thoroughly repaired and faced with massive stone terraces, and steps to the water on three sides ; this work was done at a cost of Rs. 10,000 by Soobaram Mahajun.

The Rajah tank was built by Rajah Burriar Sing 200 years ago.

Kunkalee tank in the middle of the city was built of stone throughout about 200 years ago by Kirpal Gur, Mahant, who also built a small temple to Mahadeo in the middle of the tank.

Cotton and grain are the principal articles of export ; the precious metals are the chief imports ; hardware, coconuts, and sugar are also imported to a considerable amount.

Raepoor was a place of little note till about A. D. 850, when a branch of the Ruttunpoor King's family came and established his court. The Rajpoot rule was overthrown by the Maharattas A. D. 1745 ; the old fort was dismantled and Ruttunpoor again made the seat of Government. In 1818 the country was placed under British superintendence, and Colonel Agnew, the first Superintendent, finding Raepoor a more suitable and healthy locality than Ruttunpoor, removed to it. In 1830 the country was again made over to the Maharatta Government, and Soobahs from Nagpoor governed in Raepoor till A. D. 1854 when the district was finally annexed to the British territories. From that time security for property and confidence in the Government began to arise and the town gradually increased.

#### LEAD ORE.

Copy of letter No. 138, dated Calcutta, 2nd July 1868, from THOMAS OLDEHAM, Esq., Superintendent Geological Survey of India, to COLONEL J. E. GASTRELL, Deputy Surveyor General.

I have the honor to acknowledge receipt of your letter No. 331, dated 18th ultimo, forwarding copies of letters from Mr. R. B. Smart, together with a package containing specimens of ore referred to in them, and requesting a report on these.

A specimen of precisely similar ore had been received some time before from the Deputy Commissioner of Raepoor, and I would quote a part of my letter in reply, dated May 14th, 1868.

"The ore is galena, or the sulphide of lead (sulphur and lead) ; it occurs in crystalline masses imbedded in greenish fluor spar forming a vein with quartz. Galena is a valuable ore of lead, and often yields also a large percentage of silver. The specimen in question does not contain much silver. But it is impossible to form any estimate whatever of the value, that is, of the commercial value of a metallic vein or lode from hand specimens. This depends entirely on the amount of ore, the facility of working it, the position of the mine, &c., &c., points which could only be determined after a careful examination of the locality itself."

The specimens submitted with your letter enable me to add to this, that the fluor spar is more abundant than at first appeared to be the case, and is even more frequently of a rich purple than of a green color.

The ore from these specimens has also been cupelled on a larger scale than before, but with the same result ; the amount of silver present though appreciable is not sufficient to be of any practical value.

There is no antimony in the specimens submitted, as supposed by Mr. Smart.

The specimens from Mr. Smart's account would seem to have been derived from loose blocks of stone, imbedded in earth. There is no question, however, that they form a portion of a regular vein which must have existed, where these loose blocks were derived from, and in all probability at no great distance from the spot where they occurred. It would be desirable to trace out this lode or vein, and ascertain its value.

I may add that both as to rock and gangue the vein looks decidedly promising and may be of much value.

I shall be obliged by being favored with any further information regarding the lode which may reach your office.

## OFFICE MEMO.

Forwarded to R. B. Smart, Esq., Revenue Surveyor, 2nd Division, Central Provinces, with a request that he, on again taking the field, will examine the spot more closely, and if possible trace out the vein and give such further information as is required and indicated by Dr. Oldham in the concluding paras. of his letter; a sketch survey of the locality might also be of use. The dip of the vein should be given if possible.

SUPDT. OF REVENUE SURVEYS' OFFICE; }  
 UPPER CIRCLE,  
*Calcutta, 3rd July 1868.*

J. E. GASTRELL, *Colonel,*  
*Deputy Surveyor General.*

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The lead ore was accidentally discovered by the beldars working on the road between Bhundara and Raepoor. Whilst engaged surveying the district of Raepoor, I was requested by Captain Twyford, the Deputy Commissioner, to visit and give my opinion upon the vein.

Specimens were forwarded to Colonel Gastrell, Deputy Surveyor General of India, and to the Chief Commissioner, Central Provinces.

The hills on which the ore is found are situated in the lands of Khyragurh and Nandgaon Zemindarees, and three miles to the west of Chichoolcoo Dāk Bunglow, near the village of Rancetalao and consist of large masses of quartz imbedded in rich black earth. The metal runs through the quartz in veins and nests. The hills run north and south and have a most arid and sterile appearance. The land is undulating and profusely studded with fragments of rocks. The surface soil is of a dark color and derived from the decomposition of the various and numerous rocks in the vicinity of the spot. The streams which flow to the east fall into the Seonath river; those flowing to the west into the Bang Nuddee. The jungle on the hills principally consists of the following trees, sullaie, ghoteen, kakaie, pursa, saja, renwa, and millee.

## APPENDIX.

*Extract from Annual Report of the Operations of the 3rd Division, Central Provinces, Revenue Survey, by Captain H. C. B. TANNER, Season 1867-68.*

**DISTRIBUTION OF ASSISTANTS.**—The party was divided into two camps, the one being in charge of Mr. Brady, and the other under Mr. Lawson. Lieutenant Hutchinson accompanied me on my tour when taking azimuths to learn that branch of his duties. Camp No. 1 under Mr. Brady surveyed 458 square miles, divided into two main circuits, both embracing open ground.

Camp No. 2 in charge of Mr. Lawson taking up the more broken parts to the north of Moondee and Khundwa, and the rough hill country about the Nerbudda river.

This camp surveyed 676 square miles which was divided into four main circuits.

**SYMMETRY OF MAIN CIRCUITS.**—I am glad to be able to report that all these circuits have, without exception, been made as symmetrical as possible. The time employed in eradicating the bad habit of running main circuit lines closely along tortuous boundaries has not been misspent. As a rule the ground over which the lines run has been well chosen in respect to its evenness, and the stations are few and are all marked for future reference.

**CHAIN MEASUREMENTS.**—The Nimar district though generally flat is nevertheless much broken by low stony flat topped ridges and greatly cut up by ravines. The stumps of trees also present obstacles to accurate chain measurements. The lines of main circuit No. 6 run over good ground; those of Nos. 1, 2 and 3 over rough ground, but the northern limits of main circuits Nos. 4 and 5 which skirt the Nerbudda river are carried over a tract so rugged and uneven that I quite despaired of being able even to turn out passable traverse work.

**TRIANGULATION.**—It was owing to the unpromising nature of the tract in the neighborhood of the Nerbudda, that I found it necessary to aid the traverse survey thereabouts with such triangulation as I might be able to effect.

No Great Trigonometrical Survey operations have been carried out in the district, or in the immediate neighborhood. Stations of the Great Arc series lie some 70 miles to the east of Khundwa, the intervening ground being flat and jungly. The Kanpisura series being about the same distance to the west, secondary triangulation of the Hyderabad topographical survey extends from Asseergurh to the eastward, along the Satpoora range. I therefore endeavoured to extend this series to the north-west until I could effect a junction with the Great Arc series; but after spending a considerable time in the Nerbudda Valley in searching for suitable stations for my triangulation, I had reluctantly to give up the idea, the country being quite flat and devoid of undulating hills, and jungle being everywhere excessive. I commenced fixing the stations to extend the topographical triangulation, about the middle of March, and with great labor and trouble had succeeded in fixing and observing the angles at 8 principal stations by the end of May. I then proceeded to the south-west of Asseergurh to try to effect a junction with the Great Arc series at Argao and Dumwar, Great Trigonometrical stations, but I was quite knocked up with the heat of the weather, and that part of my triangulation now remains incomplete. By the middle of June I had finished all my minor and principal triangulation, with the above exception. The work effected stands as under:—

Eight principal triangles

Eight secondary triangles, besides intersected points.

These principal triangles together with three of the topographical triangles observed by Mr. Mulleran, have been formed into two polygons, and the secondary series which extends along the southern portions of my traverse work has been computed on the Ray Trace system.

All the angles of the principal series have been observed in zero  $\frac{R}{L}$ ,  $\frac{0}{100}$ ,  $\frac{15}{100}$ ,  $\frac{30}{100}$ ,  $\frac{45}{100}$ ; but owing to my having had to make use of Asseergurh Musjid as one of the topographical stations, when the angles had to be reduced to the centre, some of the triangles were incomplete, and the supplementary angles have had to be used at this point. An error was discovered in the measure-

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ments necessary for reducing the angles to the centre of observation too late for me to rectify it when in the field. The observations have all been taken with the greatest care, and I believe these supplementary angles are none of them more than 2" or 3" from the truth.

Of the complete triangles the greatest error from 180° is 6," the mean being 2".05, which, considering the observations were taken with a 10-inch theodolite, may be considered small. The following comparison of common sides will show the dependance to be placed in the work:—

|   | Feet.    |
|---|----------|
| By triangle No. 2, from Kulhardeo to Asseergurh ... ..  | 160693.0 |
| By triangle No. 13, ditto ditto ... ..  | 160692   |
| By triangle No. 12, ditto ditto ... ..  | 160685.3 |
| By topographical survey measurement ... ..  | 160711.0 |
| Error per mile 0.03 feet between triangles Nos. 2 and 13, and 0.58 per mile between triangle No. 2 and the topographical survey distance. |          |
| By triangle No. 11, from Taklee to Asseergurh ... ..  | 80280.1  |
| By triangle No. 3, ditto ditto ... ..   | 80285.5  |
| Difference, ... feet ...  | 5.4      |
| Error per mile 0.35 feet.   |          |

In the secondary series of minor triangulation, the following are the results:—

|  |         |
|--|---------|
| By triangle No. 1, from Sirmesur to Anla ... ..    | 51253.0 |
| By triangle No. 3, ditto ditto ... ..              | 51252.0 |
| Difference, ... feet ...                           | 1.0     |
| Error per mile 0.103.                              |         |
| By triangle No. 5, from Piplod to Kalakaw ... ..   | 34304.9 |
| By triangle No. 4, ditto ditto ... ..              | 34305.7 |
| Difference, ... feet ...                           | 0.8     |
| Error per mile 0.12.                               |         |
| By triangle No. 8, Cheezkhera to Bhilkheree ... .. | 36153.8 |
| By triangle No. 9, ditto ditto ... ..              | 36153.5 |
| Difference, ... feet ...                           | 0.3     |
| Error per mile 0.05.                               |         |

The latitudes, longitudes, and heights which are now being computed give—

|  | Latitude.    | Longitude.    |
|--|--------------|---------------|
| By topographical survey, Asseergurh ... .. | 21°28'18".13 | 76°20'09".20. |
| By revenue survey, Asseergurh ... ..       | 21°28'18".18 | 76°20'09".18. |
| Discrepancy in latitude ,, 0".05           |              |               |
| Ditto longitude ,, 0.02                    |              |               |

All the angles of this minor series have not been observed, but the series is double throughout, and the average error of common sides being only 0.09 feet per mile; the result may be, I hope, considered trustworthy. The true distance between Kulhardeo, the origin of the Ray Trace series, and Taklee, the terminus, is ... 131927 feet,

and by Ray Trace computation ... 131944 "

Difference ... 17 feet.

Altogether this triangulation is the most unsatisfactory work I have ever had to deal with. I believe that more difficult country does not exist. The general face of the region between the Satpooras and the Nerbudda is almost truly level, and the slight eminences that do occur are perfectly flat, and covered with a jungle the growth of which is primeval. I had also a more serious difficulty to contend with, namely an atmosphere which at that season of the year is not only loaded with minute particles of dust, but rendered still more opaque by the smoke of ever-burning bush fires. Often the view was restricted to a few miles, and it was but seldom after the middle of April that even heliotropes could be observed. I also had to carry on my work in the very hottest time of the year in a country sterile and desolate, where roads and even paths do not exist, where water is scarce, and where the traveller seeks in vain for some shelter from the burning rays of the sun.

COMPARISON OF TRIANGULATION WITH TRAVERSE MEASUREMENTS.—The hope of extending minor triangulation all over the district, whereby I could correct my chain measurements, not having been fulfilled, I can only report a comparatively small amount of chain measurements that have been tested with triangulated distances. The necessary correction on two principal stations was not properly made by one assistant, which has lost several distances. The following table shows the error per mile on the two classes of measurements:—

*Comparison Statement.*

| Stations.                 |                | Traverse. | Triangulation. | Error. | Error per mile. | Nature of Traverse from which co-ordinates were derived. |
|---------------------------|----------------|-----------|----------------|--------|-----------------|--|
| From                      | To             | Feet.     | Feet.          | Feet.  | Feet.           |  |
| Soorgaon ...              | Beejulpore ... | 1,38,540  | 1,38,545       | — 5    | 0.20            | Village and M. C. Traverse.                              |
| Soorgaon ...              | Taklee ...     | 80,535    | 80,698         | —163   | 10.66           | Village and M. C. "                                      |
| Soorgaon ...              | Hurswara ...   | 62,035    | 62,043         | — 8    | 0.68            | Village and M. C. "                                      |
| Soorgaon ...              | Mahadeo ...    | 1,25,968  | 1,25,985       | — 5    | 0.025           | Village and M. C. "                                      |
| Soorgaon ...              | Piplod ...     | 1,20,611  | 1,20,618       | — 7    | 0.36            | Village and M. C. "                                      |
| Taklee ...                | Hurswara ...   | 72,754    | 72,805         | — 51   | 3.70            | Village and M. C. "                                      |
| Taklee ...                | Mahadeo ...    | 73,995    | 73,959         | + 36   | 2.56            | Village and M. C. "                                      |
| Taklee ...                | Cheezkhera ... | 36,856    | 36,673         | + 83   | 11.9            | Village Traverse.  |
| Mahadeo ...               | Hurswara ...   | 75,319    | 75,252         | + 67   | 4.46            | Ditto ditto  |
| Piplod ...                | Bhilkhera ...  | 46,039    | 46,060         | — 21   | 2.41            | M. C. ditto  |
| Piplod ...                | Cheezkhera ... | 36,392    | 36,361         | + 31   | 4.52            | Village and M. C. Traverse.                              |
| Bhilkhera ...             | Cheezkhera ... | 36,192    | 36,154         | + 38   | 4.36            | Village Traverse.  |
| Mean of season's work ... |                | ...       | ...            | ...    | 3.67            |  |

NERBUDDA RIVER SURVEY.—The survey of the section of the Nerbudda river that forms the northern limit of British Nimar, has turned out to be the most difficult work that has been undertaken by my party during the season under review. The task fell to the lot of Mr. Lawson, and the manner in which he has carried it out, notwithstanding the difficult natural obstacles he has had to surmount, reflects the greatest credit on him. A large conserved forest tract extends along the south bank of the river, which it was necessary to survey on the scale of 4 inches=1 mile. I had hoped to run a series of triangles down the river, but this had to be abandoned, owing to the whole of the flat topped hills in this region being exactly of the same height and all covered with forest jungle. Traverse measurements were therefore made either along the banks, or in the bed of the stream, as circumstances would admit. The line cutting in this desolate and almost uninhabited wilderness was ably carried out by Mr. Thompson, who showed great energy and perseverance in completing this laborious task. Wherever the nature of the forest would allow it, the main circuits were sub-divided in minor polygons. Triangulated lines backward and forward across the river, and up and down steep rocky slopes considerably retarded the work, but added greatly to its accuracy. Considering the hills, the ravines, the endless jungle and the intense heat which prevailed at the only time when those jungles are comparatively free from malarious influence, I consider the accuracy of the chain measurements very satisfactory. This chaotic mass of broken, rugged hills has been more than fairly delineated on my maps. A more minute survey of this utterly useless waste would be unnecessary, parts of which had prior to our arrival never before been visited by Europeans and will never be so again probably.

FOREST BOUNDARY.—The forest tract has been demarcated by the Forest Department, and the boundary has everywhere been taken up by us. The area by our measurements is 141.74 square miles.





## APPENDIX.

*Description of country surveyed in District Chanda, season 1867-68, by LIEUT. F. CODDINGTON, Revenue Surveyor, 4th Division, Central Provinces.*

**GEOGRAPHICAL POSITION OF COUNTRY SURVEYED.**—As stated in the body of the accompanying report, the portion of the Chanda district surveyed this season lies between the parallels of 19°46' and 20°22' of north latitude, and of 79°07' and 80°02' of east longitude; the extreme length north and south is about 30 miles, and extreme breadth east and west about 56 miles, and contains an area of 1116.18 square miles.

**SOIL AND CROPS.**—To the south, south-west and east along the rivers Wurda and Weingunga is found the black cotton loam soil, producing good crops of cotton, grain, and pulse; wheat appears only in small quantities, and the cotton is chiefly grown for home consumption. Where small spaces have been cleared in the jungle for cultivation the soil appears very poor, and rice may be said to be the principal crop thereupon raised. It is sown year after year, with little or no manuring, during the rains, so that the ground naturally becomes exhausted and impoverished; towards the hills the soil becomes generally reddish and more sandy. The inhabitants are lazy and make next to no attempt at irrigation, which in many places could be resorted to with advantage.

**MAIN CIRCUITS 13, 14, AND 15.**—The eastern portion of the work is that included in main circuits Nos. 13, 14, and 15; these main circuits very nearly embrace the portion of the country that was originally called Pergunnah Rajgurh, but the pergunnah divisions having been done away with throughout these provinces, the old pergunnah now forms a portion of the Tehseel of Mhool. This is the portion of the country I will first enter into a slight description of.

**GENERAL APPEARANCE OF COUNTRY.**—The general appearance of this country is undulating, small hills and small ranges of hills being dotted about; the general scenery as long as the cold season lasts is most pleasing to the eye, but as soon as the hot weather sets in as a rule, all the trees lose their leaves, and the whole country assumes a brown burnt up aspect, similar to the ordinary plains of India, excepting those parts in the immediate vicinity of water which still remain green.

**CHIEF VILLAGES.**—The following are the only villages worthy of note, *viz.*, Mhool, Sowlee, Wehar, Rajgurh, Marora, and Rajuli.

The chief village or Kusba town of the tehseel is Mhool from which the tehseel takes its name; the head quarters of the tehseel are situated there under a tehseldar. It is situated in about latitude north 20°05' and in longitude east 79°43'; the site contains about 800 huts, covering an area of 60 acres. It has a boys' as also a girls' school. Octroi is levied in the village, and a large weekly bazar is held every Thursday; there is also a police station and a post office. A large tank lies to the south-west of the village site in which are fish and wild fowl,

Sowlee is the next village of importance; it lies about 7 miles almost due east of Mhool, and contains also about 800 houses. A good trade in cotton cloths and silk is carried on at the large weekly bazar which is held there; it contains a school for boys.

Wehar is a village prettily situated about 15 miles to the east and a little north of Mhool. Mr. G. Barrett thus describes it: "As one of the prettiest villages in this part of the country, it is situated on two small hills between which is a large tank. The view from the top of the adjoining hills of the surrounding country is most prepossessing: a vast *spread* of jungle is seen lying to the south and west, and on the other sides a wide *spread* of cultivation, dotted with small villages and tops of trees, with the winding course of the Weingunga river to the east, and various hills in the distance render the scene quite picturesque."

Rajgurh is the village from which the late pergunnah of that name derived its name; it is about 4½ miles to the south-east of Mhool; a large weekly bazar is held here, but it is a village that has dwindled down in importance; there is a fort in ruins on the adjoining hill above the town.

Rajuli is worthy of remark on account of its magnificent tank or artificial lake which covers an area of 350 acres; the tank is formed by a bund enclosing the natural hollow between the hills; the depth of the water in the centre is said to be as much as 80 feet; the bund is but a small one, in length about 400 feet and about 40 feet high.

Dongurgaon is also remarkable for a very large artificial tank formed by a strong bund, more than half a mile in length, and encloses a sheet of water covering 260 acres.

**MINERALS.**—Iron is generally found over the district, and there are copper mines in existence in the village of Thana Wasa, situated in a small hill close to the site; several mines were opened, but as the amount realized was hardly sufficient to pay the labor, the working of them has been given up.

**POLICE STATIONS.**—There are police stations at Choorool and Barsagurh in addition to Mhool.

**CHIEF RIVERS.**—The only rivers of any importance are the Weingunga, the Mhool, and the Pathree Nuddee; the Weingunga skirts the whole of the eastern portion of the season's work; its average breadth is about half a mile; its bed in parts is exceedingly rocky; the banks high, and generally well defined: there are some good fish in it, and by reason of the many small rapids I should say would be most favorable for sport. In the hot season tigers often take up their abode in the high rushes in the bed of the stream; it is not navigable nor could it be made so.

The chief ghats or ferries along the portion surveyed this season are at Boremarra, Niphundra, Sonapoor, Hurama, Sakhree and Choorool, but it is also crossed at several other points when the water is low.

The Mhool Nuddee rising up near the village of Chimoor enters by the north of main circuit No. 14, and after flowing nearly due south joins the Andaree at a small village by name Jam, from whence these two streams bear the name of Andaree.

The Pathree Nuddee flows out of main circuit No. 12 of last year's work and joins the Mhool Nuddee a few miles south-east of Mhool.

These two latter Nuddees derive their names from the two villages of the same name near which they each pass.

**ROADS.**—There are no roads of any importance through this part of the district; there are several cart tracts passable in fine weather only: the chief of these are from Mhool to Gurchooroolee and from Mhool to Chumoorsee.

**MAIN CIRCUITS, NOS. 16, 17, AND 18.**—The western portion of the tract surveyed is enclosed in main circuits Nos. 16, 17 and 18, and formed pretty nearly the old Pergunnah of Havelee, which like Rajgurh is now part of Tehseel Mhool.

**GENERAL APPEARANCE OF COUNTRY.**—These main circuits have even more jungle and of a heavier description than those to the east above described. A very large tract of forest extends continually from Mhool to Chanda, a distance of 32 miles east and west and from north to south of the season's work. To the west of Chanda city, and along the Wurda river, there is a tolerable extent of cultivation: the country is undulating.

**CHIEF TOWN.**—Chanda the capital of the district is situated in north latitude  $19^{\circ} 57'$  and east longitude  $79^{\circ} 20'$  on the left bank of the Eerai Nuddee which flows not far from its walls, its banks not being well defined and the river subject to great freshes during the rains, its water often comes up to the walls and has at times forced itself inside of them. The Jhurput Nulla also runs close past the city on its eastern side. The city is surrounded by a strong well built cut-stone masonry fortress, which consists of small semi-circular bastions joined together by lines of stone parapet forming in some parts entering and in others re-entering angles; the whole is loopholed at top for musketry with a good banquette forming a road of communication round the entire fort of about 10 feet wide; the general thickness of the parapet at top is about  $3\frac{1}{2}$  feet and about 10 feet at base, and average height about  $17\frac{1}{2}$  feet. The circuit of the walls of the fort is  $5\frac{1}{2}$  miles; the walls are kept in capital repair. There are four principal gate-ways or entrances, through each of which there are approaches for wheel conveyances; they are all handsomely constructed and about 30 feet in height; there are several

other minor entrances available only for foot passengers, the names of the gates are "Jutpoora" on the north by which the imperial road from Nagpore enters; on the south "Puttan;" on the east "Achuleswar" or "Mahakalec;" on the west "Beemba"; the chief portion of the city lies inside of the fort. A new metalled road is in course of construction which will form a direct road of communication between the Jutpoora and Puttan gates; all the roads inside the fort are metalled and well kept. There is more space within the fort walls than is ever likely to be required for dwelling houses; a great portion is at present given up to cultivation and gardens; on the north-east side of the fort is a large tank called Remalla; one side of this tank is formed by the walls of the city which form its bund; on this side the walls have also a wide parapet of earth thrown up on the interior side to strengthen them. The tank would always form a good reservoir of water and there are many good pukka wells besides.

The general appearance of the city viewed from the outside is exceedingly picturesque, there are some splendid trees in its vicinity as also inside. It contains many temples, but by far the principal one is Mahakalee, situated outside the walls, in the vicinity of which a large annual fair is held in April.

At Lalpet, one of the suburbs of the city, are some stone gods formed each of one piece of stone, the largest of these idols is 31 feet 6 inches high, 21½ feet broad, and about 2½ feet thick, this one has fallen down.

The following buildings are to be noticed, the school, the dispensary, and the jail which was formerly the citadel of the fort.

There is a dāk bungalow for travellers near the Mahakalee temple, a very inconvenient and disagreeable position for it, and much out of the way.

CHANDA CIVIL STATION.—The civil station contains the head quarters of the district, and is situated to the north of the city, the public buildings in it are the Deputy Commissioner's Cutchery, Chief District Police Station, and lines for the wing of a Native Regiment. There is a wretched place called a Post Office, but it is not worthy of the name. The Telegraph Office has been shut up, as it was so little used. A Church is to be built, but there appears to be some difficulty in deciding about its exact position, and so its erection is delayed, although the necessary funds are, I believe, available. There is a small public garden between the city and military lines called the Nugeena bagh.

CHIEF VILLAGES.—The principal villages are Bullarpoor, Kotaree, Sengaon, Dewaree, and Kebzur.

Bullarpoor is picturesquely situated on the left bank of the river Wurda about seven miles from Chanda in a south-eastern direction; near the village immediately above the river is the ruins of a masonry fort evidently of the same time and description as the Chanda fort, built also of cut stone, near this is also an English-looking bungalow, without a roof, the bungalow was never completed, and is the property of the firm of Watson and Co., who proposed working a cotton press at Bullarpoor, but their agent to whom they entrusted the work spent far more than was meant in the construction of the house and so the undertaking was abandoned, and the house never finished; but as far as it went, it was admirably constructed.

Kebzur is the chief village on the line of road between Chanda and Mhoool; it is of no great importance otherwise, except it be that it had for four years previous to April last, a man-eating tigress continually in its vicinity, and who carried off many of its inhabitants, both men, women, and children, so much so that she got the name of the Kebzur tigress; I was fortunate enough to shoot her in April last, thus relieving the country of a terrible scourge; such a fear had the people of this portion of the road, that it was only in gaugs and between the hours of about 10 and 4 daily that they would pass at all, and then often one of their number was carried off by her. The night but one after she was shot, they were travelling that same road by night: by reason of this brute another whole village became deserted by every single one of its inhabitants.

MINERALS.—Coal, though of rather an inferior quality, has been known to exist in this portion of the district, near the villages of Chandoor and Ghoogaos nearly due west of Chanda on the river Wurda for some time past. But this year it has been found to exist close to the city of

Chanda where some extensive operations in boring have been carried on, and a good seam pierced about 100 feet below the surface of the ground; it seems likely that this coal will some day be found to exist in sufficient quantities to warrant its being worked.

Lieutenant Smith remarks that, "I noticed a good deal of sulphuret of iron in the pieces I picked up." A coal seam of some size also exists on the south side of the Wurda a little below Bullarpoor. The sandstone of the district is remarkable for its fine quality, and the stone carvers in Chanda have been very successful in having produced some good specimens of workmanship therefrom in the shape of tables, &c. Iron ore is also generally found.

TREES.—The trees in the jungle will be found to be as follows: tamarind, cheronjee, tenbroo, kaitta, khirnee, oula buhera, kalla behla, dhoura-behla, mowah (or butter tree), bamboo, khair, googal, neem, sembul (cotton tree), pulus, bail tree.

Bamboo has been met with in large quantities, it exists along the edges of the larger nullahs in very dense thickets, and forms in many parts the lairs of tigers and other wild animals. In main Circuit No. 16, the bamboo especially exists in large quantities, and a considerable trade is carried on in them during the months of April and May. A cart load cost but 12 annas, and sometimes as many as 50 carts have left Kholsa loaded with them in a single day.

Teak saplings are also occasionally met with; the mowah exists in large quantities.

POLICE OUTPOSTS.—Police outposts exist at Kutaree, Eesapoor, Chichpiellee, Bullarpoor, Kebzur, and at Chowkee (on the Mhool road).

ROADS.—The new imperial metalled road from Chanda to Nagpore passes through the west of the season's operations, this road is yet deficient of many bridges which are necessary to make the road available for traffic during the rains. The Erai Nuddee and other streams are yet not bridged, all the other roads in the district are merely fair-weather ones, and consist of cart tracks; the principal of these is the one from Chanda to Mhool; no road has ever been made, but the jungle is cleared for the space of about two chains wide; another leads from Chanda to Seroncha, this road passes by Bullarpoor and Kutaree, a third leads from Chanda to Wone (in Berar), and a fourth from Chanda to Chimoor.

TELEGRAPH LINE.—A line of Government Telegraph runs along by the new imperial road from Chanda to Nagpore, passing Chanda, this line extends to Seroncha; the old line that followed the road to Chimoor has been abandoned.

TANKS.—The only tanks of importance are the Ramala at Chanda, area = 74 acres of water in May, one in Dabgaon and one in Junona, the area of the latter is 174 acres, and it is remarkable for its fine masonry bund built by one of the Chanda Rajahs.

STREAMS.—The principal streams are the Wurda, the Eerai, and Andaree; the Wurda runs all along the south and south-west portion surveyed and forms there the boundary of the district; it is a slow running stream with lots of water and sandy bottom, its banks are well defined, but much intersected with deep ravines and nullahs.

The Eerai enters main Circuit No. 17 at the north, and flows nearly due south till it joins the Wurda about  $4\frac{1}{2}$  miles south of Chanda.

The Andaree enters main Circuit No. 16 from the north, and flows in a south-easterly direction through a continuous forest of jungle.

HILLS.—The only hills of importance are those to the north-east corner of main Circuit No. 16, known as the Mhool hills, and are the favorite resort of all kinds of wild animals: many streams of beautiful clear water run out of these hills, but it is very unwholesome to drink in spite of its appearance.

INHABITANTS.—The chief inhabitants in the cultivated parts are Maharattas, and in the jungles Gonds; the latter are a primitive race, not fond of hard work, and will eat anything in the shape of flesh; they consumed at Kebzur the whole of the flesh of the tigress I shot, although they knew perfectly well that she had devoured several of their kith and kin.

**REPORT**  
OF THE  
**Revenue Survey Operations**  
OF THE  
**NORTH-WEST AND PUNJAB CANTONMENT SURVEY,**  
**For Season 1867-68.**

**COMMENCEMENT OF WORK.**—The first or Darjeeling Topographical and Revenue Survey, on completion of the Daling Sub-division of District Darjeeling, was at once told off for the survey of all such Cantonments in the Upper Provinces, new plans of which were required to meet the request of the Secretary of State for India, for plans of all Cantonments and their environs, to the extent of two miles all round, where European Troops might be located, and as stated in paragraph 113 of the Annual Report Bengal Surveys for 1866-67.

Mr. E. T. S. Johnson, Assistant Revenue Surveyor, 1st Grade, in charge.  
ASSISTANTS.  
 Mr. P. Cowley, Sub-Assistant, 2nd Grade.  
 12 Native Surveyors, &c.

2. The Cantonments were accordingly taken up in the order in which they are marginally noted. The party left Recess Quarters at Darjeeling about the middle of October, and survey operations commenced on the 1st November 1867, closing in April 1868.

Benares. | Delhi.  
 Allahabad. | Umballa.

3. **INSTRUCTIONS FOR SURVEY.**—The Surveyor was instructed to make a minute survey of the Cantonments, Cities, and environs on the scale of 12 inches=1 mile.

4. **METHOD OF SURVEY.**—To ensure the greatest accuracy a main circuit was run all round the environs to the extent of two miles from the Cantonment and City limits, then the latter was enclosed in a subsidiary main circuit, and finally these two circuits were divided into traverse blocks of 250 to 300 acres each for the environs, and of 90 to 100 acres for Cantonments.

5. **CONNECTION WITH GREAT TRIGONOMETRICAL SURVEY.**—The Surveyor was furnished with charts and data of Great Trigonometrical Survey points in and around Cantonments, and the following connections were effected :—

- In Benares Survey :—with Great Trigonometrical Stations Lonka Khudan, and the old Mint house.
- „ Allahabad :—with Great Trigonometrical point on main Gateway of the Fort.
- „ Delhi :—with the Great Trigonometrical Stations of Talka Tola and Pirghyb.

6. The Stations of the Great Trigonometrical Surveys in Umballa could not be found. The one on the old Jail appears to have been destroyed when the building was pulled down ; but there is still some hope entertained by the Surveyor of finding the other station on the top of one of the barracks.

7. **TOTAL AREA.**—The areas of the Cantonments with their environs stand thus :—

|                 |   | Acres.                   | Square miles.             |
|-----------------|---|--------------------------|---------------------------|
| N. W. PROVINCES | { | Benares ... ..           | 19372.78 ... 30.27        |
|                 | { | Allahabad ... ..         | 30792.55 ... 48.11        |
| PUNJAB          | { | Delhi ... ..             | 14779.83 ... 23.09        |
|                 | { | Umballa ... ..           | 24134.55 ... 37.71        |
|                 |   | <b>TOTAL AREA</b> ... .. | <b>89079.71 .. 139.18</b> |

8. **DETAIL SURVEY.**—“The interior details,” the Surveyor reports, “have been surveyed with the greatest minuteness that the scale would allow, every enclosed garden and compound

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has been separately shown, as well as every masonry building, and in the town every street or lane having an exit at both ends, and all buildings of note have been given."

9. CHECK SURVEY.—Check lines were run through every circuit by the Surveyor and his Assistant, the Native Surveyors were constantly visited, and their work and chain measurements examined. The result is pronounced "in most cases very satisfactory. Only two errors of any consequence were discovered, and these were caused by the lines being incorrectly plotted."

10. OBSTRUCTIONS.—The survey of the crowded streets and lanes of such cities as Benares, and Delhi, was, as might have been expected, very harassing and laborious, notwithstanding the assistance the Police rendered in clearing the streets. But still greater (and unexpected) delays and difficulty were experienced in the survey of the Cantonments and their environs. The Surveyor reports "I have frequently had my parties stopped in their work by the owners, or residents of enclosures and gardens, preventing the Surveyor from going within for the purpose of fixing the positions of buildings, &c. Although in all cases hitherto I have got my work done by either writing or going personally, yet a deal of time is thus taken up, especially when I may be out on inspection duty, or the residents of the place have gone out before I have been able to write. A day or two is very often lost to a Surveyor in this way, and I must say that Europeans are the most troublesome in this kind of obstruction."

11. AUTHORITIES, CIVIL AND MILITARY.—The Surveyor thankfully acknowledges the aid he received from the Civil and Military authorities.

12. LEVEL BENCH MARKS.—To make the Cantonment plans as useful and complete as possible, all Level Bench Marks fixed by the Great Trigonometrical Survey, or by the Department Public Works, that could be found, have been connected with, and carefully entered on the plans, with their heights, and the datum to which they are referred.

13. PLANS COMPLETED.—The plans of Benares and Delhi have been received in this Office, and are clear and excellent specimens of plan drawing. Having been prepared expressly for Photography, they will soon be published. The plan of Allahabad is detained pending the final settlement of the limits of the new Cantonments.

14. SURVEY OF UMBALLA INCOMPLETE.—The Umballa plan is incomplete, as a portion of the environs still remains to be surveyed.

15. PROGRAMME FOR 1868-69.—During the field season of 1868-69, the Surveyor will finish off the remainder of Umballa, and take up the survey of the Cantonments noted in the margin, and also, if possible, Ferozepoor. There will then remain only Mooltan, and Dera Ishmael Khan, to complete the list of Cantonments allotted to this party.

- 1. Philor.
- 2. Jullundur.
- 3. Govindgurh (with Umritsur.)
- 4. Sealkote.

16. ASSISTANTS.—Mr. Cowley, Sub-Assistant Surveyor, is reported to have given every satisfaction. The Survey of Benares was entrusted to him, and the greater part of the mapping has been done by him. The Native Surveyors are also said to have done well.

17. The Surveyor's notes on the Cantonments surveyed will be found in the Appendix.

JAMES E. GASTRELS, *Colonel,*  
*Supdt. of Revenue Surveys, U. C.*

SUPDT. REVENUE SURVEY'S OFFICE, }  
CALCUTTA ; }  
The 23rd November 1868. }

## APPENDIX.

*Description of the Civil and Military Stations of Delhi Surveyed in Season 1867-68, by E. T. S. JOHNSON, ESQ., Assistant Revenue Surveyor in charge of Cantonment Surveys.*

EXTRACTS FROM MR. COWLEY'S REPORT.—“This celebrated city, once the capital of India and residence of the Mogul Emperors, stands on the western bank of the Jumna river.

POPULATION.—“The population in 1845-46 was 160,279 including suburbs.

“As taken in 1867, 154,417 including ditto.

CITY WALLS.—“It is surrounded by an embattled wall, six miles in circumference, having seven principal gates, viz., the Ajmere, Cashmere, Mooree, Cabool, Lahore, Toorkaman, and Delhi gates.

“It was built by the Emperor Shah Jehan, who named it after himself ‘Shajehannabad.’

HOUSES AND STREETS.—“The houses, which vary from one to four stories in height, are mostly built of brick.

“The streets are narrow, like in all other Indian cities, with the exception of those leading to the gates which are wider; and each street is named after the business carried on in it, which is a great convenience.

RAILWAY TERMINUS.—“About one fifth of the city has been taken up for the East Indian line of Railway whose terminus is within the walls. A magnificent iron bridge spans the river Jumna. What would be the astonishment of the Emperor Shah Jehan, were he to rise one day and see the ‘Iron Horse’ coming snorting into his Imperial City!

JUMNA MUSJID.—“The Jumna Musjid, which is within the walls, is the handsomest place of Mahomedan worship I have seen.

“It is a quadrangular building built of red sandstone; the mosque itself being of marble; the ascent to it is by a flight of thirty-five stone-steps.” It has two minarets, from the top of which an excellent view of the city and surrounding country is obtained.

FORT OF KING'S PALACE.—“The fort formerly the Emperor's palace is now occupied by British Soldiers.

“It is also built of red sandstone. The walls are about sixty feet in height, and adapted to the use of musketry.

“It has now two principal gates. The ‘Victoria,’ formerly the ‘Lahore,’ and the ‘Alexandra,’ formerly the ‘Delhi gate.’

“Within the fort walls is situated the late King's Palace, Audience Hall, Queens' Bath, and the Pearl Mosque, all of which are made of white marble richly carved and gilded, and beautifully covered with flowers and leaves formed of precious stones. These were much destroyed in the mutiny; most of the stones have been picked out, and the gilding scraped off, but the authorities have recently surrounded them with an iron railing and placed a man in charge. There are also many other splendid Mosques, too numerous to mention here.

DELHI INSTITUTE.—“The Queen's Gardens, also within the walls, containing a menagerie, and the Delhi Institute are well worth seeing to a visitor to Delhi.

ENVIRONS OF DELHI.—“The environs of Delhi, for many miles to the south, are nothing but a mass of ruins and tombs, an awful scene of desolation!

ANCIENT DELHI.—“The streets and ruins of Ferozabad or ancient Delhi can still be traced.

“There are also many remarkable ancient tombs, as ‘Humayoon's Tomb’ and the ‘Kootub Minar,’ but as they do not lie within our circuit I shall pass them over.

OBSERVATORY.—“To the south-west of the city stands an old observatory similar to the one in Benares, and also built by the same individual, Rujah Jey Singh of Jeypoor. The gnomon is still in a state of preservation, but the less durable work is crumbling away.



**TOWNS.**—“Two large towns Puhargunge and Puharpoor have now formed outside the city walls, these were formerly villages.

“The disaffected whose property was confiscated during the mutiny have principally settled in them.

**RAJPORE CANTONMENT.**—“The old cantonment of Rajpoor is about two miles to the north of the city.

“It has been abandoned since 1857 on account of its being at such a distance. Nearly all the houses have fallen down forming little mounds; many of these were once strong and richly decorated dwellings.

“The ‘Bells of Arms’ and other buildings of masonry are still in a good state of preservation, though now only the haunts of swallows and bats.

**FLAG STAFF TOWER.**—“The ‘Flag Staff Tower’ situated on the ridge is a small building about 14 feet in diameter: this was the retreat of our countrymen in 1857; and there they were huddled together during the suffocating heat of the month of May!

**BARRICADES OF 1857.**—“Hindoo Rao’s house is a strong building of masonry, where one of our principal batteries was situated. Many barricades thrown up by our forces are also still standing.

**THE MUTINY OF 1857.**—“Delhi was the hot bed of the mutiny in 1857, and the rendezvous of all disaffected Sepoy Regiments. It was here that a small force of ours had to contend against thousands of their dastardly enemies, whom, however, they taught the strength of the British Arm. The last of the Mogul Emperors was here dethroned, and the prestige of the British Government re-established.

**SOIL.**—“The soil is very barren and rocky, nothing seems to thrive well. A low range of rocky hills runs north and south, forming a very prominent feature of the country. It is mostly covered with babool trees.

**WATER.**—“The water of most of the wells in the city tastes brackish, but the canal affords a good supply of fresh water, which, however, must be filtered to separate the suspended impurities.”

**CITY.**—Besides the ruins of Ferozabad, there are still more extensive ones of the ancient Hindoo City of Indraput or Indrapristha, the streets and lanes are still traceable by the pavements, although now below the surrounding country, which has been elevated by the ruins and buildings which stood there hundreds of years ago.

**MAGAZINE.**—The old magazine and arsenal within the city walls has now been converted to other purposes, the wall has been taken down, but the gate-ways are still left to mark the place made famous in Indian history by the blowing up of the Powder Magazine by Willoughby in the year of the mutiny, 1857.

The buildings within the walls have been converted into the post office, staging bungalow, and rest houses for soldiers.

**MANUFACTURES.**—Delhi is celebrated for its needle-work; the famous shawls of Cashmere are here embroidered with silk and gold.

The gold-smiths are famous for the delicacy and beauty of their work.

Delhi has always been a place of considerable trade, and much more so since the opening of the Railway; Europe goods of every description are taken from it to every part of the Rajpootana States, and the Punjab.

Since the mutiny a considerable portion of the city has been cleared away, and some of the closest built parts are now clear spots, enabling the troops and European residents to have a little more fresh air than formerly.

**TROOPS.**—The old cantonment of Rajpoor having been given up the troops are now located within the walls of the city, with the exception of a small detachment of Native Cavalry which is placed outside. The Europeans are located within the famous “Lall Killa” or King’s Palace. The natives at Duriya Gunge.

The troops consist of a wing of European Infantry, one Battery of Artillery, one Regiment of Native Infantry, and a small Detachment of Native Cavalry.

E. T. S. JOHNSON,  
*Asst. Revenue Surveyor, in charge.*

# APPENDIX.

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*Description of Civil and Military Stations in the North-Western Provinces surveyed in Season 1867-68 by E. T. S. JOHNSON, Esq., Assistant Revenue Surveyor, in charge of Cantonment Surveys.*

## BENARES.

**EXTRACTS FROM MR. COWLEY'S REPORT.**—"This celebrated city is situated on the north-western bank of the river Ganges, in N. Lat. 25°-18'26" and E. Long. 83°3'12", and takes its name from the Burna and Assee rivers between which it is situated.

"Like other towns in India, it has a second name more in use among the natives than that by which it is known to the world: this is 'Kassee.'

**CITY.**—"The city, which is about 3½ miles in length by 1½ in breadth, rejoices in the reputation of being the chief sacred city of the Hindoos and one of the oldest towns in the country.

"The view of the city from the opposite bank of the Ganges is exceedingly interesting. The 'Ghats' with their long flights of steps, the houses crowded together and interspersed with numerous temples, whose minarets only indicate their situation, quite conform to the idea of a fine native town.

**PILGRIMS.**—"The 'Ghats' are usually crowded with multitudes of people, performing their ablutions, among whom are found Hindoo pilgrims, from every part of India, come to make their devotions in the Hindoo Jerusalem.

**GHATS.**—"Many of the 'Ghats' have been built by Rajahs and rich 'Zemindars,' who have their agents among the Brahmins regularly to perform for them their devotions at the shrines, and thus obtain for them the favor of the gods!

**BEGGARS.**—"I have been told by the Brahmins, that the numerous beggars, with whom Benares is infested, go there in the hope of ending their life in that holy place, a custom to which great virtue is attached, inasmuch as by this act alone the individual may obtain the blessings of salvation.

**POPULATION.**—"The population, including suburbs, but exclusive of the Military, as taken in 1865, consists of Hindoos 7,21,684, Mussulmans and other castes 71,593, making a total of 7,93,277,\* but the number during some of the festivals and fairs must be swelled to double that number.

"The native part of the city is very closely built. The houses, made of chunar stone in the native style, are squeezed together, and vary from one to six stories in height.

**STREETS.**—"The streets are paved with stone, and are so narrow that it is impossible for a carriage to get in; and abruptly from their sides rise the lofty houses without verandahs, so that fresh air and light have no free access within. Nearly every respectable house has its temple with grotesque figures of native gods painted on the walls.

**GOLDEN TEMPLE.**—"Close to Bissessur Nath, the Golden Temple, is the well of holy water, which is well worth visiting. The temple is made of marble with a copper roof, which is gilded thickly with gold, and glitters splendidly when the sun shines on it. Here are crowds of priests making 'poojab,' and all clamorous for "Bucksheesh" the magic wand of the Indians. The fat Brahmin in charge of the well offered me some of the holy water, but on my telling him that it was unfit to drink, he became very indignant.

**RAJAH JEY SINGH'S OBSERVATORY.**—"There are also two other places worth visiting: Rajah Jey Singh's Observatory and the mosque usually known by the name of 'Madhodass-ka-Dhurrara.'

\* This information received from Collector.

"The former was built by Rajah Jey Singh of Jeypore. It consists of a huge gnomon, about 18 or 20 feet in height, built of stone, with an arc of a circle in proportion. The mosque is said to have been built on the site of a Hindoo temple at the time of the Mahomedan invasion to mortify the Hindoos. It is very high, and from it can be seen all the city and cantonments. From no other place can one get a better view of Benares than from the top of the minarets.

**ASPECT OF THE COUNTRY.**—"The country round about Benares is flat. There are some deep ravines on the banks of the Burna near its junction with the Ganges; those to the west of the Cantonment of Sikrol, though numerous, are of no great depth. The Burna is from 3 to 5 chains in width, and has a soft, muddy, or quick sandy bottom; it can only be crossed at certain places.

**GARDENS.**—"Benares has numerous gardens, chiefly of limes, flowers, oranges, guavas, and custard-apples. The first two are cultivated mostly as offerings to the gods.

**CULTIVATION.**—"The oranges are very sour, nothing like the delicious ones of Sikkim. Nearly all the Indian vegetables and cereals are grown in the district, and besides them sugar-cane and indigo; mango topes are abundant.

**TANKS.**—"Nearly every village has in it two or three stagnant pools of water, made by excavations for building purposes. Most of these dry up at the setting in of the hot weather.

"There are many natural and artificial tanks and ponds; but the place is full of wells, from which alone drinkable water is obtained.

"Benares, as might be expected, is the favorite residence of many Rajahs and Zemindars who come there in the decline of life to pass their last days.

**GRAND TRUNK ROAD.**—"The Grand Trunk Road passes through Benares to Allahabad. There are also good metalled roads to Jounpore, Gazeepore and Chunar.

"Benares has always been and still is a great commercial town, being the centre of a rich and populous district, and now that it is connected by rail with Calcutta, its produce and manufactures find ready sale and transport.

**CANTONMENTS.**—"The Military are located in two places, the Infantry and Artillery at Sikrol, and the Cavalry at Pandypore. The former is situated to the west of the city, and south of the civil lines, and the latter to the north of the Civil Station.

**RAJGHAT FORTIFICATION.**—"The fortification at Rajghat was occupied during 1857, but is now given up. The barracks and other buildings are still standing. The situation is favorable to Military purposes; and being elevated it entirely commands the town and the river. It is surrounded on the north and north-west by the river Burna, and on the east by the Ganges, whose steep banks form a formidable natural wall, which has been strengthened with masonry and thus extended to the south and south-west."

**RAILWAY, &c.**—Benares is now connected with the metropolis by the East Indian Railway, the Railway Station, which is  $540\frac{1}{2}$  miles from Calcutta, is situated on the opposite bank of the river Ganges. Traffic is carried on by means of a bridge of boats during the time of low water, but in the rainy season ferry boats are employed. On the city side of the river horse carriages can be had for the cantonments, which is about three miles away; the rate of hire charged is enormous, being three or four Rupees, whereas a carriage can be easily got for a Rupee for the same distance in cantonments.

**THE GANGES.**—The river Ganges at Rajghat varies according to the season, between 50 and 90 feet in depth, and in width between 600 and 1,000 yards. The larger size country boats are constantly passing up and down; steamers are also frequently seen on the river.

**SACRED BULLS.**—Since the year 1857, visitors must have noticed that Benares is now free of its sacred bulls, which formerly used to be a terror to passengers in the streets and narrow lanes. These animals are now very properly confined within enclosures, in consequence of an order issued by the Magistrate.

**COLLEGES, &c.**—Benares is well supplied with the means of education for its dense population in the Government College, Jai Narain's Free School, Government Normal Schools, and several schools carried on under the Missionaries.

**BENARES.**—Benares is a wealthy as well as industrious city ; its wealth is in a great measure derived from the rich presents that are continually being sent from all parts of India as offerings to its idols and priests.

Besides, it has extensive manufactures of its own in cotton, wool and silk, and its commanding position on the grand line of communication by the trunk road, river and rail, renders it an emporium of the neighbouring districts.

**CANTONMENTS.**—The Cantonment of Sikrol is situated to the west of the City of Benares and south of Burna river, has accommodation for one Battery of Artillery, half a Regiment of European Infantry and one of Native Infantry.

The Dragoon Lines are situated at Pandypoor, some distance to the north of the Burna river, the Civil Station running between the two. The communication between Sikrol on the one side, and Pandypoor and Civil Station on the other, is kept up by two bridges over the Burna : one of stone and the other of iron.

It is the intention of Government to form a new cantonment to the west of the present one, but nothing had been done up to the time of survey to mark out the boundaries.

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#### ALLAHABAD.

**EXTRACTS FROM MR. COWLEY'S REPORT.**—"Allahabad is situated near the junction of the rivers Ganges and Junna, the former being to the north and the latter to the south of the city. It is connected by rail with Calcutta, and is 629½ miles by rail from the metropolis. There is also good water communication between it and the capital through the river Ganges.

"The station is very straggling. Its length from north to south being about 5 miles, and its breadth about 4.

"The houses are not on one spot, but often separated by grazing grounds or portions of cultivated land.

**ASPECT OF COUNTRY.**—"The country is slightly undulating, and the banks of both the rivers are cut up by many and deep ravines.

**CITY.**—"The native part of the town is situated to the south-east of the New Civil Station ; it has only two or three principal streets, from which are narrow bye-lanes running through the city. Most of the houses are built of mud and have tiled roofs.

**CIVIL STATION.**—"The new Civil Station is very well laid out, and the gardens and houses look exceedingly neat. The station is still being extended westward, where, I believe, it is intended to build another cantonment.

**FORT OF ALLAHABAD.**—"The fort is situated at an angle formed by the junction of the two rivers. The shape and appearance of it is similar to Fort William. It is situated in a very strong position, commanding completely the two rivers and also the railway bridge.

"The natives consider this spot particularly holy from its being the confluence of the sacred rivers.

**FAIRS.**—"In the fort there is a subterraneous passage leading to a spring of holy water. In February a large fair is held to the south of the fort, to which thousands of pilgrims resort to procure water from the sacred streams, some of which they carry back with them to their homes hundreds of miles away.

**CANTONMENTS.**—"The Military are also very scattered, being located in three different places. The north cantonment is to the north, and the south cantonment to the south of the old Civil Station, and north-east of the new Civil and Railway Stations ; and south-west the fort.

PLACES OF NOTE.—“The ‘Koosroo Bagh’ is the only remarkable old edifice in Allahabad, it is a quadrangular building enclosing a garden, in the centre of which stand three mosques, which are the tombs of Sultan Koosroo and his queens. They are made of marble and have domes handsomely painted.”

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SEAT OF GOVERNMENT.—Allahabad, since the mutiny, has been made the seat of the Government of the North-Western Provinces ; many fine public buildings are in consequence being raised, among them the public offices and High Court.

The new Military station is being raised to the west of the new Civil lines or “Cannington.” The boundary of the new cantonment has been fixed on the north and east, but that to the south and west had not been decided upon.

FORTIFICATION.—For the purpose of adding greatly to the strength of the place, it is proposed to construct a line of intrenchment from river to river, and extending four miles in length, this again to be protected by three redoubts, two at the extremities and one in the middle, thus enclosing the city, fort, civil and military lines in one extensive fortification.

TROOPS.—The troops located in the cantonments are three Batteries of Royal Artillery, one Regiment of European Infantry, one of Native Infantry, and a Detachment of Native Cavalry, but a greater number of troops can be located here as there is plenty of accommodation for them.

RIVER STEAMERS.—The river steamers here end their voyage up the river, the water being too shallow to admit of their going further up, although occasionally an odd one has gone up as far as Cawnpore during the rainy season.

# REPORT

OF THE

## Revenue Survey Operations

OF THE  
**NORTH-WEST PROVINCES—ROHILCUND,**  
**For Season 1867-68.**

1. **WORK RESUMED IN DISTRICT BAREILLY.**—Operations were resumed in District Bareilly Mr. J. Campbell, Assistant Revenue Surveyor, 1st grade, in charge. at the end of October 1867, and the following Pergunnahs, and area were surveyed :—

|   | No. of villages. | Square miles. |
|---|------------------|---------------|
| AREA.—Pergunnah Nawabgunj (portion of) ... .. | 210              | 135.51        |
| Pergunnah Crore (portion of) ... ..           | 186              | 92.69         |
| Pergunnah Beesulpoor (portion of) ... ..      | 205              | 185.70        |
| <b>Total</b> ... ..                           | <b>601</b>       | <b>413.90</b> |

2. **LIABLE TO SLIGHT ALTERATIONS.**—The areas of Pergunnahs Nawabgunj, and Beesulpoor will undergo slight alterations, as the boundaries of some villages along the common line were still unadjusted when the survey left the field.

3. **CANTONMENT OF BAREILLY.**—The Cantonment, Town, Civil Station, and 2 miles of environs around Bareilly, were surveyed very minutely on the scale of 16 inches = 1 mile, the area surveyed on this large scale being 31 square miles.

4. **TOTAL AREA.**—The total area of the season thus stands at 444.90 square miles.

5. **CHECK SURVEY.**—The check survey of the interior, or detail, survey carried through this area amounted to 90½ linear miles ; 104 villages out of 601 (or 17 per cent.) having been thus tested by the Sub-Assistants of the party. The check lines closed at short intervals on village stations, a continuous line being found impracticable owing to the obstruction offered by sugarcane fields. The check survey lines “ show that the detail work has been carefully done.”

6. **CONNECTION WITH GREAT TRIGONOMETRICAL SURVEY.**—The work of the season is connected with two\* Principal Stations Great Trigonometrical Survey. Omra falls within the limits of Pergunnah Beesulpoor, and Gajnera just beyond the southern boundary of Pergunnah Nawabgunj. The comparison of the direct distances between the Station of Omra and those of “ Kulianpur” and “ Kaimkhera” which were included in last season’s work, and as derived from Great Trigonometrical and Revenue Survey data, are given below. The results are very satisfactory.

| GREAT TRIGONOMETRICAL SURVEY STATIONS. | DISTANCES IN FEET.               |                    | Error of Revenue Survey. | Error per mile. |
|--|----------------------------------|--------------------|--------------------------|-----------------|
|  | By Great Trigonometrical Survey. | By Revenue Survey. |                          |                 |
| Kulianpur to Omra ... ..               | 58,952.8                         | 58,965.7           | 12.9                     | +1.2            |
| Kaimkhera to Omra ... ..               | 53,136.8                         | 53,165.0           | 28.2                     | +2.8            |
| <b>AVERAGE ERROR</b> ... ..            | ...                              | ...                | ...                      | +2.0            |

\* Omra, North-East Longitudinal Series.  
 Gajnera, Rangir Meridional Series.

7. DEMARCATION.—The Surveyor states that “except in the eastern portion of Pergunnah Beesulpoor, and along the boundary common to Pergunnahs Nawabgunj and Beesulpoor—where no masonry platforms had been erected prior to survey—the village tri-junctions were, as a rule, permanently marked, and, wherever practicable, were used as survey stations.” When the survey first took the field, the demarcations were found to be very imperfect, and difficulty was experienced in getting the villagers to point out their boundaries. After some delay this was remedied, and the survey progressed more rapidly.

8. THAKBUST MAPS.—Thakbust maps were only furnished after the survey had taken the field, and some of those sent back for revision in April were not returned to the Surveyor for re-comparison till September 1867. This delay has retarded the completion of the professional maps and areas, which cannot be submitted until the commencement of the field season of 1868-69, enables the Surveyor to insert the correct boundary, and adjust the areas of the affected villages. “The thakbust maps are by scale and compass, and generally agree well with the professional maps.”

9. LEVEL BENCH MARKS.—The Surveyor had instructions to take up all the bench marks erected by the Public Works Department, but on this subject, he thus reports:—“I could not find any of the marks. No masonry pillars or platforms were erected, but earthen mounds only, with a trench around. These, however, were invariably and systematically obliterated by the villagers, so that no clue whatever could be got of the levelling mark pins. I myself thought it strange that I could find no bench marks, and thought that pegs or mark pins only had been used as a preliminary measure; but the stations were well secured by Captain Thomason, and could have been easily and accurately closed upon, had the villagers not proved so very obstructive.”

10. OBSTRUCTIVE CONDUCT OF VILLAGERS.—“The villagers acted similarly with the survey stations, ploughing them up, or otherwise destroying them, without fear or hesitation, thereby causing serious inconvenience and trouble,” when the stations had to be closed upon.

The only remedy for this kind of obstruction is to hold the zemindars of villages personally responsible for the preservation of bench marks and survey stations.

11. PLATFORMS TO BE USED AS BENCH MARKS.—The Executive Engineer, Captain Thomason, informed the Surveyor that he now intends to use the village tri-junction masonry platforms as bench marks wherever met with; and, as these points have been, or will be, adopted as Revenue Survey Traverse Stations, our maps will show numerous bench marks all over the district. This will I hope counteract the mischief which would otherwise result from the conduct of the villagers.

12. ASSISTANTS.—The Surveyor reports favorably of his Assistant, whose conduct, he says, has been excellent, and who has worked steadily and hard.

The Native Surveyors have also as a body worked well.

13. PROGRAMME FOR 1868-69.—The party will this field season finish Pergunnahs Nawabgunj and Beesulpoor, and then move into and take up Pergunnah Fureedpoor of the Bareilly District.

14. A Statistical and Geographical Report of the country surveyed, will be found in the Appendix.

JAMES E. GASTRELL, *Colonel,*

*Supdt. Revenue Surveys, U. C.*

SUPDT. REVENUE SURVEY'S OFFICE; }  
Calcutta, 23rd November 1868. }

## APPENDIX.

*Description of country surveyed in District Bareilly, Season 1867-68, by JAMES CAMPBELL, Esq., Assistant, Revenue Surveyor, Rohilkund Division.*

I.—Pergunnah Nawabgunj is situated between  $28^{\circ}34'$  north latitude and  $79^{\circ}34'$  east longitude, and is bordered by Pergunnahs Jehanabad, Richah, Crore, Fureedpoor and Beesulpoor.

II.—The country is flat and well cultivated. The crops are, wheat, paddy, the various species of pulse, sugar-cane and cotton, &c. It is intersected by the Kylas, Pungeilec, Ubsera, and Bygool Nuddees; and on its eastern borders, by the Deoha River, numerous old discarded beds of these rivers occur. The difference in sea level height between the Kaliajpoor Great Trigonometrical Survey station, which is a short distance north of the boundary of this Pergunnah, and the Gajnera Great Trigonometrical Survey station, which is close to its extreme southern limits, is  $26\frac{1}{2}$  feet in a total distance of  $18\frac{1}{2}$  miles, thereby showing an average fall of  $1\frac{1}{2}$  foot per mile.

III.—The high road leading from Bareilly to Pileebheet traverses this portion of the district, passing through Nawabgunj Khas, the chief village of the Pergunnah, and also through Hafizgunj, another village of note. The Tehseelee and Thannah are located at the former, and there are police outposts or chowkees at Hafizgunj and "Behar-Man-Nugla"; weekly markets are likewise held in Nawabgunj and Hafizgunj and also in Koelurea and Madho-Nugla.

IV.—Only that portion of Pergunnah Crore which lies eastward of the road from Bareilly to Pileebheet was surveyed in 1867-68, and is situated between  $28^{\circ}14'$  north latitude and  $79^{\circ}45'$  east longitude. This tract of country resembles Nawabgunj a good deal in general appearance and in the crops grown; it is intersected by the Bygool and Nukutea Nuddees, the latter flowing close along the eastern boundary of the Bareilly Cantonments; the Dooreenea Nuddee flows close past the western skirts of the town, and a little further on joins the Doojora, which in its turn loses itself in the Ramgunga River.

V.—The Military Cantonment is situated south of the town, the civil station lying between them. So greatly has the Military Cantonment altered since 1857, that no one then acquainted with it would now be able to recognize a single feature, the low mounds of broken brick, the pucca wells and traces of garden roads and walks, though now but faintly discernible, show, notwithstanding, how very sweeping the change has been; nor are marks wanting of what occurred in 1858, the solitary tombs met with here and there of Officers of the 42nd Highlanders, who fell in the skirmishes with the enemy, telling the then oft-repeated tale of native hatred and resistance. There is great reason to believe that Bareilly is one of the most fanatical and ill-disposed towns in the North-West, nor is the feeling confined to the town alone, it is perceptible far and wide throughout the district. The visit paid by two Russians in March and April last did no good, in fact, if the statement of a French gentleman, who met and conversed with them, is at all reliable, the object of the Russians was undoubtedly to sow the seeds of future trouble.

VI.—The eastern portion of Bareilly is known as the old, and the western as the new, town, the Tehseelee and Peshkarec being located midway at the junction of several important roads. There are numerous gardens of guava, custard-apple and orange trees around the town; there are also a few rose fields, and numerous vegetable plots.

VII.—The Cantonment is bounded on the west by sand hills, and further out by an extensive tract of a low swampy ground under paddy cultivation, and which is believed to be an old discarded bed of the Ramgunga River. There is a considerable fall close along the southern boundary likewise, and a gradual slope eastward to the Nukutea Nuddee.

VIII.—High roads, metalled and bridged, branch off to Shahjehanpoor, Pileebheet, Nynee Tal, Moradabad and Budnon; a good road to Beesulpoor is likewise under construction.



IX.—The northern portion of Pergunnah Beesulpoor formed the third and last circuit of the season, and is situated between  $23^{\circ}16'$  latitude and  $78^{\circ}33'$  longitude. It is separated from Pergunnah Poorunpoor to the eastward by the Kunhout Nuddee, which is more properly a swamp, intersected by numerous deep channels hidden from view by dense tangled jungle, and with long low grassy glades between the water and the high banks on either side from which the forest commences.

X.—The jungle tract in the north-eastern portion of Pergunnah Beesulpoor, is a continuation of the great western belt of Poorunpoor forest, which connects with the great Terrai. The strip of forest in Beesulpoor, has a mean breadth of  $4\frac{1}{2}$  miles, and extends down to the junction of the Kawa and Kunhout Nuddees on the borders of District Shahjehanpoor, and has a total length of about 9 miles; it is almost entirely included in two villages, which have a total area of 34 square miles between them.

XI.—The forest is comprised of "Sál," "Kyma," "Doodhee," "Keerecara," and "Umlona," trees with an odd "Dhak" tree here and there, and a tolerably thick undergrowth of "Kuwounda," and "Mohkoe" bushes; the banks of the Kawa and Kunhout Nuddees are lined with the wild "Jamoon," and "Beusa" trees.

XII.—Along the Deorea boundary, there are six well known fords or ghâts of the Kunhout, viz., "Soorghutea," "Burraghat," "Semulghat," "Kootaghutea," "Georgeaghat," and "Mochaghat," and along the Deonha boundary there are seven crossings, viz., "Tyghuta," "Korooghat," "Burooeghat," "Kyhaghat," "Gyghata," "Kosmeeghat," and "Singahaghat."

XIII.—There is a remarkable rise in the ground on the western border of the jungle opposite Muhud and Ramnuggur; the fall towards the Mala or Kawa Nuddee is most marked; within the jungle the ground is undulating between Muhud and Deonha, and the same sort of undulating ground occurs in the forest east of Deonha.

XIV.—The villages bordering the forest have the appearance of being prosperous and thriving. Though the country is supposed to be disarmed, it is surprising how well supplied the villages are with fire-arms, as is evidenced, not only by the number of shikarees met with, but on the occasions of family rejoicing the volleys fired proved that guns by the score could be collected in any one place.

XV.—The road from Beesulpoor Khas to Pileebheet is the only really good one met with in this sub-division; there is a cut road from Beesulpoor to Deorea, but it is neither metalled nor bridged, and is scarcely superior to the ordinary village cart roads.

XVI.—The Kutna Nuddee which takes its rise in Pergunnah Pileebheet flows through the centre of the Pergunnah, half-way between the Dooha River and Kunhout Nuddee.

XVII.—There are police stations at Deorea and Burkhera, and weekly markets are held in both these villages, as well as in Pipra, Shergunj, Sohas, Simra and Kishnee.

XVIII.—Irrigation is practised in all three Pergunnahs from "kutchha" wells and jheels; a great deal depends upon the annual rainfall, as the water collected in the hollows and jheels is drained off and utilized for the rubber crops.

J. CAMPBELL,  
Assistant Revenue Surveyor,  
In charge Rohilkund Survey.

ASSISTANT REVENUE SURVEYOR'S OFFICE, }  
NYNEE TAL; }  
The 1st October 1868. }

## Revenue Survey Operations

IN

SINDH

For Season 1867-68.

Captain D. Macdonald, S. C., Revenue Surveyor, 3rd Grade.

ASSISTANTS.

Mr. M. E. Loftie, Civil Assistant, 3rd Grade.

„ H. Dowman, Sub-Assistant, 3rd Grade.

„ P. Ford ditto ditto.

„ J. Connor ditto ditto.

„ T. Dunne ditto ditto.

22 Native Surveyors, &c.

On the 13th November 1867, the first of the field parties left recess quarters at Hyderabad, and, before the close of the month, all hands had settled down to the new season's work.

2. COUNTRY SURVEYED.—The tract of country surveyed formed parts of two districts, viz., the remaining portion of Mahomed Khan's Tanda of the Hyderabad Collectorate, and part of Shahbunder in the Kurrachee Collectorate.

3. TALOOQUAS BAGA-KA-TANDA AND BUDDEENA.—The first consisting of portions of Talooquas Baga-ka-Tanda and Buddeena, is a long narrow belt of country, about 50 miles in length from north to south, by 12 or 13 miles in breadth, between the parallels of  $\frac{24^{\circ}18'}{25^{\circ}1'}$  north latitude, and the meridians of  $\frac{68^{\circ}56'}{69^{\circ}22'}$  east longitude, with a gross area of 4,60,308 British acres=719 square miles.

4. BOUNDARIES.—To the north and west, this tract abutted on old work of former seasons; on the east it is bounded by a supposed old bed of the Indus, called "Doora Pooran," which separates it from the Thur Parkur Political Superintendency; on the south lies the great Runn of Cutch.

5. TALOOQUAS MEERPOOR BUTTARA AND BELA.—The second tract consists of Meerpoor Buttara and Bela, the two northern Talooquas of District Shahbunder, the only portion of the Kurrachee Collectorate situated on the left bank of the Indus, lying between  $\frac{24^{\circ}26'}{25^{\circ}01'}$  north latitude, and  $\frac{68^{\circ}02'}{68^{\circ}27'}$  east longitude; it averages 32 miles from north to south, and 24 miles from east to west, including an area of 4,01,146 British acres=627 square miles.

6. BOUNDARIES OF DITTO.—The river Indus bounds it to the north and west; the Moolchund Canal to the east separates it from Mahomed Khan's Tanda District, and to the south it is bounded by Jatee, an unsurveyed Talooqua of the same district.

7. TOTAL SEASON'S AREA.—Besides the above, a part of the Runn of Cutch, south of Buddeena, and the Indus river bordering the season's work, were surveyed, the areas of which, amounting to 75,756 British acres=118 square miles, brought up the total area of the season to 9,37,210 British acres=1,464 square miles. The outturn is good.

8. The whole of the detail or interior survey "has been very extensively purtalled, "and with very satisfactory result. No less than 407 miles of check lines have been run by the "Sub-Assistants." \* \* \* "There is hardly a single board plan through which a check line "has not passed." \* \* "I have only," says the Surveyor, "been under the necessity of

"ordering three or four revisions during the whole field season. I have also examined every purtal that has been run through the work; so far I am satisfied that the work is good, "honest and reliable." This is very satisfactory.

9. CONNECTION WITH GREAT TRIGONOMETRICAL SURVEY.—Twelve principal stations of the Great Trigonometrical Survey of India\* were met with and carefully connected with the season's work. The results of the comparison of the Revenue Survey direct distances with those of the Great Trigonometrical are given below:—

Of the Great Longitudinal Series.

- \* 1. Dadoori H. S.
- 2. Helayah H. S.
- 3. Farraha T. S.
- 4. Marab-ka-Shehur T. S.
- 5. Pungra T. S.
- 6. Ameer Shah T. S.
- 7. Adoori T. S.

Of the Aboo Meridional Series.

- 8. Bibi Miriam H. S.
- 9. Vikia T. S.
- 10. Randah T. S.
- 11. Khar T. S.
- 12. Gaddha T. S.

| Names of Great Trigonometrical Stations.         | Direct distance by Great Trigonometrical Survey. | Direct distance by Revenue Survey. | Error of Revenue Survey. | Error per mile. |
|--|--|------------------------------------|--------------------------|-----------------|
|  | Fect.  | Fect.                              | Fect.                    | Fect.           |
| Adoori T. S. to Farraha T. S. ... ..             | 55091.0  | 55058.8                            | —32.2                    | 3.1             |
| Ditto to Pungra T. S. ... ..                     | 51894.2  | 51888.3                            | —5.9                     | 0.6             |
| Farraha T. S. to ditto. ... ..                   | 57636.2  | 57550.4                            | —85.8                    | 7.9             |
| Ditto to Marab-ka-Shehur T. S. ... ..            | 59613.5  | 59595.0                            | —18.5                    | 1.6             |
| Pungra T. S. to ditto. ... ..                    | 54408.0  | 54399.4                            | —8.6                     | 0.8             |
| Farraha T. S. to Ameer Shah T. S. ... ..         | 57383.0  | 57398.7                            | +15.7                    | 1.4             |
| Marab-ka-Shehur T. S. to Ameer Shah T. S. ... .. | 60465.2  | 60397.3                            | —67.9                    | 5.9             |
| Dadoori H. S. to Helayah H. S. ... ..            | 61691.7  | 61662.3                            | —29.4                    | 2.5             |
| Khar T. S. to Gaddha T. S. ... ..                | 58802.0  | 58744.4                            | —57.6                    | 5.2             |
| Ditto to Randah T. S. ... ..                     | 51035.5  | 50938.7                            | —101.8                   | 10.6            |
| Randah T. S. to Gaddha T. S. ... ..              | 60996.5  | 60959.0                            | —37.5                    | 3.2             |
| Ditto to Vikin T. S. ... ..                      | 68457.2  | 68466.4                            | +9.2                     | 0.8             |
| Khar T. S. to ditto ... ..                       | 51127.9  | 51112.5                            | —15.4                    | 1.6             |
| Vikia T. S. to Bibi Miriam H. S. ... ..          | 79701.7  | 79516.9                            | —184.8                   | 12.3            |
| Randah T. S. to ditto ... ..                     | 47431.8  | 47330.4                            | —101.4                   | 11.3            |
| Average where the error is + ... ..              | ...  | ...                                | ...                      | 1.1             |
| Ditto ditto — ... ..                             | ...  | ...                                | ...                      | 5.3             |

Most of these differences show the Revenue Survey measurements in defect instead of excess. This is probably owing to the slipping forward of the back pin when chaining over the sandy soft soil of this part of India. The results, however, are generally very good.

10. BOUNDARY MARKS.—Wherever deb, or village, triple-junction stone pillars were found, and it was possible to adopt them as Theodolite stations, it was invariably done. All intermediate stone boundary pillars that it was possible to utilize were likewise so adopted. In this manner 316 masonry, and stone, triple-junctions, and 249 stone boundary pillars, have been incorporated in the work, and made Theodolite stations, giving a total of 565 fixed points on boundary to assist the local or other authorities in identifying and laying down, hereafter, from the field books, the boundaries finally demarcated and surveyed this season.

11. LEVEL BENCH MARKS.—The Surveyor was instructed to search for, connect upon, and map correctly both on the maps of present season, and hereafter, if possible, on the maps of the Province of Sindh already sent into this office, the bench marks shown in Colonel Tremembere's map of Sindh published in four sheets in 1867, my object being to make the 1 inch=1 mile sectional maps of Sindh, now being published in Calcutta, as fully and generally useful for all departments as possible.

12. On this subject Captain Macdonald reports as follows:—"On enquiry I find that "only those stations marked with Roman numerals are bench marks." \* \* "I have had them "searched for, and have succeeded in finding only one," *i. e.*, in present season's work, "and that "was covered with earth. The fact is, they lie along the lines of principal canals, and are "generally covered with earth, which has been either excavated from the canal, when first "excavated, or else been thrown out on the bank during the annual cleaning out of the bed of

"the canals. I am afraid it will be no easy task to hunt up all the bench marks and show them on the board plans of past seasons, particularly as the villagers in their neighborhood appear to know nothing about them, and are unable to point them out. I have written to the Superintending Engineer of the Irrigation Department, Sindh, suggesting that the triple-junction pillars, be converted when met with into bench marks, and he has, I believe, directed this to be done."

13. This last is a move in the right direction, and, if adopted, will afford an easy and most economical plan of perpetuating these valuable records of the general contour of the country; I strongly advocate its being enforced as a rule in all leveling operations for the future. It will immensely increase the value of the village survey, and of the final maps, whether they be already published, or not. In either case it will be easy to enter the level data on the maps when published for issue.

14. DEMARCATION.—The demarcation and the boundary maps prepared by the Settlement Department are both very favorably reported upon. In the few cases where boundary pillars could not be found, or, being found and surveyed, discrepancies were apparent on comparison with the settlement maps, the officer in charge of that department preferred in all cases adopting the boundary as found in the field and mapped by the professional survey as final, and the thakbust or settlement maps were altered accordingly.

15. No comparisons of detail areas were made this season in the field, as the settlement is in this respect in arrears of the professional work; "in fact," the Surveyor writes, "ground, that we surveyed in 1864-65, was being settled this year." Where comparisons had been made of this work the results are said to have been "fair."

16. WORK FOR PRESENT SEASON, 1868-69.—During the ensuing field season one field camp will be sent into Oomurkote to survey the plains there, and another camp will be formed in, and for the survey of, the desert. There is not much work in either, though the area will be large probably, and the Surveyor hopes by the end of February to complete both, and then take up what remains of the unhealthy and low-lying tracts of Shabbunder.

17. REMAINING FOR SURVEY IN SINDH.—Including the desert tracts there remain now for survey in Sindh, about 8,300 square miles. Should nothing unforeseen occur, the Surveyor contemplates completing the survey of the province in two more field seasons, and be free for work in some other part of India in 1870-71.

18. ASSISTANTS.—The reports of the manner in which all the European assistants and native subordinates have worked in field and in office are highly satisfactory.

19. GEOGRAPHICAL AND STATISTICAL REPORT ON DISTRICT MAHOMED KHAN'S TANDA.—On the completion of the survey of District Mahomed Khan's, Tanda, the Surveyor, Captain D. Macdonald, submitted a Statistical and Geographical Report, with skeleton index map, of the district. These have been sent to press for publication and issue.

JAMES E. GASTRELL, *Colonel,*

*Supdt. of Revenue Surveys, Upper Circle.*

SUPDT. OF REVENUE SURVEYS' OFFICE; }

*Calcutta, 26th November 1868.* }



# Revenue Survey Operations

## NORTH-WESTERN FRONTIER, PUNJAB,

For Season 1867-68.

### 1. GENERAL DESCRIPTION OF WORK PERFORMED IN 1867-68.—

Lieut. Col. H. C. Johnstone, S. C., Revenue Surveyor, 1st grade.  
*Assistants.*  
 Lieut. J. E. Sandeman, S. C., Assistant Revenue Surveyor, 1st grade.  
 Mr. G. Housden, Civil Assistant, 1st grade.  
 „ W. H. Reynolds, Sub-Assistant, 2nd grade.  
 „ A. J. Gibson, „ 3rd grade.  
 Baboo Huri Sing, „ 3rd grade.  
 Mr. G. B. Scott, „ 4th grade.  
 „ W. J. Smith, „ 4th grade.  
 16 Native Surveyors, &c.

The greater portion of the establishment of this party, under Lieutenant Colonel Johnstone, moved again into, and resumed the survey of, District Huzara early in October 1867, the remainder followed soon after, and all continued actively employed, until, in December, the severity of the winter put a stop to all further

out-of-door work, and all then retired to Rawul Pindee to bring up mapping, &c.

In January 1868 the Surveyor, with one Assistant and six Native Surveyors, proceeded to the Eusofzai District, and completed by the middle of February the small portion of survey remaining there in the Loondkhur Valley. All hands took the field again in Khagan and Upper Huzara in April, and remained out until operations were closed in August 1868 by the disturbances on the Ugrore border.

### 2. SURVEYOR JOINS HUZARA FIELD FORCE.—

The Surveyor then proceeded, by order of Government, to join the Field Force assembling under Major General Wilde, C. B., taking with him an efficient staff,\* to survey and map the country traversed by the troops, and generally to gain and record such further information of the neighbouring country, as might be possible, either by reconnoissance or from the inhabitants. How he and his assistants performed this duty may be best stated in the words of the Major General Commanding:—

\* Four European Assistants.  
 Two Native Surveyors.  
 Measurers, &c.

“ Much of the success of the late expedition is due to the talents and labors of Lieutenant-Colonel H. C. Johnstone, of the Survey Department, whose services were fortunately placed at my disposal. I would refer to the remarkable correctness of the sketch map this Officer prepared from Native information before we entered the hills. Lieutenant-Colonel Johnstone served in the Cabul Kheyl and Mahsood Wuzerec Expeditions, and also at Umbeyla. I trust this occasion may be availed of to reward this most devoted and excellent public servant.”

3. Six Native Surveyors were permitted by the Civil and Political Authorities to continue surveying in certain parts of the Huzara District, but all Europeans were withdrawn; the remainder of the establishment then proceeding to Murree to bring up calculations, mapping, &c.

4. COUNTRY TRIANGULATED, AND AREA.—In last Annual Report it was stated that the Valleys of Ugrore and Konsh only remained for triangulation. These were completed in November 1867 and April 1868. A few more stations were also fixed by triangulation in the Pogurmung Glen and the Pukli Valley in April 1868, and a net work of triangles was thrown over the Station of Abbottabad to aid the ant Comment Survey. This completed the triangulation of the Huzara District. The area triangulated in 1867-68 amounted in all to about 211 square miles.

In addition to the triangulation in Huzara, a large portion of the Murree and Kuhoota Tehseels of the Rawul Pindee District was triangulated; but this work was discontinued on its being finally determined to make a skeleton boundary survey only of these tehseels and not to resume the topography which had already been done by Lieutenant Colonel Robinson, R. E., in 1849-50.

5. AREA OF TOPOGRAPHICAL AND DETAIL SURVEY.—An area of 1373.5 square miles of mixed topographical on the scale of 2 inches=1 mile, and of revenue on the scale of 4 inches=1 mile, was finished in Huzara; in the Loondkhwur Valley an area of 117.2 square miles of village survey was done, giving a grand total during the season of 1867-68 of 1490.7 square miles. The survey of Abbottabad was also well advanced, and will be completed by the end of December 1868.

6. CHECK SURVEY.—The checks on the truth of the detail survey varied according to the nature of the country. "The Surveyor himself took completed sheets, and marching straight across country set up his plane table at numerous points daily, and thus satisfied himself of the correctness of the work. He also visited the various survey parties, and tested their work as it progressed." Again, the European Assistants sketched in the hill features on sheets on which the cultivation, streams, roads, &c., had been laid down from the survey made by Native Surveyors, and "thus their work was thoroughly checked." In the Loondkhwur Valley Survey the usual check lines were run across country. "The results of all the purlals, or check surveys were," says the Surveyor, "most satisfactory."

7. REMAINING FOR SURVEY IN HUZARA.—Seven hundred and forty-five square miles still remain for survey in Huzara, of which 652 square miles are hills to be done on the 2 inches=1 mile scale; and 93 square miles are plains and villages to be surveyed on the 4 inches=1 mile scale.

8. COMPLETION OF WORK IN HUZARA DELAYED.—In reporting last season on the state of the work in Huzara I stated: "The whole of the field work of Huzara, the Surveyor contemplates, may be completed by the end of December 1868." This would have been verified, as from May onwards the weather was unusually fine, the work progressed rapidly, and the entire topography of Huzara would have been finished easily, but unfortunately disturbances broke out in the Ugrore Valley at the end of July, and all along the Frontier the district of Huzara was likely to be more or less unsettled. The Commissioner of the District, Major Pollock, at once addressed the Surveyor, fully explained the state of affairs, and requested the withdrawal of all survey parties from the district, excepting the six Native Surveyors and their parties, which, as before mentioned, he subsequently agreed might remain.

9. SURVEY PARTIES WITHDRAWN TEMPORARILY.—Orders were accordingly at once issued for all parties, European and Native, to proceed to Manserah, which they reached by the middle of August.

10. SURVEY PARTY ATTACKED.—Mr. Scott, Sub-Assistant Surveyor, 3rd grade, who was working at the northern end of the Pogurmung Glen, did not receive his instructions as soon as the others, and was still working, when one day his attention was drawn to bodies of armed men collecting on an opposite hill; he at once retired to his camp, and acting on the advice of two chiefs, who were with him, packed up his baggage and despatched it off at once. He, however, decided on remaining, as he came to the conclusion that if he retired, hampered with baggage, and was followed up by the numbers collected on the hill, he and his party must be cut up.

11. He had with him a guard of 20 men of the 2nd Punjab Infantry, and two hill chiefs and about one hundred of their followers. Shortly after erecting a "sungur," or stone breast-work, he and his party were attacked; but fortunately as the enemy came on, Mr. Scott and his men shot the leader and five men, and the attacking party retired upon the main body again.

12. Night was approaching and with it fogs came also. Under cover of the darkness and obscurity Mr. Scott commenced his retreat, leaving a couple of the Chiefs' followers to watch the enemy, who again came to the attack of the breast-work, and finding it vacated, followed up Mr. Scott and his party. They had, however, secured a good start, and pushing on steadily for 50 hours reached the Shinkiare Thannah station in safety.

13. Mr. Scott's, and his party's, escape appears to have been entirely due to his discretion and pluck; I consider him deserving of great praise for his gallant conduct, and I have therefore much pleasure in recounting this stirring event in a Surveyor's life on the frontier.

14. EMPLOYMENT DURING 1868-69.—During the present season the establishment will be employed in finishing what remains of Huzara; in making a skeleton boundary survey of the Murree and Kuhoota Tehseels of the Rawul Pindee District; in completing the surveys of the Cantonments of Attock and of Abbottabad; and finishing up all the records,

Letter from the Secretary, Government of India, Foreign Department, to the Secretary to the Government of the Punjab, No. 987, dated 7th September 1868.

India in September last.

maps, and plans connected therewith leaving, it is hoped, the whole party free next October to enter and commence the survey of the State of Buhawalpore, as sanctioned under the orders of the Government of

15. The Surveyor acknowledges the services of his assistants, "all of whom have conducted themselves with the zeal of past years."

J. E. GASTRELL, *Colonel,*  
*Supdt., Revenue Surveys, Upper Circle.*

SUPDT. REVENUE SURVEYS' OFFICE, }  
CALCUTTA, }  
*The 2nd December 1868.*