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Volume V
1844 to 1861
ANDREW WAUGH

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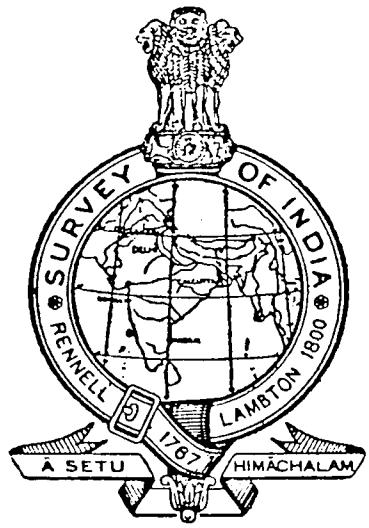

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Although there had been a mutiny of troops at Aurangābād, and gangs of Rohillas[1] had attacked the Residency at Hyderābād, the party took the field in October 1857, with three sub-assistants and five Indian surveyors. Towards the end of the season McGill found his area overrun by troops of the rebel leader Tantia Topi, and the Surveyor General asked the Resident for an escort [485–6] ;

This pergana, altho' of no value per se, is...part of a tract the survey of which should be completed and free from all gaps. ... Mr. McGill acted judiciously in retiring, the Rohillas having twice advanced to threaten his party. ... It will, however, be very desirable to complete the undertaking next season, and I would strongly recommend...an additional guard.

When I carried the Great Arc series through that jungly tract in 1838–9 [IV, 42, 473], an escort of 50 horsemen was assigned to me, ... but finding the country quiet, and the inhabitants well affected, I was enabled after a short time to dispense with so large an escort[2].

In December 1858 McGill had to withdraw hurriedly from a strong party of Tantia's men, and Mulheran had to divert his triangulators to the south. He himself was running a series of triangles eastwards from the Great Arc towards Nāgpur to fix points for Vanrenen's revenue survey party [268] which

he accomplished in his usual...able style, but his progress was frequently interrupted by the disturbed state of the country and the vicinity of bands of rebels under Tantia Topi and others who were scouring across his line of operations. He himself and...his detached parties were several times in danger, but...the work was successfully carried out[3] [485–6].

For season 1860–1 Mulheran had six sub-assistants[4] and as many Indian surveyors, and completed survey of the British-administered districts north of the Penganga. Whilst McGill took a share of the triangulation, Andrew Chamarett, a first-class planetabler like his father before him [IV, 256–7 382], was responsible for training and supervision. The survey of the Nizam's Dominions with the "assigned districts" of Berar was completed by the end of season 1865–6, 20,578 square miles having been added by Mulheran since 1855.

NĪLGIRI HILLS, 1844–52

The Nilgiri Hills had been topographically surveyed on the one-inch scale by Benjamin Ward between 1821 and 1823 [III, 111–3]. In 1843 the Directors called for a large-scale survey of the cultivated areas for revenue purposes, and in March 1844, John Ouchterlony of Madras Engineers was appointed to the charge[5]. He was placed under the professional direction of the Deputy Surveyor General at Calcutta, and furnished with instruments from the Nellore topograpaical survey that had just been closed down. Charles MacMahon, also of that survey, was posted to his detachment.

The Surveyor General thought Ouchterlony should make a topographical survey on the lines of Wroughton's survey of Sohāgpur of 1841–2 [IV, 228], basing his triangles on Lambton's Great Arc that passed through Coimbatore. He supported Wroughton's instructions with an elaborate note on the conduct of trigonometrical surveys[6] [IV, 476 ; V, 297]. What the Directors had actually called for, however, had been a large-scale survey for registration of grants of land ;

You should be provided with a detailed survey and map of the Neilgherry Hills, distinguishing the lands in the occupation of the Government and private individuals—those brought under cultivation by the Burghers—those which are to be left in the permanent occupation of the Todas—and those entirely unoccupied, over a portion of which the Todas have been accustomed to pasture their herds[7].

On realising that the survey was to be primarily for revenue purposes, the Surveyor General qualified his earliest letters ;

My despatch of the 4th October entered very fully into the details of the difficult subject of surveying a mountainous country like the Neilgherries. ... It is clear that if your survey is conducted on the accurate system proposed by me, it will not only produce all the information

[1] of Afghān orig in ; for Rohilla Wars, 1774, 1794 v. Index, vol. I. [2] DDn. 656 (146), 4–5–58. [3] DDn. 594 (361), SG.'s Report, 1859–60, 6–10–60. [4] Leigh, Chamarett, McGill, Smith, Daly, Farrell. [5] MRO., 29–3–44. [6] DDn. 491 (110), from SG. 4–10–44. [7] OD. to M., 21–6–43.

necessary for the revenue statistics of the district, but will also furnish very valuable materials for geographical purposes, which may be incorporated...into the Atlas[1].

Ouchterlony was directed to combine a geographical survey for the Surveyor General with the details required for the Revenue Department. He completed this survey on scale 1,000 feet to an inch by 1848, together with a statistical memoir[2]. All work for the Revenue Department was closed down in 1851, and it was then suggested that he should employ his skilled topographical assistants to survey the Kundah Hills to the south-west[3] and also a small tract of Coimbatore to the east, completing at the same time a general ¼-inch map for the Atlas of India.

The topographical operations of the unsurveyed tracts may for the sake of expedition be taken up on a scale of 2 miles per inch in the field, but a reduction on the prescribed scale for the Atlas, will also be required, and the delineation of the geographical lines must be very carefully attended to [363][4].

Ouchterlony continued one more year under the direct orders of the Surveyor General, but the Madras Government grudged his employment on work that was of no value for revenue purposes ;

Seeing that this work has already occupied Captain Ouchterlony upward of a year, and will apparently continue to occupy him for an indefinite period in the agreeable climate of the hills, and having daily experience of the great want of Engineer officers to superintend...works of pressing and real importance and utility, ... the Governor in Council directs me to express the hope that the services of Captain Ouchterlony may be early made available[5].

His services were thereupon restored to the Madras Government[6] and the assistant surveyors discharged or transferred to other survey units. Amongst the valuable geographical material handed in were a "Map of the Neilgherries and resurveyed portion in the vicinity of Chinoor and...in the Coimbatoor District, scale 4 miles to an inch, dated 18th December 1852", besides charts of triangles [290–1][7].

In spite of the lack of interest shown by the Madras Government, their engineer at Kotagiri was anxious to get a copy of the map in 1856 ;

Captain Ouchterlony informs me that he prepared for the Geographical Survey of India a map containing in one section Danaikencottah and the slopes of the Neilgherries adjacent, together with the Hussanoor Ghaut, and in another section the valley of the Bowany River and that tract north of Coimbatore marked "unsurveyed" in the printed map.

These sections would be most valuable and useful to me[8].

[1] DDn. 491 (123–4); SG. to Ouchterlony, 28–12–44. [2] *IO Cal.* (360–2); MBIO. 129 (1), litho. reduction on ¼-inch scale ; Markham (190) ; memoir, *JMLS.* XV (1) ; connected to OTS. 1871. [3] rise to 8613 ft. [4] DDn. 542 (234) ; SG. to Ouchterlony & Mil. Dept., 26–6–51. [5] DDn. 546 (179), Ft. St. Geo. to Govt. of India, 27–11–52. [6] BMC., 14–12–52. [7] MBIO. 129 (1, a, b). [8] DDn. 677 (8), Civ. Engr., 7th. Div. to C E. Ft. St. Geo., 31–5–56.

where existing should be shewn, the details of cultivation and soil being fully entered into, scale 2 inches to a mile. ...

The present survey has cost less than the towers originally built by General Jacob himself to carry out a system of triangulation which was never completed. ... These towers, ... well known...as Jacob's Towers, were intended...to save line-cutting expenses but, when the Surveyor commenced, ... he found that the platforms and towers were so faulty in construction that it was in vain to expect good work [45–6, 110].

Survey was accordingly run by traverse directly based on the Great Indus Series[1].

Lane's work between Karāchi and Kotri was for the assistance of the railway engineers. The area of 2,059 square miles included only 2 miles of cultivation and 65 fit for cultivation, the population barely "2,000, all miserably poor, ... with the barest necessities, the coarsest food, and the commonest raiment"[2] [479].

Macdonald's work during 1859–60, fell in Larkhāna District. He had suffered severely in health, especially his eyes, and on 22nd April 1860, he handed over to Lane and took furlough for 15 months. During 1860–1 Lane carried out 6,190 square miles of 1-inch topographical survey in Khairpur, "mostly sandy desert, with highly cultivated alluvial lands on the river bank [100]"[3].

MADRAS

Before 1850 the Madras Government had never accepted the necessity for accurate scientific control of revenue measurements or surveys. Such surveys as were required for assessment of revenues were carried out under the district officers by Indian measurers and supervisors, on the lines of Thomas Munro's survey of the Ceded Districts [II, 180–2]. After full consideration of the systems followed in Bengal and Bombay, the Board of Revenue at Madras expressed the following views on proposals put forward by the Collector of Tinnevelly in 1842 ;

Cultivated and culturable lands are measured by natives according to the native method, and tested by controlling natives, and accurate accounts...with specifications of the boundary marks, and name and number of each field, are formed. ...

A survey carefully conducted according to the rules laid down by Sir Thomas Munro and acted on in the Ceded Districts [1804–8] will be found generally sufficient for all ordinary practical and useful purposes and if, in addition, the means of testing the accuracy of the... proceedings be afforded to the Collector, ... by placing at his disposal a small scientific surveying establishment, it will be found amply so. ... The Collector will be able...to control the native measurements, to decide on disputed points regarding it, and to satisfy the ryots. ...

This combination of revenue and scientific survey will...sufficiently approach the system of the North Western Provinces as far as it is expedient to apply it to a country already scientifically surveyed. ...

The Board recommend that Sub-Assistant McMahon...be immediately placed under the orders of the acting Collector of Tinnevelly[4].

MacMahon was, however, appointed to assist Ouchterlony on his survey of the Nilgiri Hills [179]. He was essentially a topographical surveyor.

In 1843 Sir Henry Montgomery[5] was sent to Rājahmundry on a commission which led to the Godāvari irrigation project [I : 107]. He strongly recommended a regular survey and settlement, and from the discussions that followed Frederick Priestley was in 1853 appointed under the Board of Revenue to "an experimental scientific survey of villages in the South Arcot District"[6].

The other Presidencies were consulted, and concrete proposals were made by the Madras Government in a minute dated 14th August 1855 ;

In this Presidency alone there has hitherto been no regular survey. In all districts there is the utmost confusion in revenue matters, resulting in great loss to Government. The absence of accurate information has the most pernicious results. Not only does it operate injuriously

[1] *GR Rev. 1857–61* (126). [2] ib. *1858–61* (126-7). [3] ib. (128–9). *IO Cat.* (440); Sind Rev. Svy. 1855–72 ; 102 one-inch sheets, 13 quarter-inch, pub. @ 2 sh. each. [4] DDn. 451 (49–63), 21–1–43. [5] Sir Henry Conyngham Montgomery (1803–78), Bart. ; MCS. ; Sec. to Rev. & FW. Depts. 1845–50. [6] *IO Cat.* (391), Chidamparam *taluk*, s. Arcot, 1854–6, 1" to mile ; MRIO. 128 (12), 2-inch, litho ; *Mad Sel.*, IX (6–14); Feb. 1854.

on the public revenues, but it becomes a means by which the poorer and less influential classes are made to suffer for the benefit of the wealthy. ...

In some districts attempts were at the beginning of the century to establish something like a register of lands, and fixed rates of assessment founded on actual measurement and valuation. But these measurements were in every case carried out in haste, with imperfect agency. ...

Government are decidedly of opinion that the revenue survey should be connected by minor triangulations with the Grand Trigonometrical Survey[1]. ... A survey for revenue purposes, not a topographical survey. The size of the fields require to be accurately determined. This should be done by...the English methods of surveying as in Bombay, and as is now being done by Captain Priestley in South Arcot, and not in the inaccurate native method. ...

The detailed survey need extend only to the cultivable land. ... Jungle and unreclaimed waste need not be surveyed in detail, but only in its chief features. ... Permanent boundary marks would be established, and...field, ... village, ... and talook maps, should be prepared. ...

The Governor in Council proposes...to appoint a Surveyor General, or Superintendent of the Survey, ... to have at least four Deputy Surveyors General, each in charge of a separate ...division. ... 700 square miles may be taken as the work of a Deputy Surveyor General's party; ... cost should be about Rs. 64 per square mile, and the survey occupy 22 years.

Classification of land should be entrusted to...a Superindent of Settlements, ... vested with a general power of control, ... but not interfering in the mode of working[2].

Priestley was appointed Superintendent of Survey from August 1857[3];

The area to be surveyed was computed at...79,411 square miles for topographical work, and 61,617...for revenue work. Captain Priestley commenced work with an establishment...of 18 surveyors and deputy surveyors, 30 survey ameens, 30 gumashtas [II, 181], 20 draftsmen and computers, 77 peons and measurers, and 19 station markers, at an annual cost of Rs. 31,338. Mr. Nevill was appointed Superintendent of the new revenue assessment, and the two officers worked in concert.

In 1857 two talooks, one in South Arcot and the other in Trichinopoly, were surveyed. In 1858 the survey was commenced in the Rajahmundry District. In 1859 Masulipatam was taken up, and in 1860 there were parties in Nellore, Trichinopoly, and Salem.

During season 1856-7 Priestley had surveyed 450 square miles in South Arcot, and increased this to 476 the following season. Scales of survey varied from 4 to 12 inches to the mile [8][4]. During his absence for several months organizing the new department, he left William Hessey in charge[5].

In 1859 a survey was undertaken of the...district of Wynaud...to define the boundaries of the coffee estates. ... The district had been surveyed topographically...in 1826 by Lieutenants Garling and Conner, ... but the sites of villages were not accurately laid down [III, 114]. ... Work was commenced in 1860 with a system of secondary triangulation...the detail being filled in by planetable[6]. In 1861 and 1862, the Neilgherry and Coondah Hills were surveyed [III, 111-3; V, 179-80]. A lithographic Press...was...established at Madras for...publication of talook and village maps[7].

In 1859 Priestley had a staff of three military officers, Hessey, Pratt, and Crewe, and six civilians, Leggatt, Durnsford, Beaumont, Cardozo, Puckle, and Wright.

In 1870 Markham describes the Madras Revenue Survey as one in which the survey and revenue officers work together, and which is conducted on correct principles in every detail, in the field measurements as well as in the village boundaries, with a complete series of tests. ... The Madras Revenue system alone answers this description, and must consequently be considered as the best. Its work is adapted to reduction for geographical purposes, being carefully connected with...the G.T.S. ...

The revenue survey is complete in the Godavery, Kistna, Nellore, Trichinopoly, and Salem Districts, and the topographical survey of the zemindary, or rent-free lands is in progress in Nellore and Salem. In Kurnool and Tinnevelly the revenue survey is approaching completion, and it is progressing in Cuddapah, Coimbator, Chengalpat, Ganjam, and the Nilgiris. In Wynaad 124 square miles of estates were surveyed before...1862[8].

Neither the Madras nor the Bombay revenue surveys ever came under the administration of the Surveyor General of India.

[1] strongly urged by Henry Thuillier, DSG. [2] *Mad. Sel.* LVII (2-39), CD to M., 17-12-56. [3] from 18-8-57; Markham (189). [4] Godavari Dist., 1859-60, Crewe with Wright & Cardozo; MBIO. 14 (110); *IO Cat.* (329). [5] *Mad. Sel.*, LXXIV, Report 1857-8 (38-52); 16-11-58. [6] 1859-6, *IO Cat.* (314), 1" *taluk* maps. [7] *Madras Admin.*, I, 1885 (99). [8] Markham (180, 188-93); Maps of Mad. Rev. Svy., 1871; *IO Cat.* (314-7); MBIO. 128-130.

set was sent to London for incorporation into the Atlas sheets, whilst a second set was sent to Calcutta to be lithographed in four colours[1] a process that was new to India [329]. The survey was also embodied in John Walker's 16-mile "Map of the Punjab, Western Himalaya, and adjoining parts of Thibet", editions of 1854 and 1859[2].

Very little of the original survey was omitted on the ¼-inch reductions, with the result that drawing and lettering were much too fine and congested. Printing in colours was, moreover, new to the Calcutta office, and much experimental work was involved. By 1859 only one of the engraved Atlas sheets had come out from England, and the Surveyor General, being pressed for maps of Garhwāl, called on Thuillier to press on with his coloured prints which were giving difficulty [330]. Thuillier replied that

> the reproduction of these intricate degree sheets...has had my very best attention for a long time past, and I only regret...that you should have had to repeat your wishes...so often. ... A commencement will be made at once with one of the easiest sheets, ... and the whole resources of the Press...will be put upon it. ... As soon as our first specimen is ready it shall be submitted for your inspection, and...everything practicable...shall be done to produce these degree sheets in a manner worthy of the Department[3].

The full atlas was satisfactorily completed, and despatched from Calcutta early in 1862 and won a prize medal at the London Exhibition of that year [331][4].

Montgomerie's ½-inch *Map of Kashmir*, completed in April 1859 was laid before the Governor General who wrote a personal letter to congratulate the Surveyor General ; "I never saw a more perfect or artist-like production of its kind"[5]. The map won equal commendation in England where it was lithographed in 1861 [238][6]. The more extensive ¼-inch map was completed in January 1861, and taken to England by Waugh on his retirement. 800 copies were lithographed in England, whilst other copies were struck off at Dehra Dūn from the second fair drawing. Other maps followed some years later [239].

SOUTH INDIA

Except as possible material for the Atlas of India, neither Everest nor Waugh were at all interested in maps of Bombay and Madras. Manuscript maps of all Madras districts had been supplied before 1830 [III, 279] and there were also maps on the 16-mile scale. In 1822 Arrowsmith had published his quarter-inch *Atlas of the South Peninsula* in 18 sheets [III, 288] but, since the abolition of the post of Deputy Surveyor General at Madras, responsibility for maps had rested with the Chief Engineer, who was in no position to undertake further compilation [III, 276–9 ; IV, 328].

In 1854, a firm of Madras publishers, Pharoah & Co., published an *Atlas of the Southern Part of India*, containing 27 district maps on 16-mile scale, 13 circār maps of the Nizām's Dominions, 21 maps of towns and cantonments, with a 48-mile *Map of the Peninsula of India*, extending south from Allahābād, compiled in 1854 by Colonel F. H. Scott, Deputy Quartermaster General of the Madras Army. All these maps were engraved by J. & C. Walker, of London[7].

In 1859 the Surveyor General suggested to the Chief Engineer that it might be possible to publish district maps for the whole presidency, on the one-inch or half-inch scale, from the material at Calcutta[8]. This material was, however, much too old to be worth the expense, and the provision of new maps was left for the newly formed Revenue Survey Department [280].

There was a similar dearth of maps in Bombay and Sind, and the few available sheets of the engraved Atlas of India were long out of date.

[1] DDn. 547 (340), SG. to Mil. Dept., 28-6-55 ; 665 (54), to DSG., 14-5-55. [2] *IO Cat.* (232). [3] DDn. 668 (116), DSG. to SG., 17-6-59. [4] *GR Topo. 1859-62* (19), SG., 8-1-62 ; ackd., ssr., 31-5-62 ; DDn. 30 (171), John Walker to SG., 19-9-62. [5] DDn. 675 (101), 18-7-59. [6] *JRGS.*, XXX (clxx). [7] Markham (191, 407–8) ; *IO Cat.* (85, 313) ono. Comp., L-10-4. [8] 655 (425), 18-3-58 ; DDn. 675 (39), SG. to DSG., 13-4-59.

... Officers can only be trained in a good system by working with well-managed series, and under able leaders. ... The great success which has attended my administration...has arisen from...this rule—...not to entrust any officer with the charge of a series until satisfied of his fitness, because every failure can be traced to this source[1] [390].

The Government of India told the Directors they had no officers to spare but were asked to meet the Surveyor General's demand[2] and during 1851 and 1852 Tennant, Nasmyth, and Montgomerie were appointed, whilst permission was obtained to retain the services of Strange [382].

Tennant worked under Strange nearly two years making himself thoroughly master of the usual recess duties ; ... computations—cleaning, repairing, and adjusting instrumental apparatus and other preparations for the field—office business. You should give him [writes Waugh] such a share in the various computations as will conduce to his becoming acquainted with every part of the work. Expertness in...computations is even more important than field duties, inasmuch as excellence in the former is rarer than in the latter.

The ensuing field season will enable Lieutenant Tennant to master the details of field duty, ... and I hope...he may gain a thorough insight into every part of the work and become imbued with the most scrupulous notions of refinement. ... As soon as you can report that this officer has acquired a thorough knowledge of these duties, I shall make arrangements for putting him in a position in which his talents and knowledge may have full scope[3].

Montgomerie had a year with Logan on the Rahun series, and then had the exceptional advantage of spending several months with the Surveyor General himself on the measurement of the Chach and Karāchi base-lines [42–4].

In an appreciation of his officers Waugh writes in 1859 ;

I have had a succession of officers of all ranks and of all branches of the service in the three armies of India, as well as the Royal army [Austen], under my orders, and...it is rare for any officer to succeed in any eminent degree unless he joins at an early age with sufficient elementary knowledge of mathematics and military drawing, a marked aptitude for the profession, and a determination to devote all his energies to one object. ...

At the Chuch base-line I had no experienced officers to assist me except Mr. Logan who was very ill and died shortly after. I had to train every officer employed at that base-line, as well as at Kurrachee, and if any accident had happened to disable me, those difficult manipulations must either have been postponed or entrusted to inexperienced hands. ... I took advantage of...these bases to instruct all the officers of the Trigonometrical Survey then available, knowing that some years might elapse before another base would be measured. ...

An officer when first appointed has everything to learn, and for the first year at least is rather a hindrance than an assistance. Gradually as he learns the practical duties and masters theoretical principles he become useful, and after 2 or 3 years he is able to act independently. Year by year, however, he improves. ... An officer of the Trigonometrical Survey cannot be considered fully experienced much under 10 years service. ... The loss of an experienced officer deprives the State of all that has been expended on his training, not to mention the heart-breaking task of constantly teaching new hands. ...

The chief...apprehension...has been the loss of experienced officers from retirements holding out higher inducements. That competition falls peculiarly hard on old departments, with salaries fixed in ancient times, and...obliged...to train their own hands from the beginning. I would...most earnestly submit that...the Department should not be deprived of its most experienced officers, trained with so much care[4] [399, 408].

TOPOGRAPHICAL SURVEYS : MADRAS & BURMA

The only regular topographical survey in progress when Waugh took office was the Hyderābād survey under Henry Morland of Madras infantry. The Salem and Nellore surveys were in process of being wound up, and the Ganjam survey was in suspense for lack of a suitable officer [IV, 248–50 ; V, 167].

In 1844 a Madras Engineer officer, John Ouchterlony, was appointed to make a revenue survey in the Nīlgiri Hills, and for the geographical part of his survey was

[1] DDn. 542 (250), 28–8–51. [2] DDn. 541 (321), CD. to B., 2–4–51 (49–50). [3] DDn. 709 (1), 26–7–52. [4] DDn. 643 (352), to Mil. Dept., 3–11–59.

placed under the professional direction of the Surveyor General. He was withdrawn for engineer duties after completing a topographical map on the half-inch scale, and the Surveyor General recorded that "the difficulty of obtaining the services of Engineer officers for the Survey Department has always been very great, and the withdrawal of an officer of Captain Ouchterlony's superior talents and energy is a great loss[1]" [179–80].

The officers who followed each other in charge of the Pegu Survey in Burma were all appointed by the Army Commander or Chief Commissioner at Rangoon. Williams, Trevor, and Edgecome were Engineers, and Fitzroy came from Artillery. It was not until 1863 that the latter was placed under the orders of the Surveyor General [195–9].

HYDERĀBĀD

Morland reverted to military duty in March 1848 after promotion to Major, and the Madras Government then appointed Bt. Major John Brown in his place without any reference to the Surveyor General. He was a cavalry officer with no knowledge of survey, and no promise of acquiring such knowledge. Waugh was naturally disturbed at such an appointment, more especially as the party was so remote from the rest of the Department;

In consequence of no assistant officer having been appointed for several years to the Madras surveys, there was no qualified officer to take charge on the removal of Major Morland, ... and...Mr. Chamarett, the senior assistant who...was the main prop of that survey, having died not long afterwards, the efficiency and acquired skill of the party was in danger [428]. ...

Brevet-Major Brown...never having been employed in the Survey Department or analagous duty before, nor having received any...education for it, cannot fairly be expected, at his age, to become a very skilful surveyor. He is no doubt willing to learn, ... but there is no one to teach him except his own sub-assistants whom it is his duty to guide and control. ...

I have consulted Captain Du Vernet because he formerly held charge of the Hyderabad Survey, and in his time the progress made was very satisfactory and the execution superior [IV, 256–7; V, 177–8]. He concurs...regarding the necessity of appointing assistant officers to be selected with care and thoroughly trained, first in the Trigonometrical Survey and afterwards in detail duties [382]. ...

Captain Du Vernet agrees with me that an assistant officer will be required for each party... to prevent...these surveys from being paralysed by casualties. ... I would recommend that two young unmarried subalterns of about four years standing should be chosen, of undoubted taste for drawing and good mathematical attainments. ... If a proper standard...be...adhered to, I see no difficulty in finding able officers...who would do ample justice to the work[2].

The posting and "training of two well-educated officers of the Madras Army with...the surveying parties" was approved in principle [III, 329], but could not be effected, and the following year Waugh asked for the suspension of the survey;

With regard to Major Brown's professional qualifications, I...felt anxiety for the future success of this survey on account of his deficiency in elementary education for survey duties. ... He has invariably exerted himself to the best of his abilities, and shews no lack of zeal for the public service, but a person at his time of life and high standing in the army is not capable of acquiring...professional skill himself. ...

There are at present no qualified officers available to assume immediate charge of the Hyderabad party, and the paucity of officers with the Great Trigonometrical Survey...precludes my recommending that an officer should be detached from that Department as a temporary measure. ... Considering the low standard of Major Brown's professional qualifications, and the impracticability of carrying on...satisfactorily in the present disturbed state of the country without greater tact...on the part of the officer in charge, I...recommend that the Hyderabad survey should be suspended for two years[3].

Brown reverted to his military unit in January 1851, and the survey was suspended until restarted in 1855 under James Mulheran [178, 416].

[1] DDn. 549 (63), SG.'s Report for 1849–52, 9–9–53. [2] DDn. 462 (321–2), SG. to Mil. Dept., 13–6–49. [3] DDn. 549 (4), to Mil. Dept., 17–7–50.

Plate 28

INDIA

1861.

Scale 128 Miles = 1 Inch.

Miles 160 140 120 100 80 60 40 20 0 160 320 Miles

REFERENCES

Surveys 1830 to 1861

Red — Principal Triangles of the Great Trigonometrical Survey

Blue — Topographical Surveys

Green — Revenue Surveys

See also plates 3 and 16

Sheets of Atlas of India shown by brown grid, ringed numbers denoting those published by 1870.

Extension to North_East.

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