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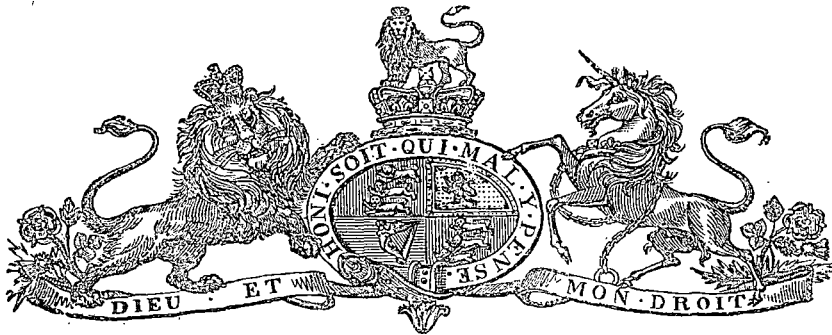
1857.

T A S M A N I A.

R E P O R T

OF THE SELECT COMMITTEE APPOINTED TO ENQUIRE INTO THE
PRESENT STATE OF THE TRIGONOMETRICAL SURVEY.

Brought up, and ordered by the Council to be printed, 19 February, 1858.



R E P O R T .

THE Select Committee appointed by your Honorable House to enquire into the progress and state of the Trigonometrical Survey has prosecuted its enquiry by the examination of the gentleman (Mr. Sprent) engaged in its execution, and other gentlemen (see margin) attached to the Survey Department.

Major Cotton.
Mr. Calder.
Mr. Lovett.
Mr. Morrison.
Mr. Hogan.

Amongst other objects sought to be acquired by the Trigonometrical Survey, your Committee has ascertained by the examination of Mr. Sprent, 1st, is to determine the geographical positions of places coming under the Survey,—such as an accurate determination of the heights of mountains, their position, as well as that of the sea-board; and the formation of a number of points, with their distances and bearings from each other, by which a skeleton Map may be prepared, and be applied for the adjustment of Chain Surveys in those localities. 2nd, That these points so fixed may be considered as standard points to which all Chain Surveys may be referred; and by which the several detached plans may be fitted together, so as to form one perfect chart of the whole.” (Questions 1, 2.)

The Trigonometrical Survey, commenced in 1833 by Mr. Sprent, was discontinued in 1837, was resumed in 1847, and continued up to the present time, altogether fourteen years, and has cost the Colony already upwards of £20,000; and in Mr. Sprent's opinion it will only take five or six years to complete, and at a cost of only two or three hundred a year. (Question 121.) (Afterwards corrected in Appendix D to £686 11s. 4d.) But it is difficult to understand the correctness of this opinion, when the extent of the work admitted by Mr. Sprent to be unfinished is considered, together with the necessity of examining and connecting nearly all, if not all, of the old Chain Surveys before they can be united to the Trigonometrical triangulation; and opposed as it is to the opinions of Major Cotton, (page 8, questions 143, 144, 145, 146, 147), and Mr. Calder, (page 19, questions 301, 302) both of whom are experienced Surveyors, and who think it will take a long series of years to effect a connection of even the present Chain Surveys with the Triangulation, so as to make a complete map of reference, and at a cost far exceeding the computation of Mr. Sprent.

With respect to Mr. Sprent's opinion, that the cost of completing the Survey will only be between six and seven hundred a year (Appendix D), it is only necessary to remark, that it falls far short of what Major Cotton estimates the annual cost of carrying on the work to completion, to say nothing of the cost of several surveyors that must be employed in examining and connecting the old Chain Surveys before they can be united with that of the Trigonometrical. It will be seen by referring to Major Cotton's answer to question 205, that he estimates the annual cost of carrying on the Trigonometrical Survey at from £1500 to £2000 per annum for an indefinite number of years. It appears from the evidence given by Mr. Sprent before a Select Committee in 1852, that in consequence of the old Chain Surveys having been executed hastily, and many of them by careless and inexperienced surveyors, they were “imperfectly and unsatisfactorily performed,” and not to be relied on without checks; and his opinion remains unchanged upon this subject. (Questions 40, 42, 44.) It also appears, that although some of the Chain Surveys may be sufficiently accurate, yet it is impossible to separate the good from the bad without examination. (Question 48.)

In attempting to construct a General Map of reference from the old Surveys, it was discovered, when adjusting and uniting the several surveys together, that they would not close in by several miles; and this was especially the case in the neighbourhoods of Waterloo Point and the Great Lake, where the Surveys were brought from different points. (Questions 55 to 69.) This error might be, and probably was, accumulative during the progress of the Surveys from North to South, and *vice versâ* from the points of commencement; and, in all probability, the same discrepancy would occur were the Surveys laid down from East to West, and from West to East, to any central point of closing. It is stated by Mr. Sprent (pages 4 and 5, questions 53 to 70 inclusive), that the localities of the errors may be discovered by the Trigonometrical Survey; and when found out, corrected in detail by the use of the chain: but even if so, this will be a work that will involve great labour, time, and expense. Mr. Sprent, however, does not think that a general revision of the Surveys would be necessary to detect these errors. It is difficult to reconcile this opinion to the necessity of the correctness of the two Surveys, so as to enable that of the Chain Survey to be properly adjusted to the Triangulation. Mr. Sprent's opinion on this point is opposed to those of Mr. Calder (page 19, questions 312, 313, 314, 323) and Major Cotton (page 9, question 152), as will be seen by the evidence of those gentlemen.

It is a fact established by experience in England and elsewhere, that for a Survey to be effected on Trigonometrical principles, the Triangulation of a Country should precede the Survey by the chain. How, then, can it be expected that that can be effected with the imperfect and unsatisfactory Surveys in this Colony which could not be accomplished in England? (Question 74.)

It appears (Question 92) that none of the Chain Surveys have yet been united with the Triangulation, and that before such can be completed the Secondary and Tertiary Stations must be greatly increased; and will, in Mr. Sprent's opinion, take about two years to effect, with a proper strength of party.

In preparing for the Triangulation of this Country the Primary Stations are, many of them, rude heaps of stones without any determinate figure, covering an area of from 150 to 200 superficial feet or more; whilst others are the trunks of standing trees denuded of their branches, and some of them very much out of the perpendicular. In England it has been deemed necessary to devote the greatest attention to the formation of the objects to and from which the observations are made, in order that there may be no doubt as to the true centre of the respective Stations to which observations are to be made.

It appears from the evidence of some of the witnesses, that the necessary degree of exactness cannot be attained with objects such as have been erected in this Colony, (see answer to question 117,) being mere rude heaps of stones, as before described, the centre of which cannot be determined with any degree of certainty when observed from a distance, (nor indeed at all,) and which is essential for the construction of a correct Map of a Country.

In England, where the greatest care and attention was observed in measuring the base-line at Hounslow Heath, and the base-line of verification at Romney Marsh, separated by a distance of about 60 miles, the work proved to be within about 28 inches. (See Hutton's Mathematics, vol. iii., page 120.) In this Colony, the base-line being at Ralph's Bay, and the line of verification at Longford, a distance of near 100 miles apart, (page 24, question 422,) proved, so it is said, within a little more than three inches. The superior exactness claimed for the work executed in this Colony is the more remarkable, and cannot but arrest the attention and cause doubts in the mind of the experienced and practical Surveyor, when such a degree of accuracy could not be attained in England; nor can your Committee be otherwise than sceptical upon this point, when the nature of this Country, and the magnitude of the uncouth and shapeless Stations that have been used, is taken into consideration, and compared with the greater facilities that are afforded in an old country like England for the accomplishment of such a work; where, also, the greatest attention was paid and care taken to perfect the forms of the objects to and from which the observations were to be made, in order that the greatest possible mathematical nicety might be attained;—yet, with all these advantages, together with more perfect instruments, (page 17, questions 266, 270,) and the work performed by gentlemen of the highest scientific attainments, and, at least, equally skilled and experienced as any that could be found in this and the adjoining Colonies, the same degree of correctness could not be arrived at that is claimed for the Triangulation of this Colony under the disadvantages before adverted to.

The present Maps of reference (as it appears by Mr. Sprent's answer to question 125,) answer every purpose, as such, as far as the wants of the Colonists are concerned. Your Committee, therefore, cannot recognize the propriety, nor the utility, of a work (and at so great a cost) which, at best, will only result in slightly improved Maps of reference; and, according to Mr. Hogan's evidence, there are doubts as to the extent of these improvements, and which doubts are confirmed by Mr. Sprent's answers to questions 129 and 131.

It does not appear to your Committee to be necessary to go so minutely into the evidence of Major Cotton, who has produced several testimonials of his high qualifications and scientific attainments as an Engineer and Surveyor, and who coincides in opinion with Mr. Sprent as to the objects to be attained by the accomplishment of a Trigonometrical Survey, and the advantages to be derived from it; but which opinion is opposed to that of Mr. Calder, the Senior Surveyor in the Department, (page 20, question 322,) and to that of Mr. Lovett, the Draftsman, (page 15, questions 237, 238,) both of whom are practical and experienced in their profession.

It is desirable, however, to bring under notice the discrepancy in the opinion of Major Cotton (pages 8, 9, 10, 13, and 16, questions 144, 145, 146, 147, 166, 170, 200, 202, and 264,) and Mr. Sprent (page 5, question 87,) as to the length of time it will occupy to connect the two Surveys together so as to make a Map of Reference, referring only to the Chain Surveys that have been already accomplished; the latter gentleman estimating that it can be done in five or six years, with the aid of one or two assistants to complete Secondary and Tertiary Stations, (see Mr. Sprent's evidence, and his letter to the Surveyor-General,) whilst, by Major Cotton's evidence, the period of its accomplishment is quite indefinite. He states, in answer to question 145, that it would, with the same force employed when he had the charge of the Survey, "occupy many years." "I cannot," says Major Cotton, "venture to say how many, as it must depend on the minuteness of detail required in the Map. The Survey of Great Britain is still in progress, and I believe it would be difficult for the Director of the Survey operations there to surmise when those operations would be brought to a conclusion." Your Committee would especially direct attention to Major Cotton's answers to questions 146, 147, 165, 166, 170, and 171, as confirmatory of the above opinion. And it will be seen by his answers to the questions 147, 148, 149, 150, 151, 152, 160, 161, 164, 165, and 166, that a general revision of the old Chain Surveys would have to be made before they would be available for the purposes required.

Although an improved general Map on Trigonometrical principles may be compiled, it, nevertheless, becomes a serious consideration whether the Government, under the financial difficulties that the Colony is at present labouring under, would be warranted in doing anything more than completing the General Map now in hand; for it not only appears by Major Cotton's evidence, (answer to question 178,) that there was a difficulty in connecting the Chain with the Trigonometrical Surveys, but that several serious errors had been discovered by the gentleman (Mr. Hogan) employed to connect the Chain Surveys with the Triangulations. (See answers to questions 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, and information furnished by Mr. Hogan in the Appendix C.) In reference to which, as one instance which occurred to him, Mr. Hogan mentioned the River Jordan as showing an error of half a mile in every seven miles, (see answer to question 392), and in its whole course (of about 50 miles) an error of about three miles and a half (see answer to question 397). It is obvious, that if such errors as these exist in various localities, a correct Map of Reference in connection with the Triangulation cannot be made that will be satisfactory or superior to those that might be compiled from the present faulty Chain Surveys, unless a lengthened, careful, and costly revision of all or the greater part of the old Chain Surveys were made.

It appears by the evidence of Mr. Lovett, the Chief Draftsman in the Survey Department, that the errors discovered to exist in the old Chain Surveys, when putting the County Maps together, were not in excess of those discovered by Mr. Hogan when compiling a General Map in connection with the Triangulation; and in his (Mr. Lovett's) opinion the errors were accumulative, and doubt would consequently hang over the whole of the Surveys of which the County Maps were composed. It may be presumed from this circumstance that the several Surveys would require to be carefully examined before they could be relied on for connecting them with a correct Trigonometrical Survey, and the more especially as many of them were executed by careless and inexperienced Surveyors.

It is scarcely necessary to do anything more than cursorily to mention the reported existence of an error (as given in evidence by Mr. Lovett and Mr. Morrison) said to have been discovered by two of the Sappers in the Triangulation in the vicinity of the Break O'Day Plains, and communicated to Major Cotton by a Surveyor of the name of Ashplant, as it is opposed to the evidence of that gentleman, as well as that of Mr. Sprent, both of whom speak positively as to the accuracy of the Triangulation of the Country. But under these reports, and taking into consideration the nature of some of the Primary Stations, some degree of doubt must exist as to the great accuracy that is said to have been arrived at. Mr. Lovett is of opinion, after estimating the cost and length of time it will take to complete a Map of Reference with the Trigonometrical Survey, that the advantage to be attained by its slight improvement by the introduction of Trigonometrical principles "would not, under existing circumstances, justify the expenditure" in completing the work (question 237); and that a mere Map of the Island on Trigonometrical principles, without including the grants, will not be of any use to the Colonists. (Question 238, and Mr. Calder's reply to question 304.)

Mr. Morrison, Second Draftsman in the Office, gives similar evidence (questions 253, 255,) to that of Mr. Lovett, and confirms his opinion of the inutility of incurring the expense of proceeding with the compilation of plans which will only be a slight improvement upon those now in use.

From Mr. Calder, a gentleman educated specially to follow the profession of a Surveyor, (see question 291,) your Committee gather that he coincides with Major Cotton and Mr. Sprent in respect to the uses of a Trigonometrical Survey;—that it would take, "to make a truly correct Map of Reference, very many years," and has sent in a statement showing the data on which he forms his opinion; in reference to this, as well as to the cost of carrying the Survey to completion, (see Appendix B,) that it would be unsafe to trust to eye sketches to fill in the Coast Lines from point to point fixed by Trigonometrical observations (308); that many of the old Surveys are useless for the purposes of connection with the Trigonometrical Survey, and, "to make a careful and correct Map," would require to be done over again (314 and 323), which would take nearly as long as before (324); that the Surveys not closing properly in compiling the County Maps was in consequence of accumulative errors in the Surveys (316), and that they could not be relied on for compiling a Map in connection with the Trigonometrical Survey (317); that the Stations which have been erected in this Colony for the Primary Triangulation are not "such as to ensure the accuracy requisite for a National Survey, such an one as has been in progress in this Colony," (326, 327, 328, 329, 330, 331); that no Chain Survey made "in so woody and mountainous a country as Tasmania" would be a perfectly satisfactory one (345), and that such could not be accomplished "before the Country is brought into something like the condition of old inhabited Countries" (346); that under all the circumstances "of the obstructions and impediments to the accomplishment of an accurate Trigonometrical Survey, with the difficulty of raising funds to meet the current public expenditure," he does not think it would answer any useful purpose, or be desirable to proceed any longer with this Survey (347, 348); that he has heard the report of the existence of the errors in the Triangulation in the neighbourhood of Falmouth and New Norfolk (364), and that, if an error should exist in any one of the triangles, "it would multiply in proportion to the distance" (365); that the present Maps of Reference answer all useful purposes, and that the landholders, who are more interested in the Survey of the Island than any other class, are generally satisfied with the Surveys of their properties under which they hold their titles (366, 367).

Your Committee, having carefully considered the valuable information afforded them by the several witnesses who have been called upon to give evidence, all of whom are practical men and experienced in their respective branches of the profession, are of opinion that the weight of the evidence obtained warrants them in coming to the conclusion that, in consequence of the indefinite and uncertain length of time required to complete a Map of reference with the Triangulation,—and which, after all, according to the evidence of Messrs. Calder, Lovett, Morrison, and Hogan, would be but a slight improvement (if any) upon the present County Maps,—and the great cost of effecting it, it is desirable that the work of connecting the two Surveys should be suspended, or at furthest that the General Map of the Island now in hand should only be prosecuted to completion, in accordance with the estimated expense of Mr. Sprent, as set forth in the Appendix marked D. And your Committee would suggest that the force of the Survey Department would be much more beneficially employed in surveying and defining new lines of roads, and marking off blocks of land, of such dimensions as

would afford the greatest facilities for the occupancy of the Waste Lands of the Colony by an industrious yeomanry, and bringing them into a state of productiveness. This being adopted, as far as possible, all future surveys might be made in connection with the existing Triangulation, by which the true position of the several blocks would be indicated in future.

Your Committee, deeming it of the highest importance that the marks at the extremities of the base-line, and the line of verification, should be properly and carefully preserved, earnestly recommend that they be immediately examined, and the greatest care used in making them permanent, and securing them from future injury.

Finally, your Committee would especially refer to the evidence of the several witnesses, together with the valuable information furnished in the papers in the Appendices marked B. C., as justifying them in the conclusion at which they have arrived.

In consequence of doubts, caused by conflicting evidence, having arisen on some points connected with the Triangulation, and the accurate connection of the Chain Survey with it, your Committee felt called upon to suggest to the Government, as will be seen by the annexed Correspondence, that it would be desirable that competent persons should be appointed to make a few intersections from some of the Trigonometrical Stations, in order to test and remove all doubts on a question of so much importance. Your Committee cannot do otherwise than regret that the Government did not consider itself in a position to accede to the suggestion.

They beg leave to lay upon the Table of the House the evidence upon which their Report is founded.

JNO. H. WEDGE, *Chairman.*

Committee Room, 19 February, 1858.
