
QUEENSLAND

DEPARTMENT OF PUBLIC LANDS

SURVEY OFFICE

RULES AND DIRECTIONS

FOR THE

GUIDANCE OF SURVEYORS

Survey Office,
Department of Public Lands,
Brisbane, 21st August, 1916.

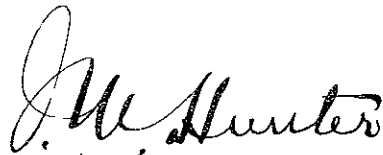
The Rules and Directions for the Guidance of Surveyors, hereinafter set forth, are now established in accordance with section 209 of "*The Land Act of 1910.*"

All previous Rules and Directions are hereby rescinded, and surveyors employed by the Department are requested to study the Directions now in force carefully, in order to become conversant with the amendments and additions that have been made.



Surveyor-General.

Approved:



Secretary for Public Lands.

Corrigenda.

PAYMENT CLAUSE 16 (page 40)—

The additional allowances do not apply to the charges for obliteration of old survey marks.

PAYMENT CLAUSE 29 (page 44)—

For "Curalle" *read* "Curralle."

PAGE 77 (Appendix No. xii.)—

Formule for calculating the position of a star at elongation should read as follows:—

$\text{Cos. hour angle} = \text{cotan. dec.} \times \text{tan. lat.}$

$\text{Sin. altitude} = \text{cosec. dec.} \times \text{sin. lat.}$

$\text{Sin. azimuth} = \text{cos. dec.} \times \text{sec. lat.}$

PAGE 86—

Delete the second number—"Appendix No. xvii."

PAGE 87—

Delete the second number—"Appendix No. xviii."

PAGE 109—

For "Appendix No. xviii." *read* "Appendix No. xxviii."

SPECIMEN FIELD BOOK (in pocket)—

For "Appendix No. xxxv." *read* "Appendix No. xxxvii."

SPECIMEN CALCULATION OF CLOSURE (in Field Book)—

For "Appendix No. xxxvii." *read* "Appendix No. xxxv."

The Rules
set forth, are
Land Act of 19

All previ
surveyors emp
Directions now
the amendmen

Approved :



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Rules and Directions for the Guidance of Surveyors.

I.—Duties of District and Staff Surveyors.

1. District and Staff Surveyors shall be under the control and direction of the Surveyor-General. Under control of the Surveyor-General.

2. It shall be the duty of District Surveyors to supervise and control the operations of the surveyors employed in their districts, issuing to them instructions for survey work, when such instructions are not issued by the Head Office, advising them in the conduct of their work, and generally insuring that the surveys in the districts under their supervision are effected in accordance with the Acts and Regulations in force for the time being, and with the Rules and Directions of this Department. Where the strength of the staff permits, district office maps should be kept charted up to date. Duties of District Surveyors generally.

3. District and Staff Surveyors are expected to acquire a personal knowledge of the districts in their charge, particularly with reference to immediate and future road requirements; to inspect and report to the Surveyor-General on lands, advising the reservation of all lands that may be required for public purposes; to effect isolated, difficult, and special survey work; to examine, by re-survey where necessary, and report on surveys effected by surveyors; to inspect surveyors' equipment; to report such instances of defective surveys or of surveys being effected by unauthorised persons as may come under their notice, and generally to promote the early and efficient completion of survey work; to be prompt in recognition of, and to give immediate attention to, all such public requirements as may be dealt with by this Department. In the performance of these duties they will be guided by the Departmental Rules and Directions. Duties of District and Staff Surveyor generally.

4. Particular attention is directed to the importance of frequent astronomical observations for meridian, both in effecting original surveys and in the examination of surveyors' work. No survey by District or Staff Surveyors can be considered complete unless referred to the astronomical meridian. Importance of astronomical observations.

5. The Surveyor-General will from time to time issue to District and Staff Surveyors instructions for their guidance in matters of detail connected with their obligations, as salaried officers, to the Department, and in their relations with the State-paid labour employed in their survey parties. Surveyor-General will direct details.

II.—Duties of Surveyors.

6. Any specified district may be assigned to a surveyor, who will generally be entrusted with the survey operations required therein; but such assignment shall not confer on him an exclusive claim to all the work in his district. Any other surveyor may also be employed therein, should circumstances render such a course expedient. Districts may be assigned to authorised surveyors.

Absence from district to be notified.

7. Surveyors who propose temporarily to accept private work, which would interfere with their duties for this Department, or to absent themselves from the districts they are operating in, should give sufficient notice of such acceptance of private work, or proposed absence, its probable duration, and their interim addresses, to the Surveyor-General and to the District Surveyor, and on returning they should similarly report to that effect.

To consult Local Authorities re public requirements.

8. Surveyors are directed to consult with Local Authorities on matters of public requirement in which they may be in doubt—such as the location of roads, reserves, and town sites—and the views and requirements of Local Authorities should receive careful attention. But the onus of providing for present and future public requirements in these respects will nevertheless fall upon the surveyor, who should look well into the future, especially where lands are being surveyed for alienation.

Surveyors to report any interference with survey marks.

9. Section 476 of the Criminal Code provides that "Any person who wilfully and unlawfully and with intent to defraud, removes or defaces any object or mark which has been lawfully erected or made as an indication of the boundary of any land, is guilty of a misdemeanour and is liable to imprisonment with hard labour for three years."

Section 2 of "*The Survey Marks Act of 1852*" also provides: "If any person shall wilfully obliterate, remove, or deface any such survey mark as aforesaid, or any land mark or beacon which shall have been erected by or under the direction of an officer of the Survey Department, or by a surveyor licensed by the Government, such person shall for every such offence forfeit and pay to Her said Majesty a sum not exceeding ten pounds, to be sued for and recovered in manner aforesaid.

"Provided always that nothing herein contained shall render the owner or occupier of any land liable to any penalty for the removal of any tree thereon upon which any such mark shall have been made which he may desire to remove in fencing, clearing, or otherwise improving such land."

Any infringement of these provisions coming under the notice of a surveyor should be reported to the Surveyor-General, and also to the nearest police officer.

III.—Equipment and Camp.

Necessary instruments and equipment to be supplied and maintained.

10. Each surveyor employed by the Department shall supply himself, for use in survey work, with the following surveying instruments, namely:—

- One transit theodolite, the horizontal circle of which is not less than five inches in diameter;
- One prismatic compass, not less than three and a-half inches in diameter;
- One five-chain steel band for standard (*see* clause 11);
- One or more five-chain steel bands adjusted to standard for general use;
- One aneroid barometer;
- One clinometer for road grading.

And at all times during his employment shall, subject to inspection by district or staff surveyor, maintain the same in good order and efficiency.

He shall further supply himself with all other necessary equipment, and shall obtain and make himself conversant with the Acts and Regulations relating to the leasing and alienation of Crown lands.

11. Each surveyor employed by the Surveyor-General is supplied with a five-chain steel band marked at the termination of each chain and correctly adjusted to standard length, with which to compare his working steel bands. This band continues to be the property of the Surveyor-General, is supplied without charge, and is to be used for the purpose of comparison only.

Standard five-chain steel bands are supplied.

12. The steel bands supplied by the Surveyor-General are standard only at certain temperatures and at certain tensions, particulars of which are supplied with each band. For each degree Fahrenheit under or over the temperature at which the band is standard, a plus or minus correction of 0.005* of an inch per 66 feet must be made.

Corrections for expansion, &c., to be applied.

13. At the expiration of periods of about two years the standard band should be returned to the Surveyor-General for comparison with the official standard; or it may be returned at any time if its value as a standard of measurement becomes impaired or the surveyor becomes doubtful of its accuracy.

To be returned occasionally for re-adjustment.

14. Contract surveyors shall engage and be personally responsible for the cost of the labour employed in their respective survey parties.

Contract surveyors personally responsible for parties.

IV.—Conduct of Surveys.

(a) General.

15. All surveys or other duties are to be carried out in accordance with these Rules and Directions, and such amendments thereof as may from time to time be authorised. Of such amendments surveyors will be duly advised.

Surveys are to be effected in accordance with the Directions.

16. All surveys shall be carried out personally by the surveyor to whom they are entrusted. The Surveyor-General may, however, subject to the provisions of "*The Land Surveyors Act of 1908*," specially sanction the employment of any competent assistant surveyor, but the surveyor entrusted with the work shall be held solely responsible.

Personal survey directed

17. As a general rule, surveys should be completed within three months after the date of the instruction. If a surveyor's work accumulates, so that he cannot comply with this rule, he should inform the Surveyor-General of the cause of such accumulation, the order in which it is proposed to effect the work, and the probable date of its completion. Instructions may at any time be withdrawn if considered necessary in the public interests.

Surveys to be completed within three months.

* This correction is arrived at by assuming that a steel band 66 feet long expands or contracts 0.0000625 of its length for a change in temperature of one degree Fahrenheit. This coefficient multiplied by the number of inches contained in 66 feet (0.0000625 x 792) produces 0.00495 as the expansion or contraction in inches for one chain, for which fraction 0.005 of an inch is a convenient working abbreviation.

The assumed coefficient of expansion (0.0000625) is a mean between 0.0000655 and 0.0000600, which are those given as extremes for steel tapes in Johnson's "*Theory and Practice of Surveying*," page 476, and very nearly agrees with General Roy's coefficient for steel rod.

Surveys to be effected with a theodolite—exceptions.

18. Traverse surveys of features, or of wide roads, may be effected with the compass (or circumferentor) and steel band. Surveys of runs may, under special instructions only, be effected with compass and perambulator. But with these exceptions, or as may be otherwise specially directed, all survey lines are to be run out instrumentally, and angles measured, with a carefully adjusted theodolite.

Measurement of lines—
instruments to be used.

19. All measurements on survey work are to be made with the five-chain steel working band, the temperature of the band being noted at each measurement and the angles of inclination from the horizontal observed with theodolite or clinometer. All inclined measurements are to be reduced to horizontal lengths, and further corrected for the expansion or contraction of the band from standard length. The use is approved of correctly graduated chain handles, or scales affixed to the band at each chain's length, by means of which corrections for the effect of variation of temperature may be made on each measurement without calculation. The theodolite should be used to read angles of inclination exceeding four degrees from the horizontal, as few clinometers can be relied upon for the accurate measurement of greater angles.

Location of improvements

20. As a general rule, approximate methods will suffice to define the position of improvements. Fences may be sketched in from intersections with the surveyed lines or by estimated distances, or they may be located by means of compass bearings and stepped distances, or by counting the fence posts or other similar methods. The position of other improvements, such as bores, &c., may usually be estimated with sufficient accuracy, and, where this is done, the plan should show that their location is approximate only. When it is necessary to determine the position of the improvements with greater accuracy, compass and tape traverses may be made.

Limit of errors.

21. As accurate surveys are required from surveyors, they will be expected to obtain as nearly as possible an exact closure. The error of closure of any new survey when tested by latitude and departure should not exceed one link per mile of the total surround in level and undulating country, and two links per mile in mountainous country. When the survey partly consists of other surveyors' work, a closure of, say, four links per mile of the total surround would not generally necessitate the resurvey of the original work. Where necessary to enable fencers to follow the lines, the boundaries should, however, be re-marked and details of the lines as marked furnished. The limit of error allowable will be decided by the Surveyor-General after consideration of the circumstances.

Memoranda re errors, &c., to receive prompt attention.

22. Official memoranda relating to errors and omissions must receive immediate attention. If a satisfactory reply is not received within a reasonable time, payment may be withheld, or action taken in the matter independently of the surveyor interested.

Erroneous marking to be defaced.

23. Where survey work has to be amended, all former marking must be obliterated or defaced.*

* The proper obliteration of survey marks is a matter of some importance, as a misunderstanding in this respect may lead to considerable trouble and expense. The method of "nicking" horseshoe marks, commonly practised by surveyors, is not sufficient, as it may mislead selectors and others. After a few years, when the sap and bark have grown over the blaze, it will present exactly the same appearance as if nothing had been done to it. The following method is to be adopted:—Extend the blaze downwards by cutting off the ledge of the original horseshoe mark, so that when the obliteration is complete it will have the appearance of a long irregular blaze, which, when overgrown, will render it at once recognizable as an obliterated mark.

24. Should a surveyor's work prove to be in error or not in accordance with the rules as then established, he may be called upon to rectify such error or default at his own cost, or he may be charged with the cost of rectification as made by another surveyor. Surveyor to rectify errors at his own expense.

25. Frontage to main roads and watercourses is to be computed at right angles to side lines. No portion shall have a greater breadth of frontage than two-thirds of the depth, except in cases where the land applied for comprises the whole of the land available for selection in the immediate neighbourhood* or the land has been mapped out on an approved design. Ratio of frontage to depth.

Generally the depth of a portion should not exceed three times its mean breadth.

26. As far as possible, roads should form boundaries of portions—that is, where the boundary of a portion would nearly coincide with a road, the road should be adopted as the boundary of the portion. Small severances of portions and irregular spaces between portions and roads are to be avoided. Roads should form boundaries.

27. As a general rule, areas of Crown lands which in themselves are too small for separate portions, or narrow strips between portions, should not be left as vacant lands, excepting such as may be required for public purposes. Small areas not to be left vacant.

(b) Designs.†

28. Before the permanent work on any extensive survey is commenced, a design of the proposed arrangement of roads and areas, based, if necessary, on a preliminary survey, and accompanied by a detailed report, is to be submitted for the consideration of the Surveyor-General. On completion of the permanent work, the approved design is to be returned with the plan of survey. Design to be submitted.

29. Surveyors engaged upon the designing of areas should exercise the greatest care and discretion, so that the land may be divided to the best advantage. A careful and comprehensive examination of the country should therefore be made before deciding on the location of new roads, and their future extension beyond the country being actually designed should be kept prominently in view. Suitable areas should also be recommended as reserves for camping, water, and other public purposes. Care to be exercised and land divided to best advantage.

30. When situated consistently with the general design, boundaries should be roads, rivers, or creeks, or should follow ranges, spurs, or other leading natural features. Failing these in suitable positions, straight lines at right angles to one another should be adopted, and, as a rule, directed to the cardinal points. But any other general direction for boundaries may be adopted where such would more suitably conform with the general trend of road systems or natural features. In rough or rugged country it is important that the boundaries should be so located as to afford the greatest facilities for fencing. All natural and artificial advantages being conserved, symmetry of design, minimum in perimeter, and rectangularity of form should be aimed at. Location and direction of boundaries.

31. The roads from each farm to the railway or other objective should be as direct as the features of the country will admit while obtaining the easiest possible gradients. It is evident that if badly Road system to receive careful consideration.

* See "The Land Act of 1910," s. 67.

† See Appendix xxxiii. for specimen Plan of Design.

selected and unnecessarily circuitous roads are provided, the land to be reached will be considerably reduced in value; the ultimate economy of a carefully considered road system is therefore very apparent. In some cases it may happen that a road, although in the most suitable position for through traffic, is not reasonably accessible from the farms along its route, by reason of its being on the summit of a high dividing range, and it may be desirable to provide additional access. The surrounding circumstances should be carefully considered before coming to a decision, bearing in mind that it is desirable each portion should enjoy the best and most suitable access while avoiding the establishment of unnecessary or intersecting roads.

Roads may be traversed when necessary.

32. In many cases the position of the roads may be located by compass and step, or other approximate methods, if sufficient connection is made with existing surveys to check the reliability of the approximate work. When necessary for the purpose of a design, proposed roads may be traversed or surveyed. If traversed, the stations should be pegged and marked and the dimensions of one side of the road determined by protractor and scale from a large scale plot of the traverse. (See clause 111.) Where the roads are traversed, the road lines need not be marked by the designing surveyor, the point to be kept in view being that the survey work necessary to obtain a reasonably accurate design should be restricted to a minimum, pending approval of the subdivision.

Travelling route to be blazed or chipped.

33. When the position of a road has been finally decided upon, as a general rule the actual travelling route should be clearly blazed or chipped, so that it may readily be identified by the surveyor making the permanent survey of the road or by clearing gangs. This is important, as a considerable time may elapse between the selection of a road and its permanent survey.

Water facilities to be fully utilised.

34. Water facilities (natural or artificial) and suitable sites for conservation of water by means of tanks, wells, &c., should be utilised to the fullest extent and equitably distributed among the farms or reserved for the use of the public.

Boundary watercourses to be traversed.

35. Watercourses that are suitable for boundaries should be traversed, and, where practicable, the traverse should be effected in such a manner that it may be used for the determination of the position of both sides of the watercourse. Where it is impracticable to obtain offsets to both sides, an offset should be taken to one side, and an approximate width of the watercourse estimated at the point of offset, from which to determine the position of the other side. The provisions of clause 75 do not apply to this estimated width.

Give-and-take lines along watercourses.

36. Watercourses that are unsuitable for boundary purposes, but are of such a nature that it is preferable to adopt give-and-take lines to obtain an equitable division of the water, or facilities for conserving same, should be traversed with compass and chain, and equalising lines adopted as the boundary. These equalising lines need not be surveyed at the time of preparation of the design, but should await the permanent survey of the portions.

Location of high boundary ranges.

37. If high ranges are adopted as the boundaries of portions, their position should generally be located by approximate methods of survey, the approximate work being sufficiently connected with existing surveys to render it reasonably reliable. When these methods are inadequate to determine the position within the limits

desirable in any particular case, the ranges may be traversed with compass and chain, or lines may be surveyed with theodolite and marked along the range in the best position for fencing purposes. Each case must be considered on its merits, as accuracy of position is, of course, not so essential where the land is being divided into large grazing farms, as where small portions are being dealt with. If lines are adopted along or in the vicinity of ranges, care should be taken that all the available land is included so that no vacant strips of useful country be left between the portions and the ranges.

38. Reference trees should be marked at suitable intervals on all traverses effected for the purpose of preparing a design, with either letters or numbers for the convenience of intending selectors in locating the farms, or of the surveyor in locating the position of the permanent lines.

Reference trees on traverses.

39. When preparing designs, and in all surveys, surveyors should note the general surface and geological formation of the country, the quality of the soil, the vegetation, and the water supply; observe bearings to hills and other conspicuous features, and, generally, obtain as much topographical information as possible.

Topographical information to be obtained and noted.

40. The danger of infestation by noxious weeds, especially prickly pear, should be kept prominently in view, and in cases where it is likely to occur, the width of roads and all reservations for public purposes should be restricted to a minimum. If it should appear that roads or reserves already established are not necessary in the public interests, a report to that effect should be furnished.

Danger of infestation by noxious weeds to be kept in view.

41. Surveyors should, as a rule, endeavour so to divide the land that each portion in itself contains a sufficient area to afford the future holder an opportunity of making a reasonable living.

Each portion to be sufficient to afford a living.

(c) Meridians of Surveys.

42. The "Initial True Meridian" in a county is the true meridian line passing through a fixed, centrally situated point (the "Initial Point") in the county.

The initial true meridian and the initial point defined.

The initial "County Arbitrary Meridian" is part of a great circle which also passes through the "Initial Point," but has a fixed angular divergence from the "Initial True Meridian."

The county arbitrary meridian defined.

This angular divergence is the "County Variation," and its value for each county is shown in Appendix xx.

The county variation defined.

43. Except in very closely settled areas, for which provision is made in clause 49, the "County Arbitrary Meridian" is to be adopted as the datum for survey work on Crown lands and, therefore, the meridians of survey work effected in each county will not converge—all north and south lines will be parallel, and all east and west lines will also be parallel.

All survey work in a county to be on the county meridian.

44. Where new survey work is to be commenced—on isolated portions or in the survey of large areas or groups of portions not connected with a survey on the county meridian—this meridian should be established by the following method:—

How to determine the meridian for new survey.

Take solar or stellar observations to determine the true bearing of a survey line or a referring object related to the survey.

Compute the convergence for the departure—east or west—of the observing station from the initial true meridian.

This convergence applied to the true bearing of the survey line or of the R.O. adjusts it to the initial true meridian as datum.

The subtraction of the fixed county variation from this adjusted bearing relates it to the county meridian as datum. [See also Appendix xxi.]

Connection and check on common boundary of counties.

45. Where surveys effected in adjoining counties meet on their common boundary the angular difference (closing angle) of the connecting lines must be observed and recorded in the field-books and on the plans.*

Meridian of adjoining surveyed lines to be re-established.

46. Where any of the boundaries of an area to be surveyed coincide with, or adjoin previously surveyed lines, the whole—or so much as may be necessary—of one of the previously surveyed lines should be carefully run out with the theodolite to re-establish the meridian of the original survey.

Meridian may be established by astronomical observation.

47. If the variation of the meridian of a long adjacent boundary line is known, instead of running it out with the theodolite, a datum for the new work may be established from a preliminary solar or stellar observation.

Meridian of adjoining surveys on the county meridian to be adopted as datum for new work.

48. If the previously surveyed line was effected on the county meridian and—by running it out—its meridian is re-established, it should be adopted as the meridian of the new survey—subject, however, if necessary, to check by one or more observations taken in the course of the subsequent survey work. But if for any reason it is not expedient to re-establish the previously surveyed line by running it out, the county meridian as datum for the new work should be established as directed in clause 44.

Meridian of previous survey to be adopted in closely settled areas.

49. If the land to be surveyed does not abut on to a tract of vacant land, but is wholly or almost wholly enclosed by previously surveyed lands, the re-established meridian should be adopted as the meridian of the new survey work—even though it be not parallel to the county meridian.

Evidence of coincidence of re-established line with previously surveyed line must be given in field-book.

50. Where any of the boundaries of a portion under survey coincide with previously surveyed lines or boundaries only so much work should be done as is absolutely necessary to re-establish the previously surveyed lines, and sufficient evidence must be given in the field-book that the boundaries adopted are coincident with those previously surveyed. (See clause 21.)

Exception—where exact coincidence of new and old surveyed lines is not essential.

Occasionally, however, it may not be necessary for a new survey line to coincide exactly with a previously surveyed line. Such a case can only occur on Crown lands or on the boundary of a pastoral lease. There, instead of incurring the expense of running out with the theodolite and offsetting an old previously surveyed line, a new line may be run on the recorded bearing, and a consequent slight want of coincidence with the previously surveyed line may be disregarded, if improvements or other interests are not affected thereby.

* NOTE.—The following rules should be adopted with regard to plans of surveys that extend from one county into another:—

(a) In the case of surveys of portions.—Separate plans of the portions in each county drawn to the arbitrary meridian of that county, and showing the difference in meridian between the two counties, must be supplied.

(b) In the case of road or feature surveys.—If a break can be conveniently made at the county boundary, furnish separate plans, as in (a). If no break can be made the plan must be drawn to the meridian of the county in which the datum of the survey is located, and this meridian must be maintained throughout. But a general note, relating to the lines in the second county, and stating the difference in meridian between the two counties, may be made on the plan.

N.B.—In no case should the several parts of any one plan be drawn to several different meridians, as this at once leads to confusion and error.

(d) Selections and Reserves.

51. All surveyed portions are to be numbered in sequence, each parish having a separate series—numbers of portions will be stated in instructions. The method of grouping the broad-arrow, number, &c., is shown in Appendix xxvi. In surveys effected for the Commonwealth Government the addition of a bar below the broad-arrow, as shown in Appendix xxvi., is required.

Numbering of portions.

52. Where a selection includes more than one portion as mapped out, unless otherwise instructed, the external boundaries only are to be surveyed, and the number will be the lowest portion number included in the selection. Where portions are designed into even areas of 160 acres or multiples thereof, the designed areas should be adhered to wherever practicable without undue distortion of the design.

Selections including more than one portion.

53. In surveying farms care should be taken not to exceed the maximum net area fixed by "The Land Act, 1910," and the Regulations thereunder. Section 56 of the Act reads as follows:—

Maximum areas allowable.

"The maximum area declared by any notification shall not exceed the area herein mentioned for the respective class or mode of selection herein mentioned, namely:—

(a) Agricultural farms	2,560 acres.
(b) Perpetual lease selections	2,560 "
(c) Agricultural homesteads	320 "
(d) Free homesteads	160 "
(e) Grazing selections	60,000 "
(f) Prickly pear selections	2,560 "
(g) Unconditional selections	1,280 "
(h) Group selections—	
Agricultural farm	2,560 "
Perpetual lease selection	2,560 "
Agricultural homestead	320 "
Prickly pear selection	2,560 "
Grazing homestead	5,120 "
Grazing farm held in conjunction with agricultural farm	2,560 "

The limit of area will generally be stated in instruction for survey, but failure in this respect cannot be regarded as an excuse for exceeding the gazetted maximum area.

54. (a) Good serviceable fences situated approximately on the boundaries of portions should be surveyed, and lines closely following the fence pegged and marked as the boundary. Suitable fence posts thereon may be adopted as corners in order to ensure close agreement with the fence. These posts should be marked with a broad-arrow, and a reference tree taken in the usual manner.

Boundaries along fenced lines.

(b) Where there is a fence which, although curved or not reasonably straight, it is desirable to utilise as a boundary, the fence should first be traversed with compass and chain. When its position has been so ascertained, within reasonable limits, give-and-take lines should be surveyed with the theodolite and marked as the boundary of the portion or portions. It is desirable, as a general rule, that

these lines should be so located that the fence is not more than, say, twenty-five links from the adopted line in the case of portions not exceeding 1,280 acres, or seventy-five links in portions exceeding that area. When an adopted line forms one side of a road, its position should be so arranged as to coincide as nearly as possible with the fence, which, as a general rule, should not encroach upon the road.

Side of road opposite to fenced lines.

55. In the survey of grazing farms, where a fence forms one side of a boundary road not exceeding ten chains in width, it will not be necessary to survey and mark both sides of the road. Unless previously traversed, the side that is fenced should be surveyed and marked, the opposite corners being laid off therefrom. The lines between these corners should be computed and shown on the plans as the boundary of the portion or portions abutting thereon. (*See* clauses 137 and 138.)

Encroachment on pastoral leases.

56. If such fences encroach to any serious extent on land held under pastoral lease, written consent to their adoption as boundaries should be obtained from the lessee or his responsible agent and forwarded to the Surveyor-General.

Lines previously traversed or marked not to be resurveyed.

57. Where portions adjoin previously surveyed rivers, creeks, or marked lines, such shall not, without good reason, be resurveyed. Connections should be made with original corners and the azimuth of old lines observed—the surveyor's own work being proved by astronomical observation. A misclosure with old work, unless exceeding four links in a mile, will not justify a resurvey. (*See* clause 21.)

Boundary lines to be cleared.

58. Boundary and road lines are to be cleared to a width of two feet by the removal of scrub, undergrowth, and trees less than six inches in diameter. In scrub and in forest country the trees standing nearest to the line are to be marked with a horseshoe mark cut into the heart wood on opposite sides of the tree in such positions that the marks face along the survey line. Trees left standing, and through which the line passes, are to be double marked on opposite sides in such positions that the marks face along the survey line.*

Lines in sparsely timbered or open downs country—trees to be marked.

59. In sparsely timbered or open downs country, surveyors should neglect no reasonable opportunity of marking reference trees at corners, and where the only suitable tree is situated at a greater distance than two chains from the corner, a measured connection thereto may be made and charged for at traverse rates. Where there is only an occasional tree near the line, such tree shall be marked with a horseshoe mark on three sides, the centre mark facing the line, and the position of that mark in reference to the surveyed line shall be determined by a measured rectangular offset, which is to be recorded in the field book and shown on the plan. In such country especial care must also be taken to use only good, sound corner posts and pegs of the full dimensions specified in these directions. Wherever, in such country, a boundary line intersects an existing fence, the intersection shall be marked by the insertion of a peg with lockspits on the line of survey.

* As it is found that bottle-trees and various trees of the order "Coniferae," Doodathu or Kauri Pine (*Agathis* or *Dammara Robusta*), Moreton Bay or Hoop Pine (*Araucaria Cunninghamii*), and the Bunya Pine (*Araucaria Bidwillii*), are destroyed by incisions being made in the bark, these trees should not, except where it is unavoidable, be blazed or used for reference purposes.

60. At distances not exceeding ten chains apart, and always so situated as to be visible one from the other, split hardwood pegs, eighteen inches long and two inches square, clear of sap wood, are to be aligned with the theodolite and driven fourteen inches into the ground. Ten-chain
pegs.

Note.—The practice of obtaining pegs by chopping them from the sides of standing timber is prohibited.

61. On each side of the split pegs, and distant about one foot, lockspits, three feet in length and six inches in depth, are, except as hereinafter provided, to be dug in the direction of the surveyed line. On very stony lands, rows of stones placed in the direction of the surveyed line may be substituted for dug-out lockspits. In dense scrubs, or where soils are of such a nature that lockspits quickly fill up and consequently are useless as permanent indicators of the direction of survey lines, they may be omitted.* Lockspits
to be dug.

62. In the survey of grazing farms exceeding 2,560 acres each, or where any line under survey adjoins Crown lands, reference trees should be marked at a distance of one mile, or about one mile apart, and the bearing and distance determined from these trees to a mile or other chainage peg. The usual horseshoe marks should be cut and the bark removed in the form of a shield, the mileage or chainage being cut under the broad-arrow on the shield. The position of and the bearings and distances from such trees (taken from bench mark at base) are to be recorded in the field-book and shown on the plan. Where both sides of a road are marked at the same time, these trees may be omitted from one side. In treeless downs, a marked peg should be placed at every mile. It is unnecessary to establish these marks on lines of 120 chains and under, or within 40 chains of a corner. Mile trees
to be
established.

63. Principal corners shall be marked with hardwood posts three feet six inches in length, clear of sap wood, and dressed to not less than four inches square, with a butt six inches long and the full round size of the timber left on the bottom of the post. Posts are to be sunk two feet into the ground and well rammed. Where hardwood timber is not readily available, such as in dense vine scrubs, the corners may be marked with split hardwood pegs four inches by four inches, and twenty inches long, well driven into the ground so as to leave four inches of their length above the surface. Principal
corner posts.

64. Where bed rock is met with in post-holes, the posts should be solidly packed up with stones, and rows of stones may be placed in the direction of boundary lines. Rocks at corners are to be marked with a broad-arrow (point at angle) and with pick marks in the direction of boundary lines. Rock at
corners.

65. Adjacent to portion and road corners in country lands, split hardwood pegs, free of sap wood, twelve inches long and one and a-half inches square, shall be driven level with the surface of the ground. These pegs are to be aligned with the theodolite in the direction of the boundaries, and driven at exact distances of twenty links from corner posts. In order that they may be of service in the determination of the angle points, the distances from the corner posts at which they are placed shall be recorded in the field-book, Pointer pegs.

* See Clause 23 of the "Rules and Directions regarding Payment for Survey Work."

Reference trees—method of marking.

66. The nearest suitable tree to a corner post should be selected and the bark removed in the form of a shield, about five feet from the ground and exactly facing the post. On this barked space the broad-arrow and portion number in Arabic numerals shall be cut at least half an inch deep. Horseshoe marks shall be cut into the heartwood on the other sides of the tree, about four feet from the ground—on large trees three such marks, on small trees a fewer number. The bearing (to the nearest five minutes of arc) and the horizontal distance (to the nearest tenth of a link) shall be observed and measured to the post from a chisel cut in the centre of a bench mark at the base of the tree and exactly facing the post. Reference trees should preferably be selected within the boundaries of portions, but should none such be available the most suitable tree shall be utilised.

Separate tree for each portion.

67. At corners common to two or more portions, a reference tree, except as hereinafter provided, shall be marked for each portion. More than two trees, however, need not be marked at any one corner.

No tree—post to be marked.

68. Should no suitable tree whatever stand within a radius of two chains of the corner, the broad-arrow and the portion number or numbers shall be cut into the post.

Tree at corner.

69. If a large tree stand exactly at a corner it shall be marked as directed with broad-arrow, portion number or numbers and horseshoe marks, and with pointer pegs at exact distances of twenty links from the corner in the direction of the boundary lines as directed in clause 65.

Corners on groups of portions.

70. Where groups of portions, the areas of which do not exceed twenty acres each, are under survey in timbered country, only principal external corners, not exceeding four in number in each group, should be marked with posts, as detailed in clauses 63 to 65, provided that such corners should not, as a general rule, be at a greater distance apart than sixty chains. All the other corners are to be marked by split hardwood pegs, eighteen inches long and two and a-half inches square, well driven into the ground, so as to leave four inches of their length above the surface. A reference tree to each such corner peg is to be marked in accordance with clause 66. Should there be no suitable tree available, a post is to be placed at the corner and marked, as specified in clause 68. Lockspits should be dug in the direction of the boundary lines, as specified in clause 61.

Principal and other corners—how to mark.

71. Four of the principal corners of a portion should be marked as described in clauses 63 to 69, but at all other corners, split hardwood pegs, eighteen inches long and two and a-half inches square, should be driven to within four inches of the surface of the ground. Adjacent to these corners, pointer pegs should be placed as provided in clause 65 and a reference tree or trees marked as described in clauses 66 and 67. In every case where a reference tree is not available, a post (as specified in clauses 63 and 68) should be placed at the corner, but this direction does not apply to the corners marked by pegs referred to in clause 85.

Reference trees on grazing farms.

72. To avoid destruction when rabbit fence lines are being cleared, reference trees at the corners of grazing farms should, where possible, be selected at a greater distance than twenty links from the post.

73. When the boundary of a portion crosses a tract of country that is inaccessible, the boundary should be surveyed and marked on either side of, and up to, the inaccessible place, posts and reference trees being established at the terminal points, which shall, when practicable, be connected by a traverse survey defouring the obstacle.

Inaccessible places.

74. To avoid inaccessible tracts, the direction of boundaries may be varied and carried by marked lines along the top or the base of cliffs or precipices, but in the case of selected land, previously designed, the boundaries should be adhered to as closely as possible.

May be avoided.

75. Traverse lines, following watercourses, should be as long as practicable, within an offset limit of three chains on country lands and one chain on town or suburban lands. Where short bends cause these limits to be exceeded, subsidiary traverse lines should be run. Offsets should be taken at intervals of about two chains, but at shorter distances if necessary, and should be either stepped or chained. At traverse corners the offset should be taken on the half angle. (See clauses 35 and 88.)

Traverses of watercourses and offsets.

76. As it is desirable to establish uniformity of practice in the measurement of frontage watercourses, it is directed that where a watercourse forms the boundary of any parcel of land, the measurements shall be to the edge of the bank. In this regulation, the term "bank" means the bank which limits the main or principal watercourse under normal conditions as indicated by the normal water level, or the water mark, or any bed of shingle, sand or mud, as the case may be. The average width of the watercourse shall be noted in the field-book and plotted on the plan.

Uniformity in surveying water frontages.

77. Where frontage creeks are shallow, indefinite in position, and offer no barrier to the crossing of stock, equalising or give-and-take lines may be surveyed crossing and recrossing the creek, provided that the land on each side is held by the Crown. Such water as may exist should be equally divided between portions on either side, and the equalising lines should, where possible, be located on country that is not flooded, in order that suitable fencing lines may be provided.

Equalising lines along shallow watercourses.

78. The edges of fresh-water swamps are not to be adopted as frontage boundaries. Portions abutting on to such are to be surveyed irrespective of them, excluding or including such swamps or parts of them, and are to be defined in conformity with the local design. Boundaries which cross swamps with deep water too wide to be actually measured over may be dealt with as inaccessible. (See clauses 73 and 74.)

Fresh-water swamps not to be boundaries.

79. The boundary lines of portions fronting lakes or lagoons required for public purposes shall be defined by marked lines at a distance of not less than 150 links from the water's edge, so as to allow the free passage of stock along the margin. In country infested with noxious weeds a less width may be adopted.

Boundaries along lakes, &c.

80. An esplanade not less than 150 links in width must be reserved above high water mark along the sea coast, navigable rivers and creeks. This esplanade should not be marked unless it is required for road purposes, but an area to provide for it must be reserved in the portion or portions and it must be indicated on the plan.

Esplanade along sea coast, &c.

81. Sandy beaches, mangroves, bare mud-flats, and salt swamps are generally to be considered as being below high-water mark, but land that can be easily reclaimed, small patches of mangrove,

General rule as to high-water mark.

or mud-flats, nearly or quite isolated from the general contour of high-water mark, may be dealt with as being above it, and may be crossed by esplanades, or be included within the boundaries of portions. Surveyors, while observing this direction as far as it may fairly apply, must exercise discretion in dealing with the varying conditions to be found along such frontages.

Reserves in grazing areas.

82. To meet the requirements of travelling stock, full and sufficient reservations should be made for camping and for water. Suitable sites for dams, tanks, or bores along main roads and stock-routes should be reserved, or their reservation recommended. Local Authorities should be consulted, and their suggestions and requirements, in the matter of reserves for all public purposes, should receive the surveyor's careful attention.

Surveyors to advise as to lands suitable for reserves.

83. Surveyors should unflinchingly advise the Surveyor-General of all lands that should be reserved for town sites, natural or artificial water supply, building-stone, road-metal, gravel, camping, State schools, recreation, trigonometrical stations, State forests for the preservation of cedar, pine, or other timber, crossings in water-courses, lakes, waterfalls, spots of unusual beauty, or for any other present or future public purpose.

Surveyors to report on land that should not be alienated.

84. Should instructions received for surveys include land which, in the public interest, should not be alienated, surveyors should immediately report thereon to the Surveyor-General.

Reservations along railway lines.

85. In defining the boundaries of land abutting on existing railways or proposed railways, the routes of which have been permanently surveyed, due provision must be made for necessary reservations. If a road is required along the railway line, it should not be less than one chain wide in addition to the railway requirements. If a road is not required along the line, only such provision should be made as is necessary for railway purposes. If the railway line is not fenced or the area required is not already laid out on the ground, the widths shown on the railway plans should not be encroached upon, but this direction does not refer to cases where a reservation three chains wide on each side of the line is shown on the railway plans, as this uniform width has now been discontinued. Where the railway line is fenced and a road is not required, lines adjacent to the fence may generally be adopted as the boundary of the land under survey, but the boundary lines should not encroach on the railway enclosure. A reservation of from one to three links should be maintained between the fence and the boundary lines, so that dual control of the fence may be avoided. Tangents or chords of not less than two chains in length should be adopted where the boundaries adjoin curves in the railway line or fence, the angles of these tangents, or chords, being marked with split hardwood pegs, free from sap, two and a-half inches square, eighteen inches long, and driven fourteen inches into the ground. Reference trees are not required at these angles, but corners marked in the ordinary way are to be provided at distances of about half a mile apart.

Connecting isolated portions.

86. The survey of one or two isolated portions should be connected with previously surveyed areas if such exist within two miles. The survey of large groups of portions should be connected with previously surveyed areas if existent within five miles. If there be no such previously surveyed portions, connections should be made

with a marked tree on a feature survey, or to any other point the position of which has been previously determined. Connections should be made by theodolite survey, preferably following a road or a natural feature. Where there are no roads or natural features, connecting surveys should be as direct as possible.

87. Should a road be traversed for this purpose, one side of it may, if advisable, be also surveyed and marked in addition to the traverse, which, provided there be no reason to the contrary, should in such a case be effected with the prismatic compass—the theodolite survey of the marked side forming the connection required.

Connection by surveyed road.

88. All traverses should be carefully effected, offsets being chained or stepped from the traverse line to watercourses, other natural features, tracks, or fences. The angles should be marked with hardwood pegs, eighteen inches long and two inches square, driven fourteen inches into the ground, the tree nearest to each peg being blazed with three horseshoe marks, the centre one of which should face the peg. At intervals of about a mile, reference trees should be marked with a distinguishing letter, and the bearing and distance therefrom to the traverse line recorded. (See clauses 35 and 75.)

Traverses along watercourses, &c.

89. It is frequently found in practice that surveyors omit to make connections which could easily be done when on the ground, but involve considerable expense and delay afterwards. Surveyors are, therefore, expected to see that their work is properly connected with former road and portion surveys, with definite and known points on railway* and telegraph lines, and with the marked trees (when such are found in the vicinity) of previous feature surveys, including preliminary surveys on designs. Also, when a surveyor is effecting surveys along a watercourse or road on the opposite bank or side of which there are previously surveyed portions, connections to such previous work shall, if possible, be made—either by actual survey or by bearings from the work in progress to a clearly defined point on the old work. When it can be conveniently done, the meridians of the old and new work should also be compared. The connections with previous work should be clearly shown on the plan, together with sufficient information to show that the old work has been properly identified.

Connections to previous work should always be made.

90. A report on the prescribed form (Appendix iii.) should accompany all plans of unselected lands surveyed for alienation. This should contain a detailed description of each portion, its rock formation, soil, approximate proportion of agricultural to pastoral land, natural herbage, grazing capacity, description and value of timber, water supply, liability to flood, existence of noxious weeds, nature of improvements, and the rent per acre recommended. Information as to the best road and mileage to the nearest port, town, or railway station should also be given.

Report and valuation to be forwarded.

* When the connection to a railway line or survey is on, or near, a curve, it should be made to the intersection of two straights produced. If not near a curve, the connection should be to the nearest permanent mark, such as a culvert or bridge. The posts, &c., indicating the traffic mileage on the ground, having no reference to the railway plan mileage and being constantly liable to alteration, are useless for connection purposes; whereas, all culverts and bridges are numbered and charted and can, therefore, be identified in the office records. Railway connections should be to the centre of the line—not to the fence.

(e) Town and Suburban Lands.

Selection of town sites.

91. The selection of sites for towns is a most important matter, meriting more attention in this State than it has had in the past—some towns having been located without proper regard to the laws of hygiene or economic considerations. When a town site is chosen by the surveyor—may be in a casual manner—the location of a future city has perhaps been really decided, and, as the health of the town or city will be a matter of supreme importance, it is essential that the site chosen should present such natural features and advantages as will conduce to the well-being of the future inhabitants. In this relation there is a well-known connection between subsoil and disease, between geological structure and the death-rate, and it may be stated, as an axiom of sanitary science, that there is less disease on pervious than on impervious soils; less, again, on high-lying pervious soils than on those that lie low.

Elevated sites should, therefore, be chosen as not being liable to be flooded by the overflow of watercourses, nor kept damp by soakage waters, and, moreover, the natural inclinations from elevated sites towards lower levels provide for surface drainage. The soil should be pervious, or thinly overlying an absorbent stratum into which moisture quickly drains away. Pervious soils also present favourable economic conditions, in that they are easily excavated for underground subways, water, gas, and sewage conduits.

It is expected that surveyors, perceiving their responsibilities in this respect, will, in the selection of town sites, exercise wisely their judgment as between clay flats and permeable strata; between flooded lands and more elevated situations safe from flood and the dangers lurking in perennial moisture.

The matter of the water supply for future town or city should also receive due attention, any existing natural provision being reserved or its reservation recommended. In this, as in all other cases when making reservations or provision for future public requirements, Local Authorities should be consulted, if necessary, and their requirements and views should receive careful consideration.

Designs to be submitted.

92. Before the permanent work on any survey of town or suburban lands is commenced, a design of the proposed arrangement of sections and streets, based, if necessary, on a preliminary survey, and accompanied by a detailed report, is, if required, to be submitted for the consideration of the Surveyor-General.

New towns to be surveyed on county meridian.

93. Where new towns are to be located, the permanent survey of town sections shall be preceded by the astronomical determination of the true meridian by eastern and western solar or stellar observations. The county meridian (see clauses 42 and 43) is to be adopted as the datum of such survey.

Sections to be rectangular.

94. Towns should be laid out in rectangular sections on lands that are fairly level, but to some extent in accordance with the surface conformation on uneven ground.

Dimensions of sections and allotments—back lane.

95. Sections should contain five acres each, measuring ten chains long and five chains wide, divided into ten half-acre or twenty quarter-acre allotments. In cases where it is probable that the town will become of considerable importance the sections

may be five chains thirty-three and one-third links wide and a lane thirty-three and one-third links wide provided as a back entrance to the allotments. These lanes are not to be provided for unless specifically mentioned in the instructions.

96. Streets, where practicable, should be located on the lower levels, that the surface water may drain from the allotments into the street channels, which, in towns without underground sewers, are the means usually provided for carrying off storm waters. In certain cases it would be an advantage that streets follow the contour of, and include the minor, watercourses; the lower levels along which storm and soakage waters flow would thus be under the control of municipal authorities. Such streets, however, should be of sufficient width to provide for ordinary traffic without immediate formation.

Streets to be located on lower levels.

97. The principal streets may be one and a-half chains wide; other streets one and a-half or one chain wide.

Width of streets.

98. When town sections are being surveyed adjacent to rivers or creeks, an esplanade of a suitable width should be reserved along the frontage.

Esplanade.

99. Provision should also be made for wharf sites on the banks of navigable waterways.

Wharf sites.

100. Requisite areas should be reserved for school, post and telegraph, and police. Reserves of suitable areas may be provided for road metal, gravel, recreation, parks, or gardens. A site for a cemetery may be recommended, but should not be located within the limits of a town. These reserves need not be marked on the ground unless instructed for.

Reserves for various public purposes.

101. Previously erected improvements should be included in allotments when so doing does not greatly interfere with the symmetry of the design.

Improvements.

102. The building lines of streets are to be cleared to a width of three feet by the removal of scrub, undergrowth, and of trees less than six inches in diameter. The trees standing nearest to the line and those left standing on the line are to be marked as directed in clause 58.

Building lines.

103. The principal corners of sections, not exceeding four in number, are to be marked by corner posts as prescribed in clause 63. The posts shall be marked with the number of the section cut into the wood—in Roman numerals three inches in height for town sections, and in Arabic numerals three inches in height for suburban sections. Outside a fifteen-inch radius from the posts, lockspits three feet long and six inches deep are to be dug in the direction of boundary lines. If a small tree stand exactly at a corner, it should be cut off eighteen inches from the ground, and a post shaped out of its stump at the exact angle point. This post should then be marked with section number and lockspits as directed.

Corners of sections.

104. Corners of allotments and of sections, other than those provided for in clause 103, are to be marked as follows:—Hardwood pegs, two inches square and eighteen inches in length, are to be driven fourteen inches into the ground. Those on the street frontages are to be marked with the numbers of the allotments, cut into the wood in Arabic numerals two inches in height. The numbers shall face the allotments they represent. Outside a radius of twelve inches

Corners of allotments.

from the pegs, lockspits are to be dug in the direction of each boundary line. Section corner posts are to be marked with the allotment numbers in Arabic numerals facing the allotments, and with the section numbers in Roman or Arabic numerals (as provided for in clause 103) facing the streets.

Rocks at corners.

105. If rocks, that cannot be removed, are found to be situated at corners of either sections or allotments, they should be marked, as directed in clause 64, with broad-arrow (point at angle) and pick marks in the direction of each boundary, and, if practicable, the section or allotment number should be cut into the rock.

Iron rods.

106. As permanent datum points in connection with the survey of town sections, iron rods, one inch in diameter and twelve inches in length, are to be driven perpendicularly into the ground to a depth of eighteen inches (*i.e.*, top of rod to be six inches below the surface) at the intersection of the centre lines of the principal streets. Sites for these rods should be selected where streets are unlikely to require other than surface formation. Not less than three rods should be inserted; in no case should the distances between them exceed twenty chains, and the sites should be visible from one another.

Survey to be connected with iron rods.

107. The survey is to be connected by angular and linear measurement with these rods, and their positions are to be noted in the field-book and shown on the plan.

Use of iron rods in subsequent surveys.

108. When additional sections are being surveyed in a town, the rods inserted in connection with a previous survey should be found, and the meridian indicated by them should be adopted as the datum for the new survey work.

Report and valuation to be forwarded.

109. A report and valuation on the prescribed form shall be forwarded with all plans of town and suburban lands surveyed for alienation. In the case of new town sites this should describe the soil and rock formation—whether porous or impermeable, whether the land is subject to flood and to what extent, how naturally drained, any natural water supply that may be available, and how the site is situated generally in respect of communication with the surrounding district and other places. A particular description is also required of allotments, the nature of any improvements, and the price per acre recommended.

(f) *Roads through Unoccupied Lands.*

Roads—general remarks, gradients, &c.

110. Rapidity, safety, and economy of carriage are the objects of roads; they should, therefore, be so located as to enable loading and passengers to be transported from one place to another with the least possible labour and in the shortest time. To attain these ends roads should be straight and level. These requirements must often conflict. In such cases, straightness should always be sacrificed to obtain the lowest practicable ruling grade. A good road winds around hills instead of passing over them. As a general rule, the horizontal length of a road may be advantageously increased twenty times the perpendicular height which is thus to be saved.

Inclinations, always injurious, are particularly so where a steep slope occurs on a long line of road which is otherwise comparatively level. It is in that case especially important to avoid or to lessen this slope, since the load carried over the whole road may have to be

reduced to what can be carried up this ascent. If a hill cannot be avoided it should be contoured with the easiest grade obtainable, but which need not be less than the ruling grade already established at other points on the road. Authorities on road making are agreed that the longitudinal slopes of a road should be kept, if possible, between one in thirty and one in one hundred and twenty-five, never steeper than the former, nor nearer to the level than the latter ("Roads and Railroads," Gillespie). Roads should therefore, wherever practicable, be so located that these grades can be obtained by a reasonable expenditure on formation. In rough and rugged country, this ideal maximum of longitudinal slope must often be exceeded, but however much this may be necessary, the importance of increasing horizontal length to obtain the lowest practicable ruling grade should not be lost sight of. Immediate public necessity for a road that is practicable often conflicts with the future public interest. It may really be false economy to contour a spur that should be cut down; to make a long detour to a crossing to save the cost of a bridge on the direct route; or to go round a swamp that should be crossed direct on a causeway. Yet immediate necessity has its claims, and economy is a comparative term in relation to funds available and the cost of such improvement. When such conflicting cases arise, surveyors should put all the facts before Local Authorities (*see* clause 114), appealing to the Surveyor-General when the decision of the Local Authority appears to be unwise.

It is obvious that the greatest care and judgment are necessary in the selection and location of roads. To assist surveyors and to establish uniformity of practice, the following directions are to be strictly observed:—

Roads surveyed or mapped out on Crown lands should be so located that—(a) the natural profile of the roadway does not exceed a gradient of one in fourteen; or (b) the proposed roadway may be improved at a reasonable cost, so that, when formed, the gradients will not exceed one in fourteen. (*See* Appendix xiv.)

In cases where it is considered undesirable or where it is impossible to provide such a roadway at reasonable cost, the circumstances should be carefully considered, the most suitable route selected, and information regarding the following particulars reported to the Surveyor-General on the proper form (*See* Appendix vii.), the position of each excessive gradient being shown on the plan of survey or design, as the case may be:—

- (i.) The location and objective of the proposed road.
- (ii.) A general description of the country traversed by the road.
- (iii.) Probable nature and volume of traffic.
- (iv.) The nature and extent of the surveyor's inspection of the country along and adjacent to the route of the road.
- (v.) Why a gradient of one in fourteen cannot reasonably be obtained.
- (vi.) The gradients recommended.

As failure to locate the best and most economical route may entail the needless expenditure of large sums of money in construction work, it is imperative that a thorough inspection of the country in the locality be made.

The extent of the preliminary inspection will be governed by the nature of the country; but in all cases it should be sufficient to discover the best route. The aneroid barometer will be found very useful in the preliminary inspection and in determining the relative heights of "saddles" or suitable crossing places in ranges. To use the aneroid to the best advantage, it is desirable to have a second instrument, to be read at stated intervals, in the camp, so that the diurnal range may be noted and allowed for in the reduction of heights.

The grading of the road should be carried out with the clinometer, and when the route has been finally selected it may be traversed with the compass and chain or theodolite and chain, as provided for in clauses 111 and 112.

In contouring spurs, care should be taken to select natural facilities and least possible side slopes. Continuous even gradients should be avoided, and short, fairly level stretches of road provided as resting places for teams.

In dealing with lands either by actual or preliminary survey, where tracks with gradients exceeding one in fourteen are in use, it may be necessary to provide for both present and future requirements by the reservation of the tracks and by the survey of the routes which will ultimately be adopted.

Selection of roads—country to be carefully inspected.

111. For the purpose of avoiding unnecessary angles, and to insure the precise location of road lines, preliminary compass or theodolite traverse surveys may be made when justified by circumstances. Before commencing the permanent survey of road lines such traverse surveys should be plotted on a large scale, with all information gained in the preliminary survey also accurately plotted, and road lines should be laid out on the plot as long as compatible with the inclusion of the best route as the centre line of the road. When previously projected roads are being surveyed, the bearings and lengths of the side laid out as directed in clause 32, should be adhered to as far as practicable, connections to the original traverse being made at suitable intervals to insure the accurate location of the road lines with regard to the traverse. These connections must be clearly shown in the field-book and on the plan.

Preliminary traverses—instruments to be used.

112. Preliminary traverse surveys of roads should, when expedient, be effected with the compass or circumferentor. The theodolite may be used for preliminary road traverse surveys in dense tropical jungle, in other dense scrubs, and in country with heavy timber and dense undergrowth; but otherwise the theodolite should be used only when the conditions require the accurate location of road lines. (See clause 87.)

Failure in selecting suitable roads an evidence of incompetence.

113. The importance of the duties of the road surveyor cannot be too clearly realised, and it is expected that the directions in reference to the survey of roads will be faithfully and intelligently observed. Failure in this respect will be regarded as evidence of the surveyor's inability to perform survey work satisfactorily and as just cause for refusing him further employment.

Local Authorities to be consulted.

114. Due notice should be given in writing by the surveyor to the Local Authority of the date on which he intends to commence any road survey or preliminary work for the preparation of a design for the survey of any area of Crown lands, so that such Local

Authority may, if deemed advisable, instruct an officer to accompany the surveyor in his inspection of the lands and put the views of the Council before him. The requirements of Local Authorities must always be respected and satisfied as far as may be possible; except that should such requirements appear unreasonable or unwise the matter should be referred to the Surveyor-General, the survey work being left in abeyance pending his decision.

115. The objective points, as towns, railway stations, fords, bridges, gaps, &c., to which roads are directed should always be kept in view, and the route selected should be that which combines an easy ruling grade with economy in construction and straightness in direction.

Objective points to be kept in view.

116. Practicable road access should be provided to each portion, except in the case of two or more portions held by the same owner.

Access to portions.

117. Existing tracks should be maintained unless examination of the country discloses a more suitable route.

Existing tracks to be maintained.

118. Should survey parties block existing tracks by felling trees across them, the surveyor will be held responsible for the cost of removing the same, and for any damage or injury that may arise out of such improper action.

Tracks not to be blocked by felled timber.

119. All road improvements are to be kept well within the limits of the road as defined by survey, and, unless otherwise necessary, trees that have been blazed to indicate the direction of the road should be kept within its surveyed limits. (See clause 33.)

Road improvements to be kept in road.

120. In the survey of portions of land contiguous to previously surveyed areas the roads through the new work should be laid out in continuation of those through the old.

Continuation of existing roads.

121. But so that lines of road communication may be uninterruptedly completed—should no suitable road system have been provided by the old surveys—roads surveyed in connection with the new work may be continued through any previously surveyed portion which is not freehold nor enclosed leasehold.

Roads through previously surveyed portions.

122. Where it is necessary that roads be continued through freeholds, or through enclosed leaseholds, the survey may, in the absence of instructions, only be undertaken when the surveyor is in receipt of the written consent of the Local Authority and of the owner. Where the requisite consent cannot be obtained, a detailed report with sketch plan should be forwarded to the Surveyor-General. Roads through reserves for camping or other public purposes should not be surveyed, except specially instructed for, but the position of the road should be indicated, approximately, on the plans of adjacent surveys.

Roads to be carried through freehold or enclosed lands under special circumstances only.

123. Where country is so steep and rugged, or otherwise so unsuitable for traffic, that roads through it must be located along watercourses, these roads are to receive first consideration, and must be provided without regard to the manner in which the adjoining lands may be affected by severance or by exclusion from frontage to the watercourse. Where a route, suitable for road purposes, can be so located, the road may be provided by give-and-

Roads along watercourses.

take lines equalising the frontage and forming boundaries. Provision must also be made, at suitable intervals, for cross roads giving access to back country, to water, and to crossings in the water-courses.

Roads to be widened in certain cases.

124. Where a number of short, sharp bends would unavoidably occur in the location of a road, or where provision should be made for future cuttings, crossings, or other improvements, such road should be widened to avoid unnecessary angles and to provide for future requirements.

Widening at watercourses.

125. At crossings of watercourses where it may be desirable to increase the width of a road, it is better to make the road lines approaching the crossing diverge to attain the required width than to mark rectangular reserves on the banks of the watercourse. When a road ends at or crosses a watercourse boundary, the part of the watercourse within the road should be traversed.

Roads across railway lines.

126. Where roads are being surveyed in the neighbourhood of the defined route of any proposed railway, crossing such route should be avoided as much as possible. Where, however, such crossing is necessary, the site should be carefully selected at either a railway bridge sufficiently high for road traffic to pass thereunder, or a cutting deep enough to allow of the construction of an overbridge; or, failing these, in a position where a level crossing may be made. The surveyor should apply to the Railway Department or to the District Engineer for information as to the location of suitable sites for road crossings. Special care should be taken not to include in any portion severances that may, upon the construction of the railway, be rendered inaccessible to the remainder of the portion.

Reserves to be provided on roads.

127. Reserves for water, camping, provisional schools, timber, or any other necessary public purpose, should be liberally provided in suitable situations on all main and other roads.

Reserves for gravel or road metal.

128. Advantage should always be taken of the outcropping of rocks, and the exposure of gravel beds in suitable situations and distances apart, to provide reserves for road metal, &c. Among rocks most suitable for road making are the basalts, traps, and the syenitic granites, ample reservations of which, when met with, should be made, as it is more economical in road construction to transport good material some distance than to use the inferior rocks found nearer at hand.

Reservations for roads inadvisable.

129. The reservation of areas for road purposes in grazing farms and grazing homesteads is inadvisable, except in special cases, when the reservation is made along a specified route. In agricultural farms it is only allowable under exceptional circumstances. As a general rule, all necessary roads are to be surveyed, and, except in special cases of tropical jungle, the practice of reserving areas for road purposes is to be discontinued.

Stock routes and roads in the Western pastoral districts.

130. Ample provision, in the Western pastoral districts, is to be made for travelling stock. Main stock routes are generally to be one mile wide. Main roads, other than stock routes, should be not less than ten chains wide. Stock-driving roads not exceeding ten chains wide, giving access from the back country to stock routes, should be provided at reasonable distances apart. Roads separating

grazing farms, or roads of access to any particular grazing farm, are to be three chains wide. The provisions of this clause shall not apply to small grazing areas in the settled districts.

131. Except in the Western pastoral districts, roads may be classified as follows:—

(a) Main roads are the most direct roads from ports or important towns—linking centres of population—or leading to extensive areas of agricultural land, whether settled or reserved for future occupation. The width of main roads should not be less than three chains, and may be extended to ten chains, according to the importance of the road, and the probable requirements of future traffic. Main roads used by travelling stock should not be less than ten chains wide, unless the land through which they pass is infested, or in danger of infestation, by noxious weeds.

Classification of roads in other areas.

(b) Secondary roads are those affording communication within limited areas, and which are not likely to be required as highways to distant areas. Secondary roads, and roads of access to single farms, or small groups of farms only, should generally be one and a-half chain or one chain wide.

132. Under no circumstances whatever may a road or street which forms the principal means of access be laid out of a less width than one chain; but lanes not less than one-third of a chain wide, providing additional means of access to town allotments, may, in special cases, be provided. (See clause 95.)

Roads not to be less than one chain wide.

133. In view of the cost of eradicating prickly pear, lantana, and other vegetable pests, which would heavily tax the financial resources of the governing authorities, roads should be restricted to the minimum effective width.

Roads should not be laid out wider than necessary.

134. On stock routes, main roads, and stock-driving roads, reserves of sufficient area for camping are to be provided at distances of about six miles apart. Such reserves should include water supply (wherever water may be available) or a suitable site for providing it. This provision is not required where roads exceed half a mile in width, the road itself supplying the necessary reservation. Also in cases where the land is infested, or in imminent danger of infestation by noxious weeds, reserves should be restricted to a minimum.

Camping reserves to be provided on roads.

135. Timber roads in present use, or that will in the future be again serviceable as means of access to State forests, timber reserves, and timbered country, should be surveyed, and may be marked of greater width than would be required for ordinary traffic, thereby affording ample room for the special traffic in connection with the carriage of heavy loads of timber.

Special road provision for timber hauling.

136. Where practicable, surveyed road lines should be laid out with bearings in whole degrees, and with lengths on the side first measured in whole chains or in chains and tens of links.

Bearings and lengths of road lines.

137. In grazing areas, main stock routes must be surveyed on both sides, but roads in general are to be dealt with in the same manner as those in agricultural areas. (See clause 138.)

Main stock routes to be surveyed on both sides.

Survey of roads through agricultural areas.

138. Roads exceeding three chains in width, whether intersecting or forming boundaries of portions, are, unless otherwise directed (see clause 55), to be aligned, measured, and marked on both sides. Where one side only is a boundary the opposite side need not, of course, be marked except at the corners. Roads not wider than three chains, and separating portions under survey at the same time, are to be marked on both sides as directed in clause 139. Unless otherwise directed, roads not wider than three chains intersecting portions are to be aligned, measured, and marked on one side only, the opposite side being indicated as directed in clause 140. When such roads are to be surveyed on both sides, they shall be dealt with as directed in clause 139.

Opposite sides of roads three chains wide and under.

139. Roads not wider than three chains that are directed to be surveyed on both sides shall be aligned with the theodolite, measured, and marked on one side. The opposite side is to be measured and marked, and the notes of such measurement entered in the field-book and shown on the plan; but, unless necessary for some local reason and provided that an accurate line is laid down, it is not imperative to align with the theodolite such opposite side between the secant posts. In no case can the provisions of this clause be held as an excuse for defective work.

Opposite corners on roads.

140. Where roads are to be surveyed on one side only, whether such roads form boundaries or are reserved out of portions, the opposite sides are to be indicated by pegs, lockspits, and reference trees at angle points, such reference trees being marked with the broad-arrow and the letter R.

Road secants.

141. In the survey of roads not wider than ten chains, secants from angle points are to be carefully run out with the theodolite, measured, and the bearing and length thereof entered in the field-book and shown on the plan. The measurement of secants across roads wider than ten chains is optional, but such measurement may not be charged for.

Resurvey of previously marked road lines.

142. Where the opposite sides of roads, previously surveyed on one side, are to be marked, and the angle points on such opposite sides have not been marked by the previous surveyor, it may be necessary to resurvey the first side, or parts of it, to obtain a datum from which to lay off the secant lines, and so determine the angle points on the side to be surveyed. The original lines, however, should not be re-run unless absolutely unavoidable.

Intersection to be noted and connections made.

143. The intersection by surveyed road lines with all marked boundaries, or other surveyed road lines, shall be noted in the field-book, and, wherever practicable, the bearings of such other boundaries or lines shall be observed and measured connection made to a corner or other defined point thereon.

Marking on surveyed road lines.

144. Surveyed lines forming the sides of roads are to be marked, posted, and pegged as directed for the boundaries of portions (clauses 58 to 65). Reference trees are to be selected at corners; the bearings and distances from such trees to the corner posts are to be determined and recorded as directed (clause 66). The trees are to be marked with the broad-arrow and letter R, and, where the road intersects or forms a boundary, with the portion number also.

(g) Roads through Leasehold and Freehold Lands.*

145. Road surveys through leasehold and freehold lands are generally initiated at the instance of Local Authorities, to whom surveyors should give due written notice of the date on which it is proposed to commence the survey, so that the Local Authority may, if desired, send an officer to inspect the proposed route with the surveyor. Local Authority to be notified.

146. It is preferred that surveyors do not accept instructions for such road surveys from Local Authorities. In order that instructions may emanate from the Survey Office, surveyors, when tendered instructions for road surveys by Local Authorities, should request that a requisition for the survey be forwarded to the Under Secretary for Lands. Instructions to be obtained from the Surveyor-General.

147. Where road surveys are to be effected under the provisions of "The Public Works Land Resumption Act of 1906," notice, as provided for in the 64th section thereof, of intention to enter upon the land for the purpose of survey, must be served upon the owner of the land, or upon his responsible agent, not less than three days prior to entry. Forms of such notice are supplied by the Department. Notice of entry.

148. Road surveys through freehold and leasehold lands are, as regards the general conduct of the work, and the marking thereof, to be effected in accordance with these Rules and Directions. Through freehold lands, they must also conform to the Real Property Regulations contained in By-law No. 2. Conduct of road surveys.

149. Where roads are to be surveyed through leasehold and freehold lands (or either), surveyors should carefully inspect the country along the proposed routes. In selecting roads, the first consideration should be public requirements and the conditions favourable for traffic; the second, the least possible interference with, or injury to, private property. Route to be carefully inspected.

150. The meridian to be adopted for road surveys through freehold and leasehold lands shall be the meridian of the survey of one of the portions through which the road passes. One of the principal boundaries of the portion should be run out as far as necessary with the theodolite, and its meridian adopted. Meridian of survey.

151. Roads through leasehold lands, unless otherwise directed, are to be marked on one side only, as specified in clauses 58 to 65, the angle-points on the opposite side being marked by posts, &c., as directed in clauses 140 and 141. Roads through leaseholds.

152. Roads surveyed through freehold lands are to be marked on both sides, in accordance with the directions in clauses 58 to 65. Roads through freeholds.

153. The survey of roads through leasehold and freehold lands shall be connected with all marked boundaries intersected, as directed in clause 143, the connection being made to the nearest corner. Resurvey of severances are not required unless serious errors are disclosed. To be connected to nearest corners.

154. Certain information and values are required to be furnished by surveyors when marking roads through leasehold or freehold lands, and the form supplied for this purpose is to be carefully Report to be forwarded.

* The Directions under this head should be read in conjunction with those contained in "By-law No. 2."

filled in and forwarded with the plans of the survey. A separate form is required for each portion through which a road may pass. (See Appendix vi.)

(h) *Resurveys, Re-establishment of Old Boundaries, and Real Property Work.**

Boundaries originally marked to be regarded as the true boundaries.

155. In the resurvey of lands held under grant, the surveyor must adhere to the principle that the boundaries originally marked on the ground by the Government surveyor are the true boundaries, although the bearings and lengths of such boundaries may not, on resurvey, be found to agree with the bearings and lengths recorded on the original plans. But where it is evident that some of the original marks found have been placed in error and do not reasonably represent the metes and bounds of the land conveyed, it may be desirable to ignore these marks. In this case a full report of the circumstances shall be made to the Surveyor-General, and approval of the action proposed to be taken sought. In the re-instatement of original boundaries the mode of procedure detailed in clauses 156 to 161 shall be practised.

Action where corner post and reference tree are found.

156. Where the corner post and reference tree are found, the position of the post shall be checked by comparing its actual bearing and distance with that originally determined and recorded on the plan.

Action where reference tree only is found.

157. At a corner where the reference tree only is found, the post shall be re-instated on the originally determined and recorded bearing and distance therefrom.

Action where line-pegs, lockspits or blazed trees are found.

158. Where neither post at corner nor reference tree is found, but indications of the original survey are afforded by line-pegs, lockspits, or blazed trees, boundaries and corners must be re-instated in correct relation to such marks, but, before adoption, these shall be checked by measured reference to existing adjacent corners or boundaries.

Action where no marks are found.

159. Where no marks of original survey can be found, it must be shown that the boundaries and corners have been re-instated in correctly measured relation to adjacent boundaries, to those situated on opposite sides of roads, to fences, or to such other evidence of original location as may be found.

Position of marks to be recorded.

160. The position of all original marks found must be shown in the field-book and on the plan.

Action where lengths as resurveyed are in excess.

161. Where resurvey shows lengths of boundaries in excess of original lengths, field-notes and plan must afford satisfactory evidence that the excess is not due to encroachment on adjoining lands or roads. In the absence of sufficient original marks, this shall be ascertained by the actual measurement of so much of the boundaries of adjoining lands as is necessary to ascertain whether such boundaries contain their granted lengths in full.

* The Directions under this head should be read in conjunction with those contained in "By-law No. 2."

162. If part only of the land in a grant or a certificate of title is subdivided, the subdivisional survey must be connected by actual survey:—

Surveyed connections to original corners.

On country lands—to a corner or corners of the previous survey.

On town lands—to a corner or corners of the previous survey, or to the corners of sections, or to the intersections of streets or lanes, or to permanent marks established by alignment, standard traverse, or other official survey.

163. Should the location of a common boundary be in dispute between the owners of adjoining lands, all particulars of occupation and evidences of original location, must be shown on the plan.

Disputed boundary.

164. The actual measurements made, and the bearings observed in the field, are to be shown on the plan in black figures, the original lengths and bearings being shown in red.

How measurements are to be shown on plan.

165. Where it is necessary to explain matters in connection with resurveys, a special report should be forwarded with the plan.

Special report.

(i) *Astronomical and Geodetic Observations.*

166. All surveys should be referred to the true meridian by astronomical observation, the greatest possible care being devoted to observation work, so that the results obtained may be precise and accurate.

Work to be referred to the true meridian.

167. The particulars of the observations are to be entered on the forms supplied for the purpose, and are to be sent to the Surveyor-General with the other records of the survey. (See Appendices xi., xxxvi.)

Particulars to be given.

168. The number of observations required by the Surveyor-General to be taken on any survey or group of surveys is set out in the following general rules, and satisfactory reasons must be given when these requirements are not complied with.

Number of observations.

169. When the datum of survey is based upon the county meridian determined astronomically, four complete solar or stellar observations taken at the same station in pairs, east and west of the meridian, and calculated separately will be required. Such observations shall be termed "Observations for Datum."

Observations for datum.

170. When the datum of survey is the (re-established) meridian of an adjoining or a connected survey, not based upon the county meridian, it is required that the new work be referred to the true meridian. For this purpose not less than two complete solar or stellar observations, east or west, should be taken at the same station and calculated separately. Such observations shall be termed "Observations for Variation."

Observations for variation.

171. When the datum of survey is the (re-established) meridian of an adjoining, or connected survey effected upon the county meridian, observations are required for the purpose of check. So also, in extensive surveys, observations are necessary as checks upon the work. For these purposes one complete solar or stellar observation, east or west, should be taken and calculated—in the former case at a suitable station in the new work, and in the

Check observations.

latter at intervals of about seven miles in even country and of about three miles in rugged country. Such observations shall be termed "check observations."

Additional observations.

172. In addition to the observations herein prescribed as officially required by the Surveyor-General, and for which rates of payment have been provided, surveyors will find it advantageous to take observations to ensure the accuracy of their work from day to day, but for such additional observations they will not be entitled to claim payment.

Observations for latitude.

173. When observations are necessary for the determination of latitude, two or more stars—in pairs—north and south of the zenith should be observed. But as the maps supplied by the Surveyor-General usually show the latitude of the initial point of the county, the latitude of an observation station may be found by scaling on the map its distance from the parallel upon which the initial point is situated, and the necessity for observations for latitude will seldom occur.

Observations for magnetic declination.

174. With a view of compiling a chart of Queensland, showing the isogonic lines connecting the places at which the variation of the magnetic needle from the true north is the same, it may at times be required that the observations showing the differences from true north of the county meridians used on the various surveys be supplemented by readings of the magnetic needle, the results being entered in field-notes, and a separate record forwarded to the Surveyor-General. (See Appendix x.)

To be taken in January and July.

175. These readings should be taken as nearly as possible at about half-past ten a.m., or about eight o'clock in the evening, on at least three days in each of the months of January and July in each year, and be compared with the true meridian. This can generally be done during the progress of ordinary field work, the meridian of which has been referred to the true north, but observations should not be made where local attraction causes magnetic deflection.

Connections to trigonometrical stations.

176. Theodolite bearings should be observed to visible trigonometrical stations from two or more points on a survey, preferably from corners. If a trigonometrical station is visible from only one point on a survey, and its distance from such point does not exceed one mile, a traversed connection should be made to it, and the angle which the traverse-line makes with a side of the triangulation should be observed and recorded.

V.—Field-Books.

Field-books supplied at cost price.

177. Field-books, in three sizes, are supplied at cost price to surveyors by the Surveyor-General. These only are to be officially used, and the size used should be in proportion to the extent of the survey of which it is the record.

Original field-books to be furnished by surveyors.

178. The original field notes, kept in the field, must be furnished by surveyors. If these are indistinct in any particular, the information may be duplicated in the field-book and noted as a copy. Copied notes only will not be accepted. Erasures in field notes are not permissible, but erroneous entries should be crossed out and rewritten.

179. Field-books should be so lucidly kept as to enable a draftsman, without other information than it affords, to draw a true plan of the survey. Field-books to be carefully kept.

180. A specimen field-book is supplied by the Surveyor-General, and surveyors are directed to adopt its style and methods, as uniformity in this respect facilitates the work of the examining draftsmen. (See Appendix xxxvii.) Style of specimen field-book to be adopted.

181. Country, whether undulating, broken, or rugged; timber, whether open, thick, heavy, or with undergrowths; scrubs, their character and situation, should be specially noted in field-books, as the rate of additional payment that may be allowed on such account is based on the information supplied. (See clause 219 and Appendix A, clauses 20, 21.) Description of country and timber to be given.

182. The first page of the field-book should exhibit the following information:— Information to be given in the first page of the field-book.

- (a) The signature of the surveyor.
- (b) Reference to the steel band used on the survey, which should be in the following form:—

The steel band used on this survey agrees in length with standard steel band No. _____, as determined by comparison made on the _____ day of _____, 19 _____.

- (c) Or if the steel band did not so agree, to what extent it differed. The method of its use, and the correction applied, should be fully explained.
- (d) The instrument used to define the direction of surveyed lines should be stated, as theodolite, compass, or circumferentor, as the case may be.
- (e) The title of the survey, the date of the instruction therefor, and the date of the commencement of the survey work.

183. The details of the survey work should be prefaced by a description of the datum on which the survey is based, how obtained—*i.e.*, whether astronomically, or by the determination of the meridian of an adjacent or an adjoining portion. If the latter, describe what original marks were found, how they were identified, and to what extent it was necessary to re-instate or replace them. Datum line to be described.

184. Each surveyed line shall be entered in the field-book separately, in the sequence in which it is measured, with the number of the station at its commencement and at its completion, and with numbered references to all the pages of the book on which any station reappears through the intersection of lines or the closure of boundaries. (See also clauses 143, 153, 187.) Each line surveyed to be entered separately.

185. Diagrams are not to be substituted for the separate entry of measured lines, but should only be used in elucidation of details. Use of diagrams.

186. Instrumental bearings of lines shall be recorded in degrees and minutes, reading from zero round through east to three hundred and sixty degrees. The actual measured or contour lengths of lines, the angles of elevation and depression, the corrections therefor, the temperature, the corrections for changes thereof, the horizontal lengths of lines, the measurements of offsets to natural features, the bearings and distances from reference trees, and measurements made to improvements, are all to be clearly shown. Measurements to be shown in detail.

Closure and intersection to be recorded.

187. The angular closure, and the measured position of the point of intersection of boundaries with each other, or with traverse lines, are to be recorded in the field notes of the intersecting and intersected lines.

Observing stations to be noted.

188. The stations from which astronomical observations are actually taken, or to which they are referred, should be specially noted in the field-book.

Field notes of watercourses.

189. Field notes of portions fronting watercourses should clearly show the distance to the traverse line, to the post, and, in accordance with the direction conveyed in clause 76, to the watercourse, with the actual and the average width thereof.

Features to be shown.

190. The features crossed by or visible from surveyed lines, such as creeks, gullies, flats, hills, ridges, plains, scrubs, &c., should also be noted in the field-book.

Detailed description of land to be given.

191. All available information as to the geological formation of the country, the quality of the soil, its suitability for agriculture; the natural herbage and grazing capability; the description, quantity, and value of its timber; the natural water supply, facilities for artificial storage; liability of the lands to flood; the existence of, and area under, noxious weeds, &c., should be recorded in the field-book.

Field notes to be certified to.

192. The date of the completion of the survey and the following certificate must be entered at the end of the field notes, and subscribed by the surveyor:—

This is to certify that the field notes herein contained are the actual results of my observations and measurements in the field.

A. B., Surveyor.

Field-books to accompany plans.

193. Field-books of each survey shall be sent to the Surveyor-General with the plans, &c., to which they refer. (*See* clause 234.)

VI.—Computations.

Measurements to be checked by closure.

194. The angular and linear measurements made on each survey are to be checked by the calculation of the difference of latitude and departure of each line, computed to tenths of a link for country, and to hundredths of a link for town lands.

Areas to be calculated.

195. Areas of portions, except such as are rectangular, are to be carefully computed by double longitudes.

Areas of portions should be multiples of 160 acres.

196. The maximum area that may be selected by one person is usually fixed at a multiple of one hundred and sixty acres. It is desirable, therefore, that the areas of portions should be exact multiples of one hundred and sixty acres, so that selectors may be able to select the maximum allowed, which may include two or more portions. Where these even areas are designed, they should be surveyed as such, unless compliance with this rule would occasion undue distortion of the position of the lines indicated on the design.

Limit of fractional quantities in areas.

197. After accurately computing the exact areas of portions, modifications with regard to fractional quantities, as specified hereunder, may be made.

In portions not exceeding 2 acres—record to the nearest 1/10th perch of the exact computed area.

More than 2 acres, but not exceeding 10 acres—if bounded by right lines—record to the nearest 1/10th perch; if bounded partially by a watercourse, record to the nearest perch.

More than 10 acres, but not exceeding 40 acres—if bounded by right lines, record to the nearest perch; if bounded partially by a watercourse, record to the nearest 20 perches.

More than 40 acres, but not exceeding 160 acres—if bounded by right lines, record to the nearest 10 perches; if bounded partially by a watercourse, record to the nearest road.

More than 160 acres, but not exceeding 640 acres—if bounded by right lines, record to the nearest 20 perches; if bounded partially by a watercourse, record to the nearest 2 roads.

More than 640 acres, but not exceeding 10,000 acres—if bounded by right lines, record to the nearest road; if bounded partially by a watercourse, record to the nearest acre.

Exceeding 10,000 acres—record to the nearest acre.

198. Where roads intersect portions, the closure of one side of the road with the boundaries must be computed.

Closure of severances to be checked.

199. The direct bearing and distance between portions connected with each other, by traverse survey only, are to be calculated.

Connections to be calculated.

200. All such calculations, computed or copied on the forms supplied by the Department, shall be forwarded with plans and other records of the survey. (*See* Appendix xxxv.)

Computations to be forwarded.

VII.—Plans.

201. All plans are to be drawn either by the surveyor himself, or under his immediate supervision, on the plan forms supplied by the Surveyor-General. It should be noted that only in cases of freehold lands, involving dealings through the Titles Office, should Real Property Office forms be used.

Drafting.

202. Surveyors' plans are copied at the Survey Office by lithography, and so that reproductions on a reduced scale may be clearly legible, plans must be drawn with ink that is quite black and thoroughly mixed, the lines firmly ruled—hair lines to be avoided—features clearly drawn, figures and lettering in bold open writing.

Plans to be clearly drawn in black ink.

203. The style and the standard of drafting, essential to the successful reproduction of plans as described, are shown in the specimen plans attached hereto (Appendices xxx., xxxi., xxxii., xxxiii., and xxxiv.). Plans that do not fairly fulfil these conditions will be rejected, or redrawn at the expense of the surveyor.

Specimen plans.

204. Plans shall be accurately plotted* with the north point upwards, and shall show the scale to which they are drawn, as well as that of any diagram thereon. The scale suitable for any given plan is a matter of judgment governed by circumstances. The following should, as a rule, be adopted, but may be varied in special cases, such as where an extensive survey is represented on one plan. Small details may be shown by diagrams drawn on larger scales.

Scale of plans.

Town Allotments.—Two chains to an inch, or, where small details are to be shown, one chain to an inch.

* The accurate plotting of many-sided figures is greatly facilitated by the marking off of, say, every seventh angle point by co-ordinates obtained by the algebraic summation of the latitudes, and of the departures of the preceding seven courses.

Suburban Allotments.—Up to 5 acres, 4 chains to an inch; over 5 acres, 8 chains to an inch.

Country Portions.—Up to 640 acres, 10 chains to an inch; over 640 acres and up to 2,560 acres, 20 chains to an inch; over 2,560 acres, 40 or 80 chains to an inch.

Road Surveys.—4, 10, or 20 chains to an inch.

Feature Surveys.—As circumstances may require.

Designs should be drawn to a scale sufficiently large to show clearly all necessary details—generally for portions of from 80 to 640 acres a scale of 20 chains to an inch, from 640 to 2,560 acres 40 chains to an inch, over 2,560 acres 80 chains to an inch. A design should not be drawn on two or more plans. Where one form is not sufficiently large to contain the whole area comprised in a design, tracing cloth should be used. (See Appendix xxxiii.)

Variation of adopted meridian to be shown. 205. Where there are no adjacent surveys, and the datum of survey work is determined astronomically, the variation from true north of the meridian adopted shall be shown on the plan.

Datum and its variation to be shown. 206. Where the meridian of a boundary line of an adjacent survey is adopted as the datum for new survey work, such boundary line shall be shown on the plan, and the word "Datum" shall be written along it. Such meridian should be compared astronomically with the true meridian, and its variation therefrom shown on the plan.

Variation not determined, show that of adopted datum. 207. Where, for any good reason, the variation of the meridian of the new survey work is not so determined, the variation of the meridian of the adjacent survey adopted as datum, if known, shall be shown upon the plan, with a note as to how the variation was determined.

Delineation of boundary lines. 208. Surveyed boundaries are to be shown by firm black lines, with the bearings and lengths written along them. The unsurveyed parts of boundaries should be shown on plans by broken lines, and the means that were employed to determine bearings and lengths thereof should be indicated.

Intersections and closure to be shown. 209. The intersection of boundary lines with one another or by a road, and the distances from points of intersection to the nearest corners, are to be shown, together with the angular closure as observed on the ground.

Water frontages—details. 210. Plans of portions fronting watercourses are to show distances to posts, to traverse lines, to the watercourse, and the actual or the average width of the watercourse is to be written along it.

Delineation of roads. 211. Surveyed roads are to be shown by firm black lines, with the bearings and lengths written along them; unsurveyed sides are to be ruled in broken black lines. Existing tracks may be shown in dotted black lines. The width of roads should be written neatly along them.

—of secants and traverse lines. 212. Road secants and all traverses are to be shown by firm blue lines. The bearings and lengths of road secants and traverse lines are to be written on the plans in the tablets provided for the purpose.

213. All the corners of country portions and of suburban sections and the angle points in traverse surveys are to be shown on the plan by small black circles circumscribing the points of intersection of boundaries or of other surveyed lines. Such circles need not be used to indicate the corners of suburban allotments, town sections, nor town allotments. On plans of re-surveys and of roads through alienated lands the circles indicating the position of original corners used in the survey should be described in red colour, and these station numbers may also be shown in red, but in all other cases the station numbers are to be shown in black figures. Astronomical stations are to be shown by red triangles. Stations and station numbers.

214. The bearings of lines to be shown on the plan are those instrumentally observed and recorded in the field-book, expressed in degrees and minutes, reading from zero round through east to three hundred and sixty degrees. The lengths of lines so shown shall be the horizontal lengths of lines obtained by the calculated reduction of the actual or contour measurements made in the field, and are to be expressed in links and decimal fractions thereof (see clause 186.) Original bearings and distances of lines that have not been resurveyed should be shown in brown. Bearings and lengths of lines.

215. Bearings to distant points, as trigonometrical stations, hills, beacons, &c., computed connections with adjacent survey work, the unsurveyed parts of boundaries in inaccessible country, are to be shown by broken black lines, with all computed bearings and distances written along such lines in black figures. Broken lines to be used in certain cases.

216. Lines of coasts, banks of rivers, creeks, &c., are to be shown on plans in firm black lines when their margins have been exactly determined; and by broken black lines when located approximately. Opposite sides of watercourses and an arrow pointing down stream should be sketched on plans. Coasts and watercourses.

217. The locally known or aboriginal names of rivers, creeks, lakes, lagoons, hills, camping places, crossings, bridges, &c., should be written on the plan—the correct orthography to be ascertained and adhered to. Where possible the meaning or origin of the name should be given in the forwarding letter. Names of rivers, &c.

218. The following spelling of timber names is to be adopted:—Belar, bendee, boree, brigalow, coolibah, gidya, mulga, quandong, and tea-tree. Timber names.

219. Hills, undulations, creeks, gullies, edges of scrubs, timber swamps, land liable to inundation and other features, as determined by actual measurement, are to be carefully etched in black on plans, in such a manner as not to interfere with the lettering. The approximate position of leading features within the portion under survey and to a reasonable distance beyond should be sketched as accurately as possible from local knowledge acquired during the survey. A description of the character of the country affording information of use to a prospective occupier of the land, and including particulars regarding the nature of the soil, should be neatly written across the face of the plan.* Physical features.

*In showing details with regard to features, &c., care should be taken not to overburden the plan with descriptive writing—discriminate between the plan and the field-book. The latter should contain full details so that the additional allowances claimed may be verified (see clause 181); but on the plan, more general descriptions, for the information of the selector and others, may be given. These should, therefore, be concise, but clear and sufficient for the purpose in view, and written in a bold, open style that will bear reduction by photography, not cramped and crowded together with useless repetitions of the same phraseology.

- Position of improvements. 220. The position of buildings, fences, cultivated areas, wells, bores, or other improvements is to be shown on plans, diagrams showing details being added where necessary.
- Portion number, areas, &c. 221. The portion number, the area, and a general description of the country should be written on the face of the plan, except on town and suburban plans (*see* clauses 225 and 226).
- Word "lot" not to be used. 222. The word "lot," which is specially applied to lots for sale, is not to appear on surveyors' plans. "Allotment" is to be applied to town and suburban allotments, and "portion" to country portions.
- Areas. 223. Areas are to be written within the boundaries of the portions to which they relate, in the following manner, viz.:—

165	3	0	
5	3	0	Surveyed Road.
160	0	0	
- Other details in tabular form. 224. The farm numbers, names of selectors, dates of instruction for survey, and of transmission of plan, meridian observations, and references to corners, road secants and traverses, are all to be neatly written in black ink in the tablets provided on the plan forms for these purposes.
- To avoid crowding. 225. Should the information gathered in respect of the conformation of the country, its soil, vegetation, improvements, &c., exceed that which can be clearly shown on the face of the plan, it should be neatly written on the plan in tabular form.
- Town and suburban plans—details of drafting. 226. Town and suburban plans are to be drawn in a clear open style, with the features, &c., shown, as detailed in clause 219, but no descriptive writing is to appear across the face of the plan, the character of the country being stated in a note placed in a convenient position. The section numbers are to be shown in Roman numerals for town sections, and Arabic numerals for suburban sections (*see* clause 103). The positions of iron pins are to be indicated by small black circles, but the connections thereto, and all traverse lines, are to be shown in firmly-ruled blue lines. Suggested names of towns and streets are to be shown in pencil or stated in the forwarding letter, in which the origin or meanings of the names, if obtainable, should also be given.
- Title and certificate. 227. The title of the plan is to be written in the space provided for the purpose, and the printed certificate thereon is to be signed by the surveyor.
- Plans to be forwarded. 228. As surveys are completed, the plans thereof, and all other documents relating thereto, are to be forwarded promptly (*see* clause 234). Delay in this respect causes inconvenience.

VIII.—Correspondence.

- Surveyor's address. 229. Surveyors are requested to advise the Surveyor-General and the District Surveyor of any change in their postal or telegraphic addresses, and of the location of their camps.
- Prompt attention to be given to official communications. 230. It is required that surveyors immediately acknowledge the receipt of official instructions. Printed forms for this purpose may be obtained on application to the Department (*see* Appendix i.).

Telegrams, memoranda, or other communications received by them from the Head Office are also to be attended to promptly. If instructions do not contain sufficient information to enable the survey to be efficiently and economically performed, application for the information required should be made immediately after receipt thereof.

231. Official letters, in reply, should be written on paper of foolscap size, and on one side only, with a marginal note descriptive of the subject therein referred to. The official number, initial letters, and date of previous correspondence should also be noted in the margin. Replies to official letters.

232. Each letter is to be restricted to one subject and, in forwarding plans of roads, reserves, or cases of a similar nature surveyed under separate instructions, each case is to be complete in itself, accompanied by a separate letter of advice, except that, for purposes of payment, several otherwise distinct cases may be included in one voucher (*see* clause 234 (g)). Separate letter for each case.

233. Immediately after the end of each month, every surveyor shall forward to the Surveyor-General a progress journal in the prescribed form. Where surveyors are employed in districts in charge of District Surveyors, duplicate journals are to be forwarded to the District Surveyor. (*See* Appendix viii.) Monthly progress journals.

The following information is to be clearly shown in journals:—

- (a) Work performed. All work effected during the month is to be shown under this heading, also all work effected during previous months, the plans of which have not been actually posted to the Head Office, the month in which the work was effected being indicated.
- (b) Work in hand. All work for which the surveyor holds instructions must be shown under this heading, and those surveys that it is anticipated will be taken in hand during the current month must be indicated alphabetically in the order in which it is proposed to effect them.
- (c) Plans forwarded to the Head Office during the month, also instructions cancelled, withdrawn, transferred, or returned, must be indicated in the proper columns.
- (d) Information should also be afforded as to the approximate date it is expected to complete all work, for which instructions are held. This information should also be supplied (by letter, if necessary) at least two weeks before completion.
- (e) Information regarding the surveyors' work, the weather generally prevailing, any notable changes thereof, the condition of the country as to grass, water, and travelling should be included in progress journals.

Occasional report should also be made as to the progress of settlement, the class of selections most in demand, and the prosperity of the district generally, especially where agriculture is one of the staple industries, together with a statement of the nature of the crops cultivated.

Documents to be forwarded on the completion of work.

234. Plans of survey work effected for the Department are to be sent to the Surveyor-General, together with all other records connected therewith, viz. :—

- (a) Forwarding letter (App. ii.);
- (b) Field-book (App. xxxvii.);
- (c) Calculations of closure and of area (App. xxxv.);
- (d) Records of astronomical and magnetic observations (Apps. x., xi., xxxvi.);
- (e) Report and valuation (App. iii., iv.);
- (f) Instructions for survey, designs, tracings, lithographs, and other auxiliary information supplied to aid the surveyor in his duties.
- (g) Vouchers in triplicate (App. B.). (Excepting that—under payment clause 43—several cases may be included in one voucher, and that vouchers may be forwarded for collection through an authorised agent or bank, but one copy must always accompany the plan of the work.)
- (h) Road reports (App. vi., vii.), if necessary.

Forwarding letter.

235. A forwarding letter should be despatched for each separate survey, the records of which should be complete, and include all the data thereto belonging. The forwarding letter should be sent under separate cover, so that inquiry may be made for mislaid or delayed plan packets.

Details re despatch of letters, &c.

236. Plans should not be folded but rolled, and the packets containing them and the related documents should be neatly made up in such manner as to prevent damage, securely fastened, legibly addressed, and sufficiently prepaid before transmission to the Surveyor-General.

IX.—Payment.

See Appendix A.

Appendix A.

Rules and Directions Regarding Payment for Survey Work.

PREFACE.

Payment for survey work in Queensland is made at uniform base rates for the work done as indicated by the length of line surveyed (Schedule 1).

To compensate for obstacles to survey work, caused by vegetation and uneven surface conformation, payment is made as additional allowances (Schedules 2 and 3—clauses 18 to 21). Such allowances are stated in Schedule 3 in terms of fractions or multiples of any measured length and are to be added thereto and charges made on the sum thereof.

To compensate for climatic and economic conditions additional payment is made as a County rate (Schedule 4—clauses 29, 30), which varies with the location of the counties.

“Half” and “Double” rates are payable under conditions specified in clauses 7 and 8.

Clauses 14 to 16 deal with the resurvey, clearing, intersection, and obliteration of lines previously surveyed.

Clauses 22 and 23 specify the fees payable for the establishment of corner posts, marking reference trees, &c.

Other items are provided for as follows:—

Items.	Clauses.
Astronomical observations	24
Travelling	25 to 28
Survey of town and suburban allotments ..	31
Rates per diem	33 to 35
Variation of rates	36 and 37
Details with regard to the preparation, stamping, transmission, and payment of vouchers	38 to 46
Specimen voucher	Appendix B.

PAYMENT.

1. Except as otherwise herein provided, payment for survey work shall be on linear measurement at the rates set forth in Schedule 1. Payment by linear measurement and allowances

These rates will be the base rates for the State, and on them, as such, shall be computed the additional allowances for conformation and vegetation set forth in Schedule 3.

In lieu of the differentiated base rates, heretofore prescribed, a county rate as provided in clause 29 will also be paid on survey work effected in the counties and parishes enumerated in Schedule 4.

Schedule 1.
"Base Rates."

SCHEDULE 1.

BASE RATES.		s.	d.
Marked-line rate, per mile	.. .. .	40	0
Traverse "	"	33	4
Compass "	"	20	0
Chaining "	"	20	0

Definition of rates.

2. The "marked-line rate" is payable for surveying and marking lines with theodolite and steel tape.

The "traverse rate" is payable for making traverse surveys with theodolite and steel tape.

The "compass rate" is payable for making traverse surveys with prismatic compass or circumferentor and steel tape or perambulator.

The "chaining rate" is payable for the measurement of lines with the steel tape.

Application of "marked-line rate."

3. The "marked-line rate" shall be applicable to—

Boundary lines;

Road lines;

Other lines, directed to be measured and marked;

Secants across roads;

Traverse lines of water-frontages, where such frontages form boundaries;

Traverse lines of water-frontages, surveyed as connections, when such frontages are suitable for subsequent adoption as boundaries, such traverse lines being marked at angles as directed in clause 88 of the Rules and Directions.

Application of "traverse-rate."

4. The "traverse rate" shall be applicable to traverse surveys of roads, features, and connections, effected with the theodolite, other than those provided for in clause 3.

Application of "compass-rate."

5. The "compass rate" shall be applicable to traverse surveys of roads, features, fences, or other improvements effected with the prismatic compass or circumferentor.*

Application of "chaining-rate."

6. The "chaining-rate" shall be applicable to the measurement of lines made with the steel band; the measurement being reduced to horizontal length, and also corrected for the expansion or contraction of the band from standard length.

Half-rate.

7. For the survey—measuring and marking, as directed in clause 139 (Rules and Directions)—of opposite sides of roads, not wider than three chains, situated on open downs or plain country, payment shall be at half the marked-line rate.

* Approximate surveys—i.e., distances determined by stepping, counting of fence-posts, or other similar methods of measurement, made in accordance with clause 20 (Rules and Directions), will be paid for at 6s. per mile.

8. Payment will be made at twice the marked-line rate for Double rate. secants across roads not wider than three chains.

9. Except as provided in clauses 10 and 31, an "additional Additional mile." mile," without relation to the length actually measured, will be paid for on each separate survey, at the rates prescribed in Schedule 1.

10. Where adjacent portions, or groups of portions, under Additional half-mile. survey at the same time by the same surveyor, are already connected by previous survey, the marking of which is well defined, payment will be made, of an additional mile on the first separate portion and of an additional half-mile on each of the other separate portions or separate groups of portions.

Portions, or groups of portions, separated by a distance not exceeding two miles in a direct line shall be deemed to be adjacent for the purpose of this clause.

11. Where, on the commencement of a survey upon which an Charges for determination of datum. "additional mile" is charged, the direction of an old boundary line or part of it as a datum for the new survey can be easily determined from existing marks, no charge therefor may be made; but where more than the ordinary amount of work has to be done to establish a datum from the old survey, payment will be made at traverse rate (Schedule 1) for a reasonable distance.

12. Where a portion under survey adjoins previously surveyed Adjoining portions. land, and it is found necessary to resurvey the old lines completely, either for the purpose of determining a datum or for the re-establishment of the boundaries, payment will be made at schedule rates. But where complete resurvey is not required, only so much work should be done and charged for as is necessary. The circumstances relating to the work effected and the charge therefor should, in each case, be explained. Surveyors are directed to refrain carefully from doing unnecessary work involving needless expense.

13. Where it is unnecessary to resurvey previously surveyed Rate for showing previously surveyed lines on plan. lines, but the original measurements are used in the survey, the sum of sixpence per line will be allowed for the extra labour involved in showing them on the plans and using them in the computations.

14. (a) Where the original survey is old and the direction of Traverse or old boundaries. boundaries cannot be easily determined, and it is consequently necessary to traverse lines between corners, to compute offsets, and to clear the true line; or

(b) Where a survey has to be made of a fenced boundary and Traverse of fenced boundaries. it is necessary to offset, clear and peg the true line between corners; or

(c) Where, in the survey of the opposite side of a road it is Trial lines on opposite side of roads necessary to run out a trial line exceeding twenty chains in length and to offset it to parallelism with the original survey:—Extra payment will be made at the rate of ten shillings per mile, with additional allowances as provided in clauses 18 to 21.

15. (a) Where a road has been surveyed on one side only and Opposit of roads it is required to locate the angle points on the opposite side; or

Fresh starts on surveys.

(b) Where after commencing a survey it becomes necessary to make a fresh start or starts from the original work:—

The sum of two shillings and sixpence will be paid for locating each original corner and obtaining a datum for the secant or other lines, the secants being paid for as otherwise provided.

Rate for clearing or obliterating old lines.

16. For the clearing of old surveyed lines and opening out the marking thereon—or for the obliteration of old survey marks, payment will be made at six shillings per mile, with additional allowances as provided in clauses 18 to 21.

Intersections with old lines.

17. In addition to the payment for the corner post and tree in accordance with clause 22 a fee of two shillings and sixpence will be allowed for each intersection with a previously surveyed line not being one of the lines of the survey in course of execution, but where the necessary connection exceeds five chains the whole length measured along the original line will be paid for at traverse rate; provided that the amount paid shall in no case be less than two shillings and sixpence.

Additional allowances may be paid.

18. Where it is clearly shown, as directed in clause 181 (Rules and Directions) that the survey effected is on country the conformation of which is more or less uneven, as defined in Schedule 2, clause 20, or is more or less clothed with vegetation, as defined in Schedule 3, clause 21, or with any gradation of these combined, additional payment will be made as provided in Schedule 3.

—application.

19. Additional allowances may be charged on—
The rates payable for linear measurement (Schedule 1);
The fees payable for the survey of town and suburban allotments (Schedule 5).

—limitations.

But may not be charged on—
The additional mile or the additional half-mile (clauses 9 and 10).
The additional rate payable on road secants (clause 8).

Schedule 2. Conformation.

20. The classification of country as regards surface formation shall be according to the following scale:—

SCHEDULE 2.

Class.	Definition.	Slopes.
1	Level or gently undulating	0° to 5°
2	Slightly broken by ridges	5° to 10°
3	Rough and broken	10° to 20°
4	Extremely rugged	Exceeding 20°

Country is to be described in field notes in the terms of one or other of the classes set forth in this Schedule. The classification must be based upon the slopes shown in the field book, but for this purpose the incidence of short isolated slopes is to be disregarded and side slopes are only to be considered when they exceed 10 degrees. If on inspection of the recorded slopes the classification is not obvious, the average of the allowable slopes on a line, or on part of a line, should be taken out to decide it.

21. The classification of country for vegetation, and the allow-Additional
ances that may be added under the provision of clauses 18 and 19 allowances.
shall be as set forth in the following Schedule:—

SCHEDULE 3.

Description of Vegetation.	ADD FOR VEGETATION AND CONFORMATION.			
	Class 1. Level or gently undulating.	Class 2. Slightly broken by ridges.	Class 3. Rough and broken.	Class 4. Extremely rugged.
a Open country or ordinary open forest	a —	—	$\frac{1}{2}$	1
b Thickly or heavily timbered forest without undergrowth, or ordinary forest interspersed with wattle, tea-tree, forest saplings, sandalwood, pine, &c., or with a combination of all or any such forest undergrowths	b $\frac{1}{2}$	$\frac{1}{4}$	$\frac{2}{3}$	$1\frac{1}{2}$
c Thickly and heavily timbered forest without undergrowth, or ordinary forest with a light but continuous undergrowth of wattle, &c., as described in (b)	c $\frac{1}{2}$	$\frac{2}{3}$	1	2
d Forest country as described in (a) or (b) with a very dense and continuous undergrowth of wattle, tea-tree, forest saplings, sandalwood, pine, fox-bush, currant-bush, rosemary-bush, emu-bush, or a combination of these or of any such other dense and continuous undergrowths	d 1	$1\frac{1}{2}$	$1\frac{1}{2}$	$2\frac{1}{2}$
e Thickly and heavily timbered forest with a very dense and continuous undergrowth as described in (d)	e 1	$1\frac{1}{2}$	2	3
f Forest as described in (a) or (b), where, fringing the vine and green scrubs, it is combined with an impenetrable and continuous undergrowth of forest or scrub woods, turkey-bush, snuff-bush, prickly-bush, or a combination of these or any other such impenetrable bushy growths	f $1\frac{1}{2}$	$1\frac{3}{4}$	$2\frac{1}{2}$	$3\frac{1}{2}$
g Thickly and heavily timbered forest, where, fringing the vine and green scrubs, it is combined with the impenetrable and continuous undergrowths described in (f)	g 2	$2\frac{1}{2}$	3	4
h Dense vine scrub, generally the green scrubs on the Pacific slope	h 2	$2\frac{1}{2}$	3	4
i Dense vine scrub, with the addition of very dense, continuous, and impenetrable undergrowths	i $2\frac{1}{2}$	3	$3\frac{1}{2}$	$4\frac{1}{2}$
j Dense tropical jungle, viz.—that indigenous to a fringe not exceeding 20 miles from the coast northerly from Cardwell	j $2\frac{1}{2}$	3	$3\frac{1}{2}$	$4\frac{1}{2}$
k Ordinary brigalow, gidya, belar, bendee, or mulga scrubs	k $\frac{1}{2}$	$\frac{3}{4}$	$1\frac{1}{4}$	2
l Ordinary brigalow, &c., as described in (k) combined with any of the dense undergrowths	l 1	$1\frac{1}{2}$	2	$2\frac{3}{4}$

SCHEDULE 3—continued.

Description of Vegetation.	ADD FOR VEGETATION AND CONFORMATION.			
	Class 1.	Class 2.	Class 3.	Class 4.
	Level or gently undulating.	Slightly broken by ridges.	Rough and broken.	Extremely rugged.
<i>m</i> Dense and heavy brigalow, gidya, belar, bendee, or mulga scrubs in which the trees are large and numerous	<i>m</i> 1	1½	2	2½
<i>n</i> Dense and heavy brigalow, &c., as described in (<i>m</i>), combined with any of the dense undergrowths	<i>n</i> 1½	1½	2½	3
Prickly pear or lantana, where growing so high as to be a serious obstacle to measurement—in addition to the foregoing provisions for other vegetation, except dense undergrowth and scrub, and for conformation—				
<i>o</i> For dense and continuous prickly pear or lantana (lengths of 5 chains and upwards may be claimed for as being continuous)—Add up to 1½	<i>o</i>			
<i>p</i> For prickly pear or lantana that is not continuous on the length or lengths infested, in proportion to the density of the infestation—Add up to 1	<i>p</i>			
For low-growing prickly pear or lantana that is not a serious obstacle to measurement—No addition				
NOTE.—Field-notes must show, on each line, a description as to the height, the location, and the measured extent of the infestation for which the allowance is claimed.				

In making out claims for additional allowance in the voucher or schedule of details, surveyors must specify the class of country in which each line lies, reference being made to the figures and letters of this Schedule. (See specimen voucher, Appendix B.)

Corners— 22. Corners marked in accordance with the "Rules and Directions" will be paid for at the following rates:—

- at 5s. each. At five shillings each—
- The principal corners of portions (see clauses 63 and 71);
 - The external corners, not exceeding four in number, of each group of conterminous country portions, the areas of which do not exceed 20 acres each (see clause 70);
 - The corners, not exceeding four in number, of each suburban section (see clause 103);
 - The corners, not exceeding four in number, of each town section (see clause 103); and
 - All corners in the open treeless country in the Land Agents' districts of Hughenden and Winton, and in such other localities as the Surveyor-General may approve (see clause 71).

at 4s. each. At four shillings each—

Every corner at which a post is established, but where no reference tree is available (see clause 71).

23. Three shillings each will be allowed for renewing old principal corner posts, together with lockspits or pointer pegs. at 3s. each.

Two shillings each will be allowed for marking corners with pegs and trees in accordance with clauses 70 and 71. at 2s. each.

One shilling each will be paid for corner pegs as provided for in clause 85; also for locating and marking reference trees to— at 1s. each.

Renewed corner posts;

Existing corner posts not requiring renewal;

Mile pegs in accordance with clause 62; and

For marking additional reference trees in accordance with clause 67.

One shilling and sixpence each will be allowed for inserting iron rods in town surveys (see clause 106, Rules and Directions). at 1s. 6d. each.

Where, under clause 61 of the "Rules and Directions," dug-out lockspits are omitted, a reduction at the rate of 2s. 6d. per mile will be made on the linear rate chargeable. Reduced rate for omission of lockspits.

24. Payment for observations will be limited to the requirements of the Department. (See clauses 168 to 174, Rules and Directions.) Observations—

	£	s.	d.	
(a) Single check observation without calculation (Clause 171)	..	0	5	0 Solar.
(b) Single check observation calculated (Clause 171) .. ..	..	0	7	6
(c) Observation for variation (Clause 170) .. ..	..	0	12	6
(d) Observation for datum (Clause 169) .. ..	..	1	0	0
(e) Observation for variation (Clause 170) .. ..	..	0	12	6 Stellar.
(f) Observation for datum (Clause 169) .. ..	..	1	0	0
(g) Observations for latitude (Clause 173) .. ..	..	0	10	0
(h) Observation for magnetic declination. (See Clauses 174 and 175)	0	5	0	Magnetic.

25. Payment for travelling by road with camp and party to effect surveys for the Department will be at three shillings per mile for distances measured on the map in a direct line from the centre of the last survey to the centre of that to be effected. Travelling by road.

26. Where it is practicable to do so, and the distance to be travelled exceeds thirty miles, surveyors are directed to move camp and party by railway and to make timely application to the Surveyor-General for the necessary railway requisitions. Railway requisitions.

27. Where, in accordance with the provisions of the preceding clause, camp and party travel by rail, payment—as compensation for wages and maintenance expenses—will be made at the rate of £2 2s. for each day or part of a day so occupied, a "day" being construed to mean the interval between 6 a.m. and 6 p.m. Payment for time occupied in travelling per rail.

28. Surveyors are required to effect surveys for which they are instructed in such sequence as will minimise travelling. Work to be arranged to avoid travelling.

COUNTY RATES.

29. In addition to the fees payable for survey work as provided in Schedules 1 and 3, County rates will be paid on the surveys effected in the counties specified in Schedule 4; thus, a sum calculated, at the percentages assigned in Schedule 4 to each county or parish, on the total amount of the vouchers, as calculated on the fees payable under the provisions of the preceding clauses and schedules, may be added thereto. County rates.

SCHEDULE 4.

The percentages assigned to each county or parish as the county rate shall be as set forth in the following schedule :—

County.	Per cent.	County.	Per cent.
ABBOTSFORD	8	Chudleigh	8
Aberdeen	5	Churchill	40
Albany	5	Clarke	25
Albion	8	Claude	5
Allison	8	Clermont	5
Amaroo	25	Clinton	20
Archer	55	Clive	(b)
Argylla	8	Coen	55
Aubigny	2	Cogoon	2
Auburn	2	Conbar	5
Ayrshire	5	Consuelo	5
		Cook	20
		Cooper	8
BALURGA	25	Coorajah	5
Bando	2	Cootah	25
Banks	55	Copperfield	25
Barcoo	5	Coreena	2
Bauhinia	5	Cumberland	5
Beaconsfield	8	Curalle	8
Beaufort	5	Currawilla	8
Bell	5		
Belmore	2	DAGMAR	25
Belyando	5	Dalrymple	5
Bentinck	(a)	Daroo	25
Binburie	8	Davenport	5
Bolwarra	25	Dawson	5
Boondooma	5	Deas Thompson	20
Bowen	5	Denison	5
Brahe	25	Derby	2
Brighton	8	Diamantina	8
Buckingham	25	Dickson	5
Buckland	5	Douglas	5
Bulgroo	5	Drake	40
Buller	25	Drummond	5
Bulloo	5	Drury	5
Bulwer	2	Dublin	2
Bundara	2	Dulhunty	55
Burarie	8	Dunbar	55
Burdekin	40	Durham	8
Burenda	2	Durrie	25
Burke	25	Dutton	5
Burrandilla	2		
Byerley	25	EDDINGTON	8
		Einisleigh	25
CAIRNS	5	Elderslie	8
Cameron	8	Elgin	2
Canning	40	Elphinstone	40
Canobie	8	Esmeralda	25
Cardwell	55	Etheridge	25
Carlisle	20	Eurinye	25
Carnarvon	2	Evora	2
Carpentaria	55	Eyre	25
Carrandotta	25		
Carruthers	8	FARRAR	8
Cassillis	2	Ferguson	5
Cavendish	40	Fermoy	5
Chataway	5	Fielding	25
Chatsworth	25	Fitzroy	5
Chelmsford	25	Flinders	20
Chesterton	2		
Cheviot	5		

SCHEDULE 4—continued.

County.	Per cent.	County.	Per cent.
Fortescue	5	Lukin	55
Foxton	5	Lynd	25
Franklin	55	Lyndhurst	8
Fraser	20	Lytton	2
GAYUNDAH	5	MACKENZIE	5
Georgina	25	Malwa	25
Gilbert	25	Maneroo	5
Gladstone	40	Manfred	8
Glanworth	2	Manuka	5
Glengyle	25	Maramie	25
Glenora	8	Maranoa	2
Gordon	5	March	(d)
Gould	25	Marga	25
Gowan	5	Marsh	2
Granada	8	Mayne	8
Gregory	25	McKinlay	5
Grey	8	Melville	55
Griffith	5	Merivale	(e)
Grosvenor	20	Merlin	25
Gunnawarra	25	Mexico	2
		Mitchell	5
		Monkira	25
HADDON	8	Morstone	25
Hamilton	25	Mosman	25
Hann	55	Mowarra	8
Herbert	40	Mueller	25
Hillalong	40	Munga	2
Hodgkinson	25	Mungallala	2
Howitt	55	Murchison	20
Humboldt	5	Murray	(f)
Humeburn	5	Musgrave	5
IFFLEY	25	NARES	55
		Nash	25
		Nebine	2
JARDINE	55	Newcastle	5
		Nicholson	25
		Nickavilla	5
KALKAH	55	Nive	2
Kamileroi	25	Noorama	2
Kendall	55	Norley	5
Kennedy	2	Norman	55
Killarney	5	Numalla	5
Kimberley	5	Nyama	25
King	25		
Koolatah	55	OAKLANDS	25
Kungie	2	O'Connell	25
Kyabra	5	Oondooroo	5
Kynuna	8	Orrery	2
Kyrunda	5		
LABOUCHERE	5	PAKINGTON	5
Lamington	25	Palmer	2
Landsborough	25	Palmerston	20
Lang	25	Paluma	5
Langlo	2	Parker	55
Lennox	(c)	Paroo	2
Leura	5	Pelham	5
Liebig	20	Pender	8

SCHEDULE 4—continued.

County.	Per cent.	County.	Per cent.
Perey	8	UANDA	5
Philp	5	Ularunda	2
Pitteroo	8	Undilla	25
Piturie	25		
Plantagenet	5		
Porchester	55	VERGEMONT	5
Portland	2	Victor	8
Pring	2		
RAGLAN	5	WAIRUNA	25
Rawbelle	5	Waldegrave	2
Richmond	5	Walker	5
Rochedale	25	Walsh	25
Rodney	2	Warbreccan	10
Rogers	2	Warburton	25
Roper	5	Ward	40
Rosebery	25	Warner	25
Rosebrook	8	Warrong	2
Ross	2	Waverley	25
Rupert	8	Weipa	55
Ruthven	5	Wellesley	55
Rutledge	5	Wellington	(g)
		Wentworth	55
		Weramo	25
SALISBURY	40	Weringa	25
Sandringham	25	Westgrove	5
Savannah	8	Weymouth	55
Saxby	8	Wicklow	5
Selheim	40	Wilkie Gray	40
Selwyn	8	Wills	25
Shelburne	55	Wilson	8
Sidmouth	55	Windeyer	2
Solander	55	Windsor	25
Somerset	55	Windula	8
Stanley	40	Wodehouse	20
Stokes	25	Wokingham	8
Strathleven	25	Wolseley	5
Strathmore	25	Wondoola	25
Sturt	25	Wongalee	5
Surrey	25	Wonomo	25
		Woodstock	8
TALAWANTA	25	Woolgar	8
Talbot	5	Wooroolah	2
Taldora	8	Wooroona	5
Tambo	2	Woura	5
Tanbar	8	Wrotham	25
Tate	25	Wyara	5
Tewinga	25		
Thunda	5		
Tingarra	5		
Titheroo	5		
Toko	25	YAGOONYA	55
Tomoo	2	Yappar	8
Toorak	8	Yarrol	8
Torres	55	York	55
Towerhill	5	Youranigh	2

(a) BENTINOK.—20 %—Parishes of Ballandean, Broadwater, Catterthun, Drumsleed, Folkestone, Herries (that part south-east of the divide between Pike Creek and Macintyre Brook waters), Jibbinbar, Marsh, Nundubbermere, Pikedale, Stanthorpe, Tenterfield.

- (b) CLIVE.—20 %—Parishes of Aitken's Flat, Claremont, Glenlyon, Maidenhead, Mingoola.
2 %—Remainder of the county.
- (c) LENNOX.—40 %—Parishes of Amamoor, Brooloo, Cambroon, Conondale, Glastonbury, Imbil, Kandanga, Kilkivan, King, Widgee, Woonga, Yabba.
20 %—Remainder of the county.
- (d) MARCH.—40 %—Parishes of Como, Conondale, Gympie, Kenilworth, Laguna, Maleny, Noosa, Tagigan, Tewantin, Traveston, Tuchekoi, Weyba, Woondum.
Also that part of the Parish of Goomboorian west and south-west of Coondoo Creek and that part of the Parish of Neerdie south-east of a line following the east boundary of portion 23; the south-west and north boundaries of portion 18; a road; the west and north boundaries of portions 2117 and 1312; the east boundary of portion 1319; the south and east boundaries of portion 286; a line north to portion 1640; the south and south-east boundaries of that portion, and the north-west boundary of portion 1354 to Tinana Creek.
20 %—Remainder of the county.
- (e) MERVIALE.—40 %—Parishes of Emu Vale, Gilbert, Gladfield, Killarney.
2 %—Remainder of the county.
- (f) MURRAY.—40 %—That part of the county east of the Burdekin River.
5 %—That part of the county west of the Burdekin River.
- (g) WELLINGTON.—2 %—That part of the county east of the Paroo River.
5 %—That part of the county west of the Paroo River.

30. The county rates set forth in Schedule 4 shall not be payable on the fees per diem (clauses 33 and 34); nor on the charges for any of the work required in connection with the survey of town and suburban allotments—except where paid for at linear rates; nor on any line charged for under clause 13.

31. The survey of town and suburban allotments in accordance with clauses 91 to 109 (Rules and Directions), may be paid for at linear rates (clauses 1 to 6), at daily rates (clause 34), or by special arrangement (clause 36); but if daily rates or other special terms are not specified in the instructions, payment will be in proportion to area at the rates set forth in the following schedule, with additional allowances as prescribed in clauses 18 to 21, and payment for corners as detailed in clause 22. No first mile may be charged on work in connection with town and suburban surveys.

SCHEDULE 5.

Fees Payable for the Survey of Town and Suburban Allotments. Schedule 5.

	£	s.	d.
Not exceeding 1 rood	0	7	0
Not exceeding 2 roods	0	9	0
Not exceeding 1 acre	0	12	0
Not exceeding 2 acres	0	15	0
Not exceeding 3 acres	0	17	6
Not exceeding 4 acres	1	0	0
Not exceeding 5 acres	1	2	6
Not exceeding 7 acres	1	7	0
Not exceeding 10 acres	1	14	0

32. The fee on any complete separate survey shall not be less than the sum of £3 3s.; and where the fee calculated at any of the rates of payment provided herein amounts to less than £3 3s., this amount may be substituted therefor.

33. The inspection of country for new roads, &c., not usually necessitating the employment of a full survey party, will be paid for at £2 12s. 6d. per diem.

Payment at per diem.

34. Payment may be made for survey-work at per diem, at rates decided by the Surveyor-General in proportion to the number of men necessarily employed by the surveyor, but claims for payment at per diem may not be made unless the instruction for the survey so directs.

Daily record to be kept.

35. Surveyors employed at per diem are expected to enter up daily, in the space provided on the voucher form, a detailed statement of the nature and the extent of the work done on each day.

Rates may be varied.

36. The provisions for payment of fees for survey work herein contained may not apply to surveys on repurchased estates and are subject to the reservation by the Surveyor-General of the right to pay at lower rates for extensive and favourably-situated surveys, or at higher rates for difficult work which cannot profitably be undertaken at schedule rates.

Rate of payment stated in instructions.

37. Where such variation is made the rate of payment will, as a rule, be stated in the instructions. If the surveyor considers such rate unsatisfactory he should, if practicable, communicate with the Department before commencing the work.

VOUCHERS.

To be prepared in triplicate.

38. Vouchers are to be prepared in triplicate on the forms supplied by the Department, in accordance with the specimen appended hereto (Appendix B), two copies being stamped and one always forwarded with the plans. It is imperative that vouchers should either be prepared by the surveyor himself, or he must make himself conversant with the details of charges made therein, before signing the required declaration. (See clause 234, "Rules and Directions.")

Agent may be appointed.

39. A surveyor may appoint a bank or other agent to present vouchers for payment and to collect the moneys payable thereon. Such appointment must be made by the surveyor in writing, and due notice of change of agency must be given to the Surveyor-General through the retiring agent. So that vouchers shall traverse the same channel as respective payments on account thereof, the bank or other agent shall be the sole medium through which vouchers are to be transmitted and payments made to the surveyor.

Stamp duties on vouchers.

40. Vouchers that are assigned by the drawers to some other person (*i.e.*, the interest being absolutely transferred to such person) are liable, under section 49 and the First Schedule (Conveyance on Sale) of "The Stamp Act, 1894," to an *ad valorem* duty of 7s. 6d., on an amount not exceeding £50; 15s., on an amount exceeding £50, but not exceeding £100; and 15s. for each additional £100 or fraction thereof, for every voucher so assigned. But when a bank or agent is authorised to collect the amount of the voucher for and on behalf of the drawers, such agent is regarded as merely holding orders to receive, and vouchers so presented, bearing stamps in accordance with the following schedule, fulfil the requirements of the Act.

SCHEDULE 6.

Schedule 6.

Duties payable upon receipts given for or upon the payment of money:—

Amounting to one pound or upwards, but less than two pounds ..	d.
Amounting to two pounds or upwards, but less than fifty pounds ..	1
Amounting to fifty pounds or upwards, but less than one hundred pounds ..	2
Amounting to one hundred pounds or upwards, for every one hundred pounds or fraction of one hundred pounds ..	3
Amounting to one hundred pounds or upwards, for every one hundred pounds or fraction of one hundred pounds ..	6

41. In stamping vouchers, it will be to the advantage of surveyors to be guided by the following:—

Stamping and transmitting vouchers.

- (a) The copy showing details (clause 42), the final office record, should bear stamps in accordance with Schedule 6, as for 20 per cent. of the total amount claimed.
- (b) Another copy—for an advance payment (clause 43)—should be stamped as for 80 per cent. of the total amount claimed.
- (c) The third copy, which need not be stamped, must be forwarded with the plan, and will be returned to the surveyor for his information. The other two should pass through the bank or agent.
- (d) For claims amounting to less than £20, only two copies of the voucher are necessary, while one only—that containing the details—need be stamped as for the total claim. (See clause 43.)

42. One copy of the voucher must show the details of each line charged for (*see* specimen voucher), but when the details are numerous they may be shown in the supplementary schedule supplied with voucher forms for the purpose. By detailing their charges, line for line, from field books, either in the voucher or in a supplementary schedule thereto attached, surveyors will aid the work of the examining officer, render misunderstanding improbable, and generally facilitate passing the accounts for payment.

Details to be supplied.

43. As soon as is practicable after the receipt of the plans and vouchers, an advance payment of eighty per cent. of the total amount payable may be made. The balance due will be paid when the examination of the plans and vouchers has been completed and the work passed. No advance will be paid until the three copies of the voucher have been received, nor on vouchers totalling less than £20. In order to reach this minimum, it is permitted to include a sufficient number of cases in one voucher. All such cases should be forwarded together with one copy of the voucher in which they are included. (See clause 234 (g).)

Advance payments.

44. Before a voucher is passed for payment, errors will be corrected, omissions supplied, and overcharges reduced. Overcharging is deprecated, and if persisted in the surveyor's claim for employment will be impaired.

Examination of voucher.

45. Surveyors will be duly advised of payments made on their behalf to the bank or agent, and one copy of the voucher showing the amount paid will be returned. (See clause 41 (c).)

Surveyors advised of payments

46. Surveyors will be informed by memoranda of the reasons for differences between the amount claimed and that passed for payment. If such alteration is not acceptable to the surveyor, he may forward a written explanation or protest, on consideration of which, if found satisfactory, the amount claimed or part thereof may be reinstated. But no claim in respect of any correction, reduction, or omission in a voucher will be entertained unless it be made within six months of the date of final payment.

Appendix B.

Voucher No. _____
 Surveyor's No. 15-45
 Cat. No. _____
 Survey of _____

STAMP OF BANK OR AGENT.

Survey Office Stamp.

THE DEPARTMENT OF PUBLIC LANDS,

Dr. To MR. AUTHORIZED SURVEYOR Thomas Brown

FOR THE UNDERMENTIONED SERVICES—(Particulars as within).

AS CHARGED BY SURVEYOR.				AS PAID BY DEPARTMENT.			
LINEAR MEASUREMENT:—							
at 40/- per mile	2373.20	chains	64 6 7	at 40/- per mile	chains		
at 33/4 per mile	432.92	chains	9 0 5	at 33/4 per mile	chains		
at 20/- per mile	650.00	chains	8 2 6	at 20/- per mile	chains		
at _____ per mile		chains		at _____ per mile	chains		
CORNERS:—							
	51	at 6/- each	12 15 0		at 6/- each		
	29	at 4/- each	5 16 0		at 4/- each		
	6 "Fresh Starts"	2 at 1/- each 2/6	2 0 0 15 0		at each		
OBSERVATIONS:—							
	Tottenham	1 for Var.	12 6				
		1 Check	7 6				
		1 Magnetic	5 0				
TRAVELLING							
48 miles, at 3/- per mile as shown on back.			7 4 0		miles at 3/- per mile		
TOTAL:				109	6	6	
COUNTY RATE:—							
20% on the above			21 17 4	% on the above			
UNDER SCHEDULE 5:— as within				29	12	1	
DAY WORK:—							
5 days, at £2.12.6			13 2 6	days at £			
Travelling by Rail 1 day, at £2.2.0 as shown on back.			2 2 0	days at £			
TOTAL:				176	0	5	
DEDUCTIONS:							
BALANCE:							
FINAL PAYMENT:							

I DECLARE that the Services charged for in this Account have been faithfully and truly performed in strict accordance with the Regulations and practice of the Department; that the charges therein are warranted by the nature of the country as personally known to me in detail; and that this voucher has been prepared *by myself*.

and I authorize The Bank of Coora to receive payment on my behalf.

(Signature) Thomas Brown
 Authorized Surveyor.

* "By myself," or "under my direct personal supervision," as the case may be (see "Payment," Clause 38).

I CERTIFY that the Services charged in this Account were satisfactorily performed, and that under existing Regulations the above-named Authorized Surveyor is entitled to the payment of _____ the above Account.

Surveyor-General.

RECEIVED on the _____ 19 _____ the Sum of _____ pounds
 _____ shillings and _____ pence sterling, being the
 _____ the above Account.

Stamp.
 (See Note.)

Authorized Surveyor or Agent.

WITNESS TO PAYMENT: _____

PARTICULARS OF DAY WORK.

DATE.	DETAILS.—NUMBER OF MEN EMPLOYED, HOW EMPLOYED, NUMBER OF CHAINS MEASURED AND THE NATURE AND EXTENT OF THE WORK PERFORMED ON EACH DAY. Day rates will not be considered unless above information is given.	CHAINS.
1915.	<i>—Inspection of Mulga Downs $\frac{1}{4}$ Resumption</i>	
Sept. 18	} <i>Self and one man inspecting Resumption, one man exploring Creek for Permanent Waterholes</i>	
19		
20		
21		<i>Traversing Track along Creek and locating waterholes that appear to be permanent.</i>	370
22	<i>Completed traverse of track etc.</i>	200
23	<i>Self preparing Design — men cutting pegs.</i>	
24	<i>Self preparing Design — men cutting pegs. (Sunday) Completed Design and Report.</i>	
	<i>Total</i>	<i>570</i>
Oct. 4	<i>Travelling by Rail — Coora to Tottenham</i>	

PARTICULARS OF TRAVELLING, REMARKS, Etc.

The last travelling charged was from *3y Parish of Gayfield* to *66 M^l Larcom*

The particulars of travelling charged in this voucher are—

From	<i>Gladstone to Coora</i>	<i>17 miles</i>
	<i>Coora to Tottenham by Rail — 1 day</i>	
	<i>Tottenham to Road Littabella</i>	<i>7 "</i>
	<i>Littabella to Road South Kolan</i>	<i>24 "</i>
	<i>Total</i>	<i>48 "</i>

NOTE.—In claiming additional allowances, the class of country in which each line lies must always be shown as in this specimen. It is not necessary to enter every line, but sufficient detail should be given to enable the charges to be easily followed. The figures and letters —1b, 2c, 4f. &c.—refer to the classification shown in Schedule 3. (See 'Payment,' Clause 21.)

Corner and per centages should be put on the same lines as the lengths to which they refer. "Double Rates" may be conveniently charged for as shown.

There is such ample room on the Voucher form that Surveyors can easily give all necessary details and thereby facilitate the work of checking and passing the Voucher on for payment.

No. *15.31*

Surveyor General, Rockdale,
25th August 1915.

TO THE SURVEYOR-GENERAL,
BRISBANE.

SIR,

I have the honour to acknowledge having received the instructions for survey as per margin, dated *18th August 1915.*

I have the honour to be,

Sir,

Your obedient servant,

J. H. Brown

Authorised Surveyor.

REFERENCE No. 15.44.

Bundaberg

2nd November 1915.

*Portions 54 and 61
Parish of
Tottenham*

Sir,

I have the honour to transmit herewith (a) / Plan, (b) / Field Book, and Accounts, in triplicate, of Survey noted in the margin; and I hereby, on honour, declare that I have personally surveyed and marked out on the ground all the boundaries of the abovementioned portions, and that the Plans and Field Books are correct, and the whole Service performed with care and in strict accordance with the Regulations and practice of the Department. I further declare that, according to my estimate of the character of the country, I am entitled to the allowance of the extra percentage noted against each portion in the margin.

I have the honour to be,

Sir,

Your obedient Servant,

Jos. Brown.

Authorized Surveyor

TO THE SURVEYOR-GENERAL, BRISBANE.

Remarks or Report on above Surveys.

54. This portion has not been surveyed in strict accordance with the application, which included the road now forming the western boundary, and part of the Camping Reserve. Deletio's consent to reduced area hereunder.

61. With the exception of the road on the East boundary, this portion has been surveyed in accordance with instructions. The road along the north of 60 to 63, is rather heavy in wet weather, and will require forming at some future date. Road of access to the Quarry Reserve has therefore, been left between 61 and 62.

(a) Here state number of Plans.

(b) Here state number of Field Books.

MEMO. FOR SURVEYOR.—Unless Plans are sent to the Surveyor-General in a complete state, accompanied by this Form, Field Books, Instructions, and Vouchers (except where the latter are transmitted through the Bank), payment for Surveys will be delayed. Each Plan should also be noted with the date and by whom the instruction was issued.

SURVEYOR'S VALUATION—COUNTRY LANDS.

NO. OF PORTION.	AREA.	FAIRLY.	DISTRICT.	PRICE PER ACRE.	VALUE OF IMPROVEMENTS.	DESCRIPTION OF LAND AND NATURE OF IMPROVEMENTS, ETC.
3	100 ac.	<i>Little bella Bundaberg</i>		<i>11 per. ac.</i>	<i>0.0</i>	<i>This portion consists of well grazed alluvial soil very well suited for agriculture. It is moderately timbered with gum and apple but not over a small quantity. The water is not permanent, but may occasionally be abundant. There are 12 chains of 5 wire fence along the road. Sub, knitted and grasses in 80 there is a belt of dense scrub along the creek which contains prominent water-courses about 5 chains wide, along the fence so liable to inundation.</i>
4	100 ac.	"	"	<i>11 per. ac.</i>		<i>I have 70 acres of agricultural land suitable for grazing. The soil is well grazed and grasses suitable for grazing. The soil is from the Little bella river, floodwood and gum. The water is not permanent, but a good supply has been obtained in the locality by sinking 45 feet. Improvements 1 and 80 acres of grassy land, timber, water, etc. etc. etc. Improvements about 10 acres of 5 wire fence, 100 acres of 5 wire fence.</i>
5	100 ac.	"	"	<i>11 per. ac.</i>		<i>Improvements about 10 acres of 5 wire fence, 100 acres of 5 wire fence.</i>
6	100 ac.	"	"	<i>11 per. ac.</i>		<i>Improvements about 10 acres of 5 wire fence, 100 acres of 5 wire fence.</i>
7	100 ac.	"	"	<i>11 per. ac.</i>		<i>Improvements about 10 acres of 5 wire fence, 100 acres of 5 wire fence.</i>
8	100 ac.	"	"	<i>11 per. ac.</i>		<i>Improvements about 10 acres of 5 wire fence, 100 acres of 5 wire fence.</i>
3 to 8	generally					<i>These portions are included in the large area of alluvial formation in this District. The northern part forming the Recreation of alluvial flats, while the southern part is broken by hills and the high range. This range is about 15 miles long and runs generally in a north-south direction. The north-east extremity of the hills runs along the Little bella river and crosses the Little bella river at about 2 miles from the junction with the Little bella river making the total distance about 2 1/2 miles.</i>

Jos. Brown.

Authorized Surveyor.

SURVEYOR'S VALUATION—TOWN AND SUBURBAN LANDS.

NO. OF T- ACRES.	NO. OF PORTION.	AREA.		SECTION.	TOWN.	PAID PER ACRE.	VALUE OF IMPROVEMENTS.	DESCRIPTION OF LAND AND NATURE OF IMPROVEMENTS, ETC.
		A.	B.					
1 to 10	(Acres)	2	0	I		20	£	No improvements
15		1	0	II	Suggested	25	120	" Bluebonnet; Shop and water-board Cottage
16		1	0	"	same	"	20	No improvements
17/18		1	0	"	"Abilla"	"	20	Shed, out-houses and 5/2-class two-wheeled
19		1	0	"	"	"	300	face connected with the Hotel on allotment 20.
20		1	0	"	"	"		La Villa Hotel. Light-timber weather-board house, shingle roof. Detached kitchen; 1 chain two-wheeled fence. remainder of faces follows, road, section 1 & 2.

These sections are situated on the north-western slope of a sandstone ridge affording good natural drainage. The site is about fifty feet above the ordinary level of Bundaberg Creek. Distant about 20 chains. Where an unimpeding supply of good water may be obtained. The Hotel on Section II is situated on the main road to Bundaberg Railway Station, about 10 miles distant.

Thos. Brown.
Authorized Surveyor.

SURVEY OFFICE,

BRISBANE, QUEENSLAND.

Notice of Entry under "The Public-Works Land Resumption Act of 1906."

To Mr. Jacob Smith

Occupier of Portion 231 Parish of Kolan

IN pursuance of Section 31 of "The Public Works Land Resumption Act of 1906," notice is hereby given that it is intended to enter upon Portion 231; Parish of Kolan for the purpose of surveying a road

DATED 29th September 1915.

Thos. Brown.

Authorized Surveyor.

Appendix No. vi.

Information to be Supplied by Surveyors when Marking Roads through Freehold or Leasehold Lands.

Portion No. 231

Parish of Kolan

What length of road passes through enclosed land?	18 chains and 85 links
What kind of fence is the land enclosed by, and what is its value per chain?	Wire bound, wallaby proof, paling fence, value 15/- per chain.
How much of the land included in the road is cleared or cultivated?	nil.
What is the kind and value of the cultivation?	nil.
State if there are any other improvements, and their nature; also, if the land is injuriously affected by severance, and to what extent and value?	House and kitchen, £150. Well £20, Stables £40. about 6 acres of cultivation (maize) fenced, £25. Garden (fenced) with fruit trees, etc. £20. I consider the land is injuriously affected by severance, to the extent of at least £40.
State the name of the Occupier?	Jacob Smith
Have all the improvements been shown on the plan of survey?	Yes.

Jos. Brown.
Authorised Surveyor.

Appendix No. vii.

SURVEY OF Road through Pors. 13, 44, Rosedale.
MAXIMUM GRADIENT OF ROADS.

Report to be forwarded in all cases of Survey of Roads through Crown Lands.

Are all the roads within a maximum gradient of 1 in 14?*	No
What is the general description of country traversed by the road?	Granite ridges from undulating to extremely rough and broken, timbered with scrub oak Bloodwood.
What is the probable nature and volume of traffic?	Carriage of cream and settlers ordinary requisites from the limited area to the South.
What is the extent and nature of the Surveyor's inspection of the country along and adjacent to the route of the road?	Thorough inspection with clinometer and aneroid, of the adjacent country, following on a general horseback examination of the country dealt with.
Why cannot a gradient of 1 in 14 be reasonably obtained?	In places it is necessary to follow spurs and the general profile of the country, as the cost of construction of a contour road would be prohibitive in view of the prospective traffic.
What gradients are recommended?	1 in 9, 1 in 10, 1 in 12.
State the position of each gradient in excess of 1 in 14.	From 600 to 800 Stations 6 to 7, 1 in 9. 450 " 700 " 10, 11, 1 " 10. 2,200 " 2300 " 14, 15, 1 " 12.

(Signed)

Jos. Brown.
Authorised Surveyor.

* If this question is answered in the affirmative, replies to the other questions are unnecessary.

PROGRESS JOURNAL.

MR. AUTHORISED SURVEYOR Thomas Brown

FOR THE MONTH ENDING 31st October 1915

POSTAL ADDRESS Bundaberg

TO THE SURVEYOR-GENERAL,
BRISBANE.

N.B.—Surveyors are requested to promptly advise the Department of the completion of work and when Plans will be forwarded; also of any change in Postal or Telegraphic Address.

PROGRESS JOURNAL for the Month ending 31st

October 1915 Mr. Authorised Surveyor Thomas Brown

WORK PERFORMED.									
DATE OF RESUBMISSION	REGISTERED NO.	SECTION NO.	PORTION NO.	PARISH OR LOCALITY.	AREA.	DATE OF INSTANT. TOWN.	REGULATED NO.	SECTION NO.	PORTION NO.
SPECIAL ATTENTION IS DIRECTED TO FOOTNOTE AND TO THE NECESSITY TO FOR									
28.7.15	15-12567C			Road through portions 231, 22v and 55v parish of Kolan					
18.8.15		1209	54		100 acs.				
		1210	55		100 "				
		1372	56		160 "	(d)			
28.7.15		1240	57	Parish of Tottenham	120 "	20.7.15	L.O.35		
		1563	58		160 "				
		1342	59		80 "	(a)			
		1238	60		160 "	1.10.15	15.21598	P.L.	
18.8.15		1354	61		160 "				
		1682	62		160 "				
28.7.15		1140	63		160 "				
		1352	64		160 "				
9.7.15	R.6. 9357		163	Parish of Littabella, Road through		(c)			
			164			15.10.15		1683	75
			176	(Completed 2 nd November)		(b)			
						22.10.15		1694	65
14.5.15	15-14200L.C.		96	Parish of Euleilah (Completed 21 st Sept. plan not yet forwarded)	184 acs.				
PLANS FORWARDED TO HEAD OR DISTRICT OFFICE DURING THE MONTH.									
DATE.	SECTION NO.	PORTION NO.	PARISH OR LOCALITY.	AREA.					
3.10.15		368	Parish of Littabella Town of Takilla sections I and II	840 acs 10 "					
10.10.15			Road through Portions 231, 22v and 55v Parish of Kolan						

NOTE.—The order in which it is proposed to carry out the work during the next month must be indicated alphabetically.

DATE: 3rd November 1915.

PLACE: Rosedale Railway Station.

WORK IN HAND.		CANCELLED, WITHDRAWN, TRANSFERRED, OR RETURNED.				
PARISH OR LOCALITY.	AREA.	DATE OF INSTANT. TOWN.	SECTION NO.	PORTION NO.	PARISH OR LOCALITY.	AREA.
WARD JOURNALS PROMPTLY AT THE END OF EACH MONTH.						
		10.6.15	1135	65	Parish of Langmore (Withdrawn by wife from Surveyor General 10.10.15.)	160 acs.
Town of Coora						
	Sec. VI. Allot. 1 to 10					5 acs
	" VII " 1 to 20					5 "
	Sub. Sec 6 " 1 to 4					17 "
	" " 7 " 1 to 5					23 "
	Parish of Barmundoo					2560 "
	Parish of Tottenham					160 "
SUMMARISED WEATHER REPORT AND OTHER REMARKS.						
<p>The weather during the month has been favourable for survey work and if it keeps fine I expect to complete the surveys of Coora in about ten days time.</p> <p>In this district generally there is a scarcity of grass and water and a fall of rain is eagerly looked for by the farming community.</p> <p>Settlement on the agricultural lands continues fairly active and there is an increasing demand for sugar lands and some enquiry for grazing homesteads.</p>						

When private work interferes with work for the Department, the matter should be reported and particulars supplied.

Thomas Brown Authorised Surveyor.

Appendix No. ix.

Department of Public Lands,
Brisbane, 30th April, 1914.

HIS Excellency the Governor, with the advice of the Executive Council, has been pleased to approve of the following By-law under the provisions of "The Land Surveyors Act of 1908."
14-12070—Sec.

JAMES TOLMIE.

WHEREAS by the provisions of section 24 of "The Land Surveyors Act of 1908" the Surveyors Board is authorised to make By-laws for all or any of the purposes in the said Act mentioned: It is hereby resolved by the said Board, by and with the approval of the Governor in Council, that the following By-law shall be in force from the date of the publication hereof in the *Gazette*:—

BY-LAW No. 4.

Repeal.

By-law No. 3, published in the *Gazette* dated 17th February, 1912, pages 400 and 401, is hereby repealed, and the following By-law substituted in lieu thereof:—

AMENDED BY-LAW No. 1.

Interpretation.

In the interpretation of this By-law, unless the context otherwise indicates, the following terms shall have the meanings set against them respectively, that is to say:—

"The Act"—"The Land Surveyors Act of 1908."

"Board"—The Surveyors Board constituted under the Act.

"Secretary"—The secretary appointed by the Board.

EXAMINATION OF CANDIDATES.

1. Examinations of candidates for registration as surveyors shall be held in Brisbane in the month of September of each year, and at such times as may be deemed advisable.

2. Every candidate shall forward to the secretary of the Board—

(a) Notice of his intention to present himself for examination, with documentary evidence of having complied with the preliminary conditions specified hereunder, all of which must reach the secretary at least ten days before the date fixed for the examination, due notice of which shall be given in the *Gazette*.

(b) The prescribed examination fee of five pounds five shillings, which must be paid on or before the date of examination.

Part I.

PRELIMINARY CONDITIONS.

3. A candidate shall satisfy the Board that he will be of the full age of twenty years at the time of examination, but no candidate shall be registered as a surveyor until he shall have attained the age of twenty-one years.

4. A candidate shall produce satisfactory evidence that he is of good fame and character.

5. (a) A candidate shall have passed at any University recognised by an Australasian University the matriculation examination, or such other examination as shall, in the opinion of the Board, be equivalent thereto; and shall have been professionally employed under registered articles, or other similar agreement, with some qualified surveyor or surveyors for not less than three years, two of which must have been in the field.

(b) Or he shall have taken the degree of Bachelor in Engineering at any University recognised by an Australasian University, and have been professionally employed under registered articles or other similar agreement in the field for a period of two years with a qualified surveyor or surveyors.

[*Note*.—All articles of indenture or other similar agreements, duly stamped in accordance with the provisions of "The Stamp Act, 1894," shall be forwarded to the secretary for registration within thirty days of the date of commencement thereunder.]

(c) Or he shall have passed in any part of the British Empire or other country over sea an examination which in the opinion of the Board, is equivalent to the matriculation examination prescribed in (a) and have completed such term of professional field service with an authorised surveyor or surveyors in the State of Queensland as, in his case, the Board may have prescribed.

(d) Notwithstanding anything to the contrary in the preceding conditions, a candidate may be admitted to examination if he produces certificates of six years' satisfactory field service with an authorised surveyor or surveyors, and has passed a special examination prescribed by the Board, which shall include English, arithmetic, geometry, and algebra. Provided that such six years' field service was commenced before the date of the publication of this By-law in the *Government Gazette*.

(e) Candidates who have taken a degree in Engineering at the University in an Australian State or in the Dominion of New Zealand who produce:—

(1) Certificates of having completed a University course in surveying which is recognised and approved by the Surveyors Board of that State or Dominion;

(2) Certificates of eighteen months' satisfactory field-service with an authorised surveyor or surveyors;

(3) Certificates of competence to effect surveys as prescribed in clause 6 herein—

shall be exempted from examination in the subjects prescribed in Part 2 herein other than that mentioned in subclause 10 (b), but will be required to undergo the examination prescribed in Part 3.

6. In addition to other certificates of service, a candidate shall produce, in the following form or to the like effect, a certificate from a qualified surveyor with whom he has served, that he is competent to effect surveys:—

Form of certificate for presentation to the Board.

I, A.B., a qualified land surveyor, hereby certify that C.D. has been professionally and continuously employed under articles [or other similar agreement] with me in the practice of land surveying for a period of _____, viz.:—from _____ to _____, of which _____ have been in the field, and that he is fully competent to effect surveys.

[Here describe the survey work on which C.D. was engaged.]
(Signed) A.B.

(Date.)

For this purpose a "qualified surveyor" shall mean any person entitled to practise as a land surveyor in any part of the British Empire where the standard of examination is, in the opinion of the Board, equivalent to that prescribed by this By-law.

7. A candidate shall produce his original field-notes and plan plotted by him therefrom of the survey of an area of not less than 40 acres, one of the boundaries of which shall be a watercourse or other natural feature or an irregular road; and also his original field-notes, plan, and description of a survey of a town lot built upon, as made for the purpose of an application under the provisions of the Real Property Acts of 1861 and 1877.

The field-notes, plans, and surveys must be certified by the candidate to be entirely his own work.

8. Each candidate presenting himself for examination shall provide himself with a book of logarithms, 40-20 scale, a parallel ruler, protractor, and necessary appliances for plan-drawing, except paper.

9. Candidates whose credentials are, upon examination, found to fulfil the requirements of Part I. will be admitted to:—

Part II.

SUBJECTS OF EXAMINATION (WRITTEN)

10.

(a) Computations.

Computations relating to triangulation, measurement of heights, trigonometrical stadia and underground surveying; the setting out of areas, roads and curves; the adjustment of discrepancies in surveys; the reduction of traverses and the determination of areas including such as have irregular or curved boundaries.

(b) Principles and Practice of Surveying.

Conduct of surveys; keeping of field-notes; plotting plans, sections and contours; locating and grading roads, setting out curves; and designing for the purpose of the subdivision of land.

(d) *Field Astronomy, Geodesy, &c.*

Determination of time, latitude, and azimuth; the use of ephemerides; elementary geodesy, including spherical excess and convergence of meridians, variation of the magnetic needle, projection of maps and charts.

(e) *Miscellaneous.*

Elementary physics, elementary geology, elementary forestry. [The scope of the examination in elementary physics shall be that covered by "Stewart's Elementary Physics," Fourth Edition, omitting chapters 8, 10, and 11, and the scope of the examination in elementary geology shall be that covered by "Geikie's Class-book of Geology," Fourth Edition.]

11. Candidates holding diplomas from public technical schools or colleges recognised by the Board may be exempted from working out papers in physics and geology and shall on such exemption be credited with 60 per centum of the maximum marks allotted in respect of those papers.

Part III.

SUBJECTS OF EXAMINATION (ORAL).

12. Principles of construction, and practical tests in the adjustment and use of the following instruments:—Theodolite, plane-table, sextant, tachometer, level, compass, clinometer, thermometer, and steel band. Methods of field practice and actual tests in astronomical observations and levelling. Candidates may be required to effect surveys under supervision.

REGISTRATION OF SURVEYORS.

13. A candidate fulfilling the preliminary conditions and passing the examination held under this By-law shall be entitled to a certificate of competency as a land surveyor, and, on compliance with the provisions of the Act, to registration as an authorised land surveyor in the State of Queensland.

14. A surveyor applying to the Board for registration as an authorised surveyor without examination on the grounds of his holding a license or certificate entitling him to practice in any of the other Australasian States or in the Dominion of New Zealand, shall produce such license or certificate of competency from the Board of the State or Dominion in which he is licensed or authorised to survey, together with satisfactory evidence as to character: Provided that should such license or certificate have been issued upon examination held prior to September, 1895, or in virtue of a certificate issued prior to September, 1895, he shall further produce a written recommendation or certificate dated not more than twelve months previously from such Board: Provided also that any surveyor prevented by absence from the State or Dominion in which he obtained his license or certificate from obtaining the recommendation of the Board of that State or Dominion, shall, on passing such examination under this By-law as the Board may require, and on compliance with the provisions of the Act, be entitled to registration as an authorised land surveyor in the State of Queensland.

The Board may grant a certificate of competency or a letter of recommendation to any surveyor authorised by registration in Queensland and desiring to be registered in another State or the Dominion of New Zealand, either without examination or on such *visa voce* examination as, in the opinion of the Board, may be necessary.

15. Applications for registration of articles of indenture or other similar agreement shall be accompanied by evidence of the pupil's educational qualifications and the date of his birth.

FEEs.

16. The following fees shall be paid to the secretary in respect of the matters hereunder mentioned—

	£	s.	d.
On entry of a candidate's name for examination...	5	5	0
Upon registration of any surveyor not exempted by the Act	2	2	0
Upon application for registration by a surveyor duly qualified outside Queensland	1	1	0
Upon issue of a letter of recommendation	1	1	0
Upon issue of any certificate of registration	0	10	6
Upon registration of articles of apprenticeship or other similar agreement	0	5	0
Upon application to inspect the Board's register	0	2	6

17. In the event of failure of any candidate to pass the full examination, the Board may, at its discretion, remit part of the examination fee at any subsequent examination of such candidate.

SCHEDULE.

1. Certificate of Competency.

No.

STATE OF QUEENSLAND.

We, the Surveyors Board constituted under "The Land Surveyors Act of 1908," hereby certify that Mr. _____ has proved to our satisfaction that he possesses the requisite field experience and has passed an examination before this Board in the following subjects, viz.:—Mathematics, as applicable to surveying; computation of areas, traverses, and curves; principles and practice of surveying, levelling, and the measurement of earthwork; practical astronomy, as applied to land and geodetic surveying; principles of construction, adjustment, and use of surveying instruments; compilation and drawing of plans; projection of maps and charts;—and that he is qualified for the position of a land surveyor in the State of Queensland.

Dated the _____ day of _____, 19 _____.

[Seal of Board.]

President, }
Secretary. } Members of
the Board.

Office of the Surveyors Board,
Department of Public Lands, Brisbane.

2. Certificate of Registration.

No.

STATE OF QUEENSLAND.

The Surveyors Board constituted under "The Land Surveyors Act of 1908."

This is to certify that Mr. _____, having satisfactorily proved his qualifications, has been registered as an authorised surveyor under the provisions of "The Land Surveyors Act of 1908."

Dated the _____ day of _____, 19 _____.

[Seal of Board.]

_____, President.
_____, Secretary.

Office of the Surveyors Board,
Department of Public Lands, Brisbane.

3. Letter of Recommendation.

No.

STATE OF QUEENSLAND.

The Surveyors Board under "The Land Surveyors Act of 1908" hereby certifies that it has now reviewed the qualifications of Mr. _____, an authorised surveyor registered in Queensland under the provisions of "The Land Surveyors Act of 1908," and recommends for favourable consideration any application for registration as a surveyor made by him to any of the Surveyors Boards co-operating with the Surveyors Board of Queensland in the registration of surveyors.

Dated the _____ day of _____, 19 _____.

[Seal of Board.]

_____, President.
_____, Secretary.

Office of the Surveyors Board,
Department of Public Lands, Brisbane.

Certificate.

The foregoing By-law was made and passed by the Surveyors Board on the second day of April, 1914.

ALLAN A. SPowERS, President.

MAGNETIC OBSERVATIONS.

LOCALITY, CHARACTER OF OBJECT, ETC.	READINGS ON REFERRING MARK.						MEAN BEARING OF REFERRED MARK.				
	Box Direct.		Box Reversed.		V. B.						
	South End.	North End.	South End.	North End.	Ver. A.	Ver. B.					
Station 5 South East Corner of Portion 106 Parish of Taunton Sandy soil - Stony.	AM	10	20	0° 13' 40"	180° 12' 40"	0° 10' 50"	180° 10' 30"	0° 22' 0"	180° 31' 50"	0° 14' 28"	
		10	45	0° 19' 40"	180° 19' 20"	0° 3' 40"	180° 3' 20"	363° 23' 0"	179° 58' 40"	0° 13' 25"	
		PM	6	50	0° 4' 20"	180° 4' 0"	0° 17' 25"	180° 17' 0"	363° 57' 0"	179° 56' 40"	0° 11' 10"
			7	20	0° 19' 20"	180° 19' 0"	0° 6' 20"	180° 6' 20"	363° 55' 0"	189° 28' 40"	0° 13' 12"
	Log.										
	Time.										
	Day.										
	Month.										
	Year.										
	Sum									0° 52' 15"	
	Mean									0° 13' 4"	
	True Bearing of Referring Mark									8° 6' 11"	
	Magnetic Declination									8° 19' 15"	

Thos Brown
Authd.
 Surveyor.

Appendix No. x.

Appendix No. xi.

District _____
 Official No. of Observation _____
 T.M.M. Sheet No. _____
 Cat. No. _____

FORM OF COMPUTATION OF TRUE MERIDIAN BY SOLAR OBSERVATION.

Observed by Mr. *Authorized* Surveyor *Thomas Brown*
 at Station *3* *North east corner of*
 Portion *64* Parish *Tottenham* County *Gloucesters*
 Latitude° *24° 38' 34" N.* Longitude° *151° 57' 42" W.*
 Date *16th October 1915* Instrument *5" Transit theodolite*
 Description of Referring Object (R.O.) *Picket on line*
 Bearing of R.O. referred to Datum of Survey *295° 48' 0"*

Variation by Obs. 1	<i>7, 50, 44.5</i>	MEAN VARIATION,—
" " " 2	<i>7, 50, 45</i>	
" " " 3	<i>7, 50, 29.5</i>	
	<i>7, 50, 26</i>	

TO CHECK BEARING

Mean True Bearing of line by Observation at Station <i>3</i>	303	38	26
Convergence from Initial True Meridian (for <i>24.9</i> miles East)	+	9	55
Computed Bearing of line referred to Initial True Meridian.	303	48	21
Variation of County Arbitrary Meridian (See Appendix xx)	-	8	0
Computed Bearing of Line referred to County Arbitrary Meridian.	295	48	21
Bearing of Line by Field Book	295	48	0
Difference			21

TO COMPARE VARIATION.

Variation of County Arbitrary Meridian - Appendix xx	8	0	0
Convergence from Initial True Meridian (for <i>24.9</i> miles East)	-	9	55
Computed Variation at Station <i>3</i>	7	50	5
Mean Observed Variation at Station <i>3</i>	7	50	26
Difference			21

CONVERGENCE OF MERIDIANS.

The formula for convergence is:—
 Log Tan. Lat. Log. Dep. (in miles) Constant Log. 9.93823
 — Log. Convergence in minutes and decimal.
 Mean Lat. between the two stations to be used.
 Table of Convergence of Meridian for one statute mile, East or West. (See also App. xxi xxiv. xxv.)

Lat.	Angular diff. in Seconds.	Lat.	Angular diff. in Seconds.	Lat.	Angular diff. in Seconds.
10°	9-18	17	15-91	24°	23-18
11	10-12	18	16-01	25	24-28
12	11-06	19	17-02	26	25-39
13	12-02	20	18-07	27	26-52
14	12-98	21	19-08	28	27-63
15	13-05	22	21-03	29	28-86
16	14-03	23	22-11	30	30-05

** State how Latitudes and Longitudes were obtained.*
Latitude and Longitude by scale from X station on Parish Map. Standard Time (10 hrs. E.) used.

17. 10. 1915.
Thos Brown
Authd. Surveyor.

NOTE.—For Formula, Diagrams, Examples of Computation, etc., see "Rules and Directions for the Guidance of Surveyors."

Observation 1.

FIELD BOOK.

Apparent positions in which sun is observed (to be shown).	Horizontal Circle Reading on R. O.	Standard Time by watch.	Horizontal Circle Reading on Sun.	Altitude (I.)	Zenith Distance (II.)
Circle Left	A 295 48 0 B 115 48 20	3 55 30	A 266 25 30 B 86 25 40	1 30 19 50 2 30 19 40	
Circle Right	Return A 115 48 30 B 295 48 10		Reverse plate and telescope		1 60 49 30 2 60 49 50
Sum	60	113 20	106 30	90	80
Mean	295 48 15	3 56 40	266 26 37.5	30 19 45	60 49 40
Mean Circle Reading on R. O.			295 48 15	90 0 0	
Angle between Sun's Centre and R. O.			29 21 37.5	59 40 15	Zen: Dist: col. I. 60 49 40 " " " II.
			Sum 29 55		
			Mean 60 14 57	Apparent Zen: Dist:	
			+ 1 40	Refraction } For Alt.	
			- 8	Parallax } For Alt.	
			z = 60 16 29	True Zen: Dist:	

p = South Polar Distance
c = Co-latitude
z = Zenith Distance
 $s = \frac{p + c + z}{2}$
Z = Azimuth Angle
P = Hour Angle

TO FIND GREENWICH TIME.

	Month	Day	h.	m.
Mean Time of Obs:	10	16	3	57
Subtract 12 hrs. if A.M.				
Astronomical Time	10	16	3	57
Correction for Standard Time			- 10	
Greenwich Time	10	15	17	57

TO COMPUTE VARIATION.

z = 60 16 29	Log. Sin. = 9 9 3 8 7 2 6 2
c = 65 21 26	Log. Sin. = 9 9 5 8 5 2 8 1
p = 81 30 9	19 8 9 7 2 5 4 3
2 207 8 4 = Sum	20:
s = 103 34 2	$\frac{1}{\sin z \sin c} = 0 1 0 2 7 4 5 7$
s - z = 43 17 33	Log. Sin. = 9 8 3 6 1 4 8 8
s - c = 38 12 36	Log. Sin. = 9 7 9 1 3 7 1 7
	2 19 7 3 0 2 6 6 2
z = 47 8 33.5	Log. Sin. = 9 8 6 5 1 3 3 1

TO FIND SOUTH POLAR DISTANCE.

Sun's declination* on				
Month Oct day 15 hour 18	8	29	54	
Correction for 3 minutes			- 3	
Corrected Declination South	8	29	51	
Add to or subtract from	90			
South Polar Distance (p)	81	30	9	

TO FIND SOUTH POLAR DISTANCE.

z = 47 8 33.5	Log. Sin. = 9 8 6 5 1 3 3 1
z = 94 17 7	Azimuth angle.
180	Add to; Subtract from (for P.M.) (for A.M.)
274 17 7	True bearing of sun's centre
29 21 37.5	{ Angle between sun's centre (and R. O.
303 38 44.5	True bearing of R. O.
295 48 0	{ Bearing of R. O. referred (to datum line of survey.
7 50 44.5	Observed Variation

* " NAUTICAL ALMANAC " [ABRIDGED]. Pages III. to VII. each month.

Observation 2.

FIELD BOOK.

Apparent positions in which sun is observed (to be shown).	Horizontal Circle Reading on R. O.	Standard Time by watch.	Horizontal Circle Reading on Sun.	Altitude (I.)	Zenith Distance (II.)
Circle Left	A 295 48 0 B 115 48 10	4 1 55	A 266 38 40 B 85 39 0	1 28 43 30 2 28 43 20	
Circle Right	Return A 115 48 10 B 295 47 50		Reverse plate and telescope		1 61 15 0 2 61 15 10
Sum	10	1 40	226 20	50	10
Mean	295 48 2.5	4 0 50	265 56 35	28 43 25	61 15 5
Mean Circle Reading on R. O.			295 48 2.5	90 0 0	
Angle between Sun's Centre and R. O.			29 51 27.5	61 16 35	Zen: Dist: col. I. 61 15 5 " " " II.
			Sum 31 10		
			Mean 61 15 50	Apparent Zen: Dist:	
			+ 1 44	Refraction } For Alt.	
			- 8	Parallax } For Alt.	
			z = 61 17 26	True Zen: Dist:	

FORMULA FOR AZIMUTH.

$$\sin \frac{1}{2} Z = \sqrt{\frac{\sin(s-z) \sin(s-c)}{\sin z \sin c}}$$

TO FIND GREENWICH TIME.

	Month	Day	h.	m.
Mean Time of Obs:	10	16	4	1
Subtract 12 hrs. if A.M.				
Astronomical Time	10	16	4	1
Correction for Standard Time			- 10	
Greenwich Time	10	15	18	1

TO COMPUTE VARIATION.

z = 61 17 26	Log. Sin. = 9 9 4 3 0 3 2 8
c = 65 21 26	Log. Sin. = 9 9 5 8 5 2 8 1
p = 81 30 6	19 9 0 1 5 6 0 9
2 208 8 58 = Sum	20:
s = 104 4 29	$\frac{1}{\sin z \sin c} = 0 0 9 8 4 3 9 1$
s - z = 42 47 3	Log. Sin. = 9 8 3 2 0 2 2 3
s - c = 38 43 3	Log. Sin. = 9 7 9 6 2 1 4 1
	2 19 7 2 6 6 7 5 5
z = 46 53 18.5	Log. Sin. = 9 8 6 3 3 3 7 8

TO FIND SOUTH POLAR DISTANCE.

Sun's declination* on				
Month Oct day 15 hour 18	8	29	54	
Correction for 1 minutes			- - -	
Corrected Declination South	8	29	54	
Add to or subtract from	90			
South Polar Distance (p)	81	30	6	

TO FIND SOUTH POLAR DISTANCE.

z = 46 53 18.5	Log. Sin. = 9 8 6 3 3 3 7 8
z = 93 46 37	Azimuth angle.
180	Add to; Subtract from (for P.M.) (for A.M.)
273 46 37	True bearing of sun's centre
29 51 27.5	{ Angle between sun's centre (and R. O.
303 38 4.5	True bearing of R. O.
295 48 0	{ Bearing of R. O. referred (to datum line of survey.
7 50 4.5	Observed Variation

* " NAUTICAL ALMANAC " [ABRIDGED]. Pages III. to VII. each month.

STELLAR OBSERVATIONS.

Formulae for calculating the position of a star at elongation:—

Cosine hour angle = $\frac{\cos \delta}{\cos \phi} \times \tan \text{lat.}$

Sin. altitude = $\frac{\cos \delta}{\cos \phi} \times \sin \text{lat.}$

Sin. azimuth = $\cos \delta \times \sec \text{lat.}$

For computing corrections to circum-elongation observations for azimuth, the value of *m* for the sidereal interval between the calculated time of elongation and the time of observation, is given for every second up to 17 minutes in the following table. The formula for correction is:—

Tan. azimuth \times sin.² dec. \times log. *m*. Five-figure logs are sufficient.

If the altitude at circum-elongation be noted instead of the time of observation (and by this method a knowledge of the time is obviated), convert the difference between the observed altitude corrected for refraction, and the calculated altitude at elongation, into a relative time interval, by dividing by 15, and take the value of *m* therefrom from the table. Then—

Tan. dec. \times sec. alt. \times log. *m* = log. of correction as before.

The result by either method will be the angular difference in seconds between the star's azimuth at observation and elongation.

Several observations may be taken before and after elongation, reversing the face of the instrument for each alternate "shot." The correction may be reduced as far one observation by taking out the value of *m* for the corresponding difference in time or altitude at each observation, and applying the correction for the mean value of *m* to the mean of the readings taken on the star. The times of observation should be reasonably regular.

The table may also be used for the reduction of circum-meridian observations for latitude. The formula is:—

Sec. alt. \times cos. lat. \times cos. dec. \times log. *m* = log. of correction.

The result will be the correction in seconds, additive to the observed altitude, and subtractive from the zenith distance.

The Almucantar principle may be adapted for the determination of azimuth, as follows:—

Set the apparent altitude of the Pole (*i.e.*, latitude + refraction) on the vertical circle, and record the bearing of a suitable star at its transit across the intersection of the threads. Then—

Sin. $\frac{1}{2}$ azimuth = sin. $\frac{1}{2}$ codec. \times sec. lat.



Cos. hour angle = tan. $\frac{1}{2}$ codec. \times tan. lat.

To be observable under the above conditions, a star must be between the Pole and a north declination equal to colatitude minus latitude, but stars

[Continued on page 80.]

Observation 3.

FIELD BOOK.

Apparent position in which sun is observed (to be shown).	Horizontal Circle Reading on R. O.	Standard Time by watch.	Horizontal Circle Reading on Sun.	Altitude (I.)	Zenith Distance (II.)
Circle Left	A 295 48 0	4 3 40	A 265 26 0	1 28 20 50	
	B 115 48 30		B 85 26 10	2 28 20 40	
Circle Right		4 6 10	A 85 28 20	1 62 49 30	
	Return A 115 48 0		B 265 28 0	2 62 49 40	
	B 295 47 30				
Sum	102 0	9 50	108 30	90	70
Mean	295 48 0	4 4 55	265 27 7.5	28 20 45	62 49 35
Mean Circle Reading on R. O.			295 48 0	90 0 0	
Angle between Sun's Centre and R. O.			30 20 52.5	61 39 15	Zen: Dist: col. I.

Reverse plate and telescope

FORMULA FOR LOCAL TIME.

$\sin \frac{1}{2} P = \sqrt{\frac{\sin(s-p) \sin(s-c)}{\sin p \sin c}}$

Sum	28 50	Apparent Zen: Dist:
Mean	62 14 25	Refraction
	+ 1 48	Parallax
	- 8	For Alt.
	= 62 16 5	True Zen: Dist:

TO FIND GREENWICH TIME.					TO COMPUTE VARIATION.				
Month	Day	h.	m.		z =	Log. Sin.	c =	Log. Sin.	p =
Mean Time of Obs.	10	16	4	5	62 16 5	9.9470092	65 21 26	9.2585281	51 30 2
Subtract 12 hrs if A.M.									19.9255373
Astronomical Time	10	16	4	5	2 209 7 33 = Sum	20			
Correction for Standard Time			10		s = 104 33 46.5	$\frac{1}{\sin s \sin c} = 0.0944627$			
Greenwich Time	10	15	18	5	z = 46 17 41	9.8279792	c = 39 12 20	9.8027855	2 19.7252307
					z = 46 38 48.5	9.8616153			
Sun's declination on									
Month Oct day 15 hour 18	8	29	54		Z = 93 17 37	Asimuth angle.			
Correction for 5 minutes			+ 4		180	Add to; Subtract from (for P.M.) (for A.M.)			
Corrected Declination South	8	29	58		273 17 37	True bearing of sun's centre			
Add to or subtract from			90		30 20 52.5	(Angle between sun's centre and R. O.)			
South Polar Distance (p)			81 30 2		303 38 29.5	True bearing of R. O.			
					295 48 0	(Bearing of R. O. referred to datum line of survey)			
					7 50 29.5	Observed Variation			

* "NAUTICAL ALMANAC" [ABRIDGED]. Pages III. to VII. each month.

FRONTAGES.

near these extremes are not recommended for observation by this method. It is desirable that the motion in azimuth should not be large relatively to the motion in altitude, and stars unfavourably situated to furnish this condition should not be selected.

It is very necessary that the alidade bubble shall be in the middle of its run at the time of the star's transit for each observation. Any necessary adjustment to secure this result should be made by the pair of screws which move both telescope and bubble together, after the telescope is directed towards each star immediately before observation. The altitude slow-motion screw must not be moved. To effect the transit at the intersection of the threads, the slow-motion azimuth screw should be used. To compensate for errors in collimation, or in pointing due to level or the assumed value of the latitude, observations should be made on both sides of the meridian.

A variation of the above method may be made by observing in a similar manner the bearing of a suitable star at an altitude equal to its declination + refraction. Then—

$$\text{Cos. azimuth} = \tan. \frac{1}{2} \text{ colat.} \times \tan. \text{ dec.}$$

$$\text{Cos. hour angle} = \tan. \frac{1}{2} \text{ colat.} \times \tan. \text{ dec.}$$

The simplicity of this calculation may appeal to some surveyors, as the azimuth is the same as the hour angle, the triangle being isosceles.

The limiting declinations of stars observable will be 0° and south declination equal to latitude + 1/2 colatitude, and the same qualifications apply as in the former case.

These formulæ may be found useful for finding the position of a bright star in the daytime, for observation by ex-meridian altitude methods, when no other suitable object is available. The calculation of the hour angle will be advantageous in all cases, in order to find the approximate time when the observation of a selected star will be possible.

By section 67 of "The Land Act of 1910," the frontage of a portion is restricted to two-thirds the depth, except where all the available land is included. Under clause 25 of the "Directions to Surveyors" the method of computing such frontage is laid down, and it is also provided that "generally the depth of a portion should not exceed three times its mean breadth."

Except for the first fifteen acres, the frontages in the Table* have been computed to the nearest link for every acre up to 160 acres. In order to avoid making the Table unduly long, the frontages for every ten acres, with differences for every acre, are given from 160 acres to 960 acres; then for every twenty acres, and so on. So as to maintain accuracy, and yet not burden the Table with numbers to more than one place of decimals, the differences for areas greater than 960 acres have been worked out to every two, four, eight, and ten acres as set forth at the head of their respective columns of differences. Should the frontage of an area not exactly arranged for by the Table be required, it may easily be obtained by adding to the frontage for the next lower area given in the Table, a proportion of the corresponding difference.

Where diminishing differences are being operated upon without regard to minute fractions, inequalities must occasionally arise. Some of these appear in the Table, and there are others hidden under the column of Differences, but, as a general rule, the errors in frontage caused thereby do not exceed half-a-link, and in no case do they amount to a whole link—provided that the differences are faithfully applied. Fractions of less than half-a-link have been disregarded; half-a-link or more has always been taken as one link.

Besides showing the maximum frontages that may be allowed for any given area the minimum breadth may also be taken out—the minimum frontage (one-third depth) being equal to the maximum frontage of half the area.

For convenience of reference the following more frequently occurring areas are given in detail:—

AREA.	FRONTAGE † DEPTH.		FRONTAGE † DEPTH.		AREA.
	Frontage must not Exceed--	Depth must not be Less than--	Frontage should not be Less than--	Depth should not exceed--	
Acres.	Links.	Links.	Links.	Links.	Acres.
40 ..	1633	2450	1155	3464	40
80 ..	2309	3465	1632	4899	80
120 ..	2829	4242	2000	6000	120
160 ..	3266	4809	2300	6930	160
240 ..	4000	6000	2820	8484	240
320 ..	4619	6928	3266	9798	320
480 ..	5657	8486	4000	12000	480
560 ..	6110	9166	4321	12900	560
640 ..	6532	9798	4619	13856	640
960 ..	8000	12000	5657	16971	960
1,120 ..	8641	12962	6110	18331	1,120
1,280 ..	9238	13856	6532	19596	1,280
2,560 ..	13064	19596	9238	27712	2,560
5,120 ..	18475	27714	13064	39192	5,120
10,000 ..	25820	38730	18257	54774	10,000
20,000 ..	36515	54778	25820	77460	20,000
30,000 ..	44723	67084	31623	94869	30,000
40,000 ..	51840	77460	36515	109545	40,000
50,000 ..	57737	86605	40826	122478	50,000
60,000 ..	62250	94875	44723	134169	60,000

* For Table see pages 82 and 83.

Appendix No. xiv.

GRADIENT TABLE.

Gradient.	Angle.	Vert. Rise per Chain.	Gradient.	Angle.	Vert. Rise per Chain.
One in—	° ' "	Feet.	One in—	° ' "	Feet.
3	18 26 6	22-00	34	1 41 5	1-94
4	14 2 10	16-50	35	1 38 12	1-88
5	11 18 36	13-20	36	1 35 28	1-83
6	9 27 44	11-00	37	1 32 53	1-78
7	8 7 48	9-43	38	1 30 27	1-74
8	7 7 30	8-25	39	1 28 8	1-69
9	6 20 25	7-33	40	1 25 56	1-65
10	5 42 38	6-60	41	1 23 50	1-61
11	5 11 40	6-00	42	1 21 50	1-57
12	4 45 49	5-50	43	1 19 56	1-53
13	4 23 55	5-08	44	1 18 7	1-50
14	4 5 8	4-71	45	1 16 23	1-47
15	3 48 51	4-40	46	1 14 43	1-44
16	3 34 35	4-12	47	1 13 8	1-40
17	3 21 59	3-88	48	1 11 37	1-37
18	3 10 47	3-67	49	1 10 9	1-35
19	3 0 46	3-47	50	1 8 45	1-32
20	2 51 45	3-30	55	1 2 30	1-20
21	2 43 35	3-14	60	0 57 17	1-10
22	2 36 9	3-00	65	0 52 53	1-02
23	2 29 22	2-87	70	0 49 6	0-94
24	2 23 9	2-75	75	0 45 50	0-88
25	2 17 26	2-64	80	0 42 58	0-82
26	2 12 9	2-54	85	0 40 27	0-78
27	2 7 16	2-44	90	0 38 12	0-73
28	2 2 43	2-36	95	0 36 11	0-69
29	1 58 30	2-28	100	0 34 23	0-66
30	1 54 33	2-20	110	0 31 15	0-60
31	1 50 51	2-13	120	0 28 39	0-55
32	1 47 24	2-06	125	0 27 30	0-53
33	1 44 9	2-00	130	0 26 27	0-51
			140	0 24 33	0-47
			150	0 22 55	0-44

Appendix No. xvii.

TABLE showing the DIFFERENCES between STANDARD TIME and MEAN TIME of the UNDERMENTIONED PLACES in QUEENSLAND. STANDARD TIME in QUEENSLAND is the mean time of the 150th meridian of East Longitude (see Section 3 of "The Standard Time Act of 1894.")

			Minutes.				Minutes.				Minutes.
put clock	ON	BACK		put clock	ON	BACK		put clock	ON	BACK	
Adavale	ON	21½	Flonaville	put clock	ON	40½	Palmerville	put clock	ON	33½	
Alton	BACK	8	Gatecombe Head	put clock	BACK	54	Paterston	put clock	ON	30½	
Araucano	ON	19	Gayndah	put clock	ON	6	Pialba	put clock	BACK	11	
Ayrathalla	ON	13½	Georgetown	put clock	ON	26	Pile Lighthouse	put clock	ON	13	
Avon Downs	ON	11	Geraldton	put clock	ON	16	(Moreton Bay)	put clock	ON	13	
Ayr	ON	10½	Gilbert River	put clock	ON	29	Pittsworth	put clock	ON	6½	
Ayrshire Downs	ON	29	Gin Gin	put clock	BACK	8	Point Archer	put clock	ON	18½	
Banana	BACK	1	Gladstone	put clock	ON	5	Port Alma	put clock	BACK	3½	
Barcaldine	ON	19	Goondiwindi	put clock	ON	1	Port Douglas	put clock	ON	18	
Beaudesert	BACK	12	Gympie	put clock	ON	11	Queenston	put clock	ON	15	
Beenleigh	ON	18	Barkwood	put clock	ON	3	Raglan	put clock	BACK	12	
Blackall	ON	18	Herberton	put clock	ON	18	Ravenswood	put clock	ON	12	
Bloomsbury	ON	6	Hillgrove	put clock	ON	17	Redcliffe	put clock	BACK	13	
Bollu	ON	10	Highenden	put clock	ON	23	Richmond Downs	put clock	ON	27½	
Boonberry	ON	2	Inglewood	put clock	ON	15	Rockhampton	put clock	BACK	2	
Boulia	ON	49½	Inglewood	put clock	BACK	43	Rollleston	put clock	ON	6	
Bowen	ON	7	Jaspit Point	put clock	ON	12	Roma	put clock	ON	5	
Brisbane	BACK	12	Ipswich	put clock	ON	11	Rosedale	put clock	BACK	7½	
Bundaberg	ON	10	Isis	put clock	ON	9	Sandgate	put clock	ON	12	
Burketown	ON	42	Isisford	put clock	ON	22½	Sandy Cape	put clock	ON	13	
Burnett Heads	BACK	10	Jimbour	put clock	BACK	5	Sea Hill	put clock	ON	4	
Bustard Head	ON	7	Junction Creek	put clock	ON	22½	South Passage	put clock	ON	14	
Caboolture	ON	12	Jundah	put clock	ON	28	Southport	put clock	ON	14	
Cairns	ON	17	Karumba	put clock	ON	36½	Springsure	put clock	ON	8	
Camboon	BACK	2	Keppel Bay	put clock	BACK	4	Stanthorpe	put clock	BACK	8	
Camoooyal	ON	47½	Kilkivan	put clock	ON	9	St. George	put clock	ON	6	
Cape Bowling Green	ON	10	Killarney	put clock	ON	9½	St. Helena	put clock	BACK	13	
Cape Capricorn	BACK	5	Laidley	put clock	ON	10	St. Lawrence	put clock	ON	4	
Cape Cleveland	ON	12	Lake Nash	put clock	ON	43	Surat	put clock	ON	4	
Cape Moreton	BACK	16	Laura	put clock	ON	22	Talbuggera	put clock	BACK	14	
Cardwell	ON	15	Layburn	put clock	BACK	6½	Tambo	put clock	ON	15	
Charlottesville	ON	15	Limestone	put clock	ON	22½	Tangaluma	put clock	BACK	14	
Charters Towers	ON	15	(Groganville)	put clock	ON	22½	Tangorin	put clock	ON	23	
Childers	BACK	9	Longreach	put clock	ON	23	Taroon	put clock	ON	1	
Clare	ON	11	Lytton	put clock	BACK	13	Tate River	put clock	ON	23	
Clark River	ON	18	Mackay	put clock	ON	3	Tewantin	put clock	BACK	12	
Clermont	ON	10	Mackinlay	put clock	ON	34½	Thargomindah	put clock	ON	26	
Cleveland	BACK	18	Magazine Island	put clock	ON	13	Thornborough	put clock	ON	19½	
Cloacurry	ON	38	Magnetic Island	put clock	ON	13	Thursday Island	put clock	ON	31	
Coen	ON	27	Marburg	put clock	BACK	10½	Tiaro	put clock	BACK	10½	
Collaroy	ON	3	Marceba	put clock	ON	18	Toowoomba	put clock	ON	8	
Cooktown	ON	19	Marlborough	put clock	ON	1	Townsville	put clock	ON	13	
Crossbrook	BACK	10	Maryborough	put clock	BACK	11	Urangundi	put clock	ON	47	
Crow's Nest	ON	8½	Marytown	put clock	ON	23	Wallangarra	put clock	BACK	8	
Croydon	ON	31	McDonnell	put clock	ON	30	Walsh River	put clock	ON	24	
Cumberland	ON	27	Mein	put clock	ON	28	Wangaratta	put clock	ON	10	
Cunnamulla	ON	17	Miles	put clock	BACK	4½	Warwick	put clock	BACK	8	
Dalby	BACK	5	Mirani	put clock	ON	4½	Watsonville	put clock	ON	19	
Divranbundi	ON	7	Mirani Vale	put clock	BACK	6	Welford Lagoon	put clock	ON	25½	
Donaldson	ON	38½	Mitchell	put clock	ON	8	West Leichhardt	put clock	ON	41	
Donor's Hill	ON	37½	Montablon	put clock	ON	10	Westwood	put clock	BACK	1	
Double Island	BACK	13	Moreton	put clock	ON	29½	White Cliffs	put clock	ON	12	
Point	ON	11	Morvon	put clock	ON	11½	Windsor	put clock	ON	28	
Dugandan	ON	14½	Mount McCosnell	put clock	ON	12	Winton	put clock	BACK	11	
Dungeness	ON	14	Mount Morgan	put clock	BACK	2	Woodford	put clock	ON	28	
Dunwich	BACK	4	Mount Perry	put clock	ON	7	Woody Island	put clock	ON	12	
Durah	ON	4	Mungindi	put clock	ON	4	Station	put clock	ON	12	
Edsroid	ON	4	Musgrave	put clock	ON	26	Woowonga	put clock	ON	8	
Emerald	ON	7½	Muttaburra	put clock	ON	22	Wyandotte	put clock	ON	20½	
Emma Park	BACK	3½	Nanango	put clock	BACK	8	Yaamba	put clock	BACK	1½	
Esk	ON	10	Nebo	put clock	ON	5	Yandilla	put clock	ON	5½	
Eulo	ON	20	Nerang	put clock	BACK	13½	Yelvertoft	put clock	ON	45	
Fairview	ON	22	Normanton	put clock	ON	36	Yeppoon	put clock	BACK	3	
Fassifern	BACK	10½	One-Mile Creek	put clock	BACK	10½					
Flat-Top Island	ON	3	(Gympie)	put clock	ON	10½					

Appendix No. xx.

TABLE OF THE COUNTIES OF QUEENSLAND,
Showing the COUNTY VARIATION and the Location (with Latitude and Longitude) of the INITIAL POINT for each.

County.	Initial Point.	Latitude S.	Longitude E.	County Variation.
	Trigonometrical Station shown *			
	Astronomical Station shown †			
	Latitude Station shown ‡			
Abbotsford	Post at angle of Rabbit fence at north-west corner of Ben Castle Block	26 40 00	141 24 00	5
Aberdeen	North corner, portion 2, parish of Goongarri	25 56 44	149 19 00	7
Albany	South-east corner of View Hill Block at tree marked broad-arrow over A	21 43 10	146 16 40	6
Albion	North-west corner portion 8, parish of Owl's Nest	21 24 04	142 40 24	5
Allison	No. 3 Bore, near Beaudesert Station	21 31 00	141 04 00	4
Amaroo	50-Mile peg (Bedford's Survey)	23 05 18	139 08 49	4
Archer	Tree marked broad-arrow over MD6 over B5 at north-west corner of Meta Downs No. 6 Block	13 25 30	142 31 20	5
Argylla	Tree marked broad-arrow over E over 3.4 at north-west corner of Euston No. 4 Block	20 39 40	139 53 25	4
Aubigny	Bloodwood *	27 22 48.35	151 34 42.17	8
Auburn	North corner Police Reserve (R. 67), Chinchilla	26 44 30	150 37 32	8
Ayrshire	Winton Post Office	23 23 45	143 02 43	5
Belunga	North-east corner Koolah No. 8 Block	15 10 30	142 42 20	5
Bendo	Coongoola Railway Station	27 39 00	145 54 15	6
Banks	Crossing of Cooktown-Laura Railway over Normanby River	15 23 25	144 53 20	6
Barcoo	South corner portion 3, parish of Albilbah	24 27 20	144 14 15	6
Beulahia	Old Telegraph Station, near Boomberry	24 43 12	149 28 00	7
Beaconsfield	Cloncurry †	20 42 53	140 30 20.25	4
Beaufort	Hobartville Station	23 18 30	146 31 09	6
Bell	Twin Hills †	21 57 49.1	146 56 36	6
Belmore	St. George †	28 01 47.6	148 35 29.4	7
Belyando	Alpha †	23 39 01.05	146 38 37	6
Bentick	Bullaganang Mountain *	28 35 05.98	151 24 56.92	8
Binburie	Brighton Downs Head Station	23 20 40	141 36 05	5
Bolwarra	Bolwarra Head Station	17 31 45	144 04 15	5
Boondooma	Mount Dangore *	26 27 31.48	151 36 28.3	8
Boyen	Mount Ferry †	25 10 38.26	151 38 37.12	8
Brake	Tree marked broad-arrow over F over ND at north-west corner Gundaria North Holding	20 12 10	139 07 00	4
Brighton	South corner portion 6v, parish of Middleton, county of Woodstock	22 31 20	141 36 40	5
Buckingham	Tree marked broad-arrow over CXCIV over M.7 at east corner Tramore Holding	22 09 30	139 29 00	4
Buckland	Nardoo Head Station	24 35 34	147 34 33	7
Bulgroo	Bulgroo Head Station	25 47 40	143 42 45	6
Buller	North-west corner Portia Downs Holding, near tree marked broad-arrow over C over EV	18 17 00	138 49 15	4
Bulloo	North-east corner portion 3v, parish of Artoch	27 02 30	144 09 20	6
Bulwer	Miles †	26 39 36.53	159 11 07.23	8
Bundara	West corner portion 10, parish of Silverleaf	25 45 30	147 49 15	7
Burarie	North-east corner section IV, Nocoundra	27 48 50	142 34 15	5
Burdekin	South-west corner portion 2, parish of Fanning	19 51 25	146 21 30	6
Burenda	Nive Downs Head Station	25 30 00	146 32 38	6
Burke	Burketown †	17 44 38.7	139 32 54.9	4
Burrandilla	South corner portion 18, parish of Borradilla	26 09 06	145 49 29	6
Byerley	Tree marked broad-arrow over R over XLVI on Red River at north-east corner Charnwood Holding	17 26 50	143 29 20	5
Cairns	Cotherstone Head Station	22 37 00	148 15 37	6
Cameroon	Yanko Head Station	28 35 20	141 53 45	5
Canning	North-west corner of post and telegraph reserve, Woodford	26 56 26	152 45 43	9
Canobie	West corner Nooral Block, at tree marked broad-arrow over Z over 17	19 30 20	140 45 55	4
Cardwell	Cardwell †	18 16 11.12	146 01 59.55	6
Carlisle	South-west corner section III, Mirani	21 9 37.2	148 51 57.5	7
Carnarvon	North-east corner portion 1, parish of Minnel	28 18 31	149 53 21	8
Carpentaria	Tree marked broad-arrow over LXXX at south-east corner Inverleigh No. 1 Block at "M" Lagoon	18 06 30	140 07 00	4
Carrandotta	Tree marked broad-arrow over J over CXXIX on Georgina River, near west corner of Carrandotta Holding	22 00 00	138 30 00	4
Carruthers	260-Mile post on Border Survey	29 00 00	141 22 25	5

TABLE OF COUNTIES, WITH THE COUNTY VARIATION AND INITIAL POINT FOR EACH—Continued.

County	Initial Point	Latitude S.	Longitude E.	County Variation.
Cassilis	North-east corner portion 4, parish of Heness	27 56 10	146 41 35	7
Cavendish	Perseverance Mountain *	27 24 54	152 09 50	8
Chateaux	North-east corner portion 3, parish of Egera	20 65 30	146 15 08	6
Chatsworth	27 chains west of gum-tree marked broad-arrow over CXIII over 14 over BP2, near south-west corner Bushy Park Holding	21 23 45	139 41 20	4
Chelmsford	South corner of section VII., Maytown	16 03 20	144 17 25	5
Chertston	South-east corner Babbuloora Holding	25 13 05	147 29 10	7
Chivot	North corner section IV., Welford	35 02 45	143 40 45	5
Chudleigh	South corner Terricks No. 1 Block, at tree on Stawell River marked broad-arrow over S over T 1	19 52 45	143 55 17	5
Churchill	Mount Zabel *	27 48 41	152 19 45	9
Clarke	Crossing of telegraph line over Gray Creek	18 58 30	145 02 20	6
Clarde	Trees marked broad-arrow over C at junction of Claude River and Goodlife Creek	24 32 20	147 05 35	6
Clermont	Clermont †	22 49 29	147 38 31	7
Clinton	Cladstone †	23 50 28	151 15 33	8
Clive	Texas Mountain *	28 51 25	151 12 46	8
Coen	South-west corner Koksby No. 1 Block, at tree marked broad-arrow over S 1 over R 1	14 07 00	142 39 20	5
Cogoon	North-east corner reserve on east boundary Rocky Holding	27 19 10	148 27 31	7
Conbar	Mount Margaret Head Station	27 07 35	143 24 25	6
Consuelo	Trees marked broad-arrow over X over V on Christmas Creek	24 47 30	148 33 00	7
Cook	Rundaberg †	24 52 15	152 20 50	8
Cooper	Trees marked broad-arrow over C over 171 on Maspoor Waterhole (Cooper's Creek) at south-west corner of Finland Holding	27 35 50	141 15 15	5
Coorajah	South corner of Strathcoonan Holding	25 13 10	144 15 15	6
Cootah	West corner of Drumtuff Holding	15 57 20	142 37 50	5
Copperfield	Carpentaria Downs Head Station	18 43 40	144 18 50	5
Coreena	North-west corner portion 10v, parish of Bushinia (county Evora)	23 26 20	145 37 35	6
Cumberbund	South-east corner portion 7v, parish of Brompton	22 35 00	143 59 30	5
Cumralle	Mount Howitt Head Station	26 30 55	142 16 20	5
Currawilla	Currawilla Head Station, at tree marked broad-arrow over F over XV	25 08 50	141 21 05	5
Daggar	Thornborough (Post Office)	16 56 05	145 02 40	6
Dairyvale	South-west corner portion 3v, parish of Southwick	19 48 40	145 44 30	6
Dawo	South-west corner of section IV., Beteote	25 41 30	140 45 00	4
Davenport	Charters Towers †	20 04 10	148 15 08	6
Dawson	East corner section 3, Village of Woolton, parish of Woolton	24 55 35	150 16 00	8
Deas Thompson	East corner portion 30v, parish of Langmuir	23 43 02	150 54 52	8
Denison	South-west corner section VII. (school reserve), Springsure	24 07 04	148 05 20	7
Derby	Southern termination east boundary of portion 25, parish of Wenanga	27 19 26	150 52 31	8
Diamantina	Daveycourt Downs Head Station	24 09 35	141 07 40	5
Dickson	East corner portion 3v, parish of Martyr	22 05 27	147 40 47	7
Douglas	Hughenden †	20 50 41	144 11 59	5
Drake	South-east corner portion 2, parish of Flavilah	20 51 30	147 46 30	7
Drummond	Alpha Head Station	24 08 35	146 38 00	6
Drury	Labona Head Station	22 06 45	146 20 15	6
Dublin	Mungallala Railway Station	26 27 04	147 32 23	7
Dulhunty	Moreton Telegraph Station	12 26 15	142 35 00	5
Dunbar	Trees marked broad-arrow over R over R.P.7 at north corner Rutland Plains Holding	15 29 00	141 44 30	4
Durham	Durham Downs Head Station	27 04 40	141 54 35	5
Durrie	Nurrah Head Station at tree marked broad-arrow over I over XXXII	25 38 10	140 01 10	4
Dutton	North-west corner portion 4, parish of Fairlight	20 33 45	143 51 30	5
Eddington	Eddington Head Station	20 39 32	141 33 04	5
Eidsleygh	Trees marked broad-arrow over L over L. 1, 2 at North east corner Fiery Block	17 57 25	143 35 15	5
Elderslie	West corner Blacksburg Holding, at tree marked broad-arrow over E near north corner portion 2, parish of Haliun	22 37 30	142 24 50	5
Elgin	Sunset	27 09 10	149 04 19	7
Elphinstone	Woodstock Railway Station	19 35 48	146 50 16	6
Esmeralde	South-west corner Esmeralde Holding	18 40 00	142 17 00	5
Etheridge	North-west corner portion 10 (school reserve), parish of Bumba	18 08 40	142 51 50	5
Eurneys	Trees marked broad-arrow over A over 81 on east boundary of Iru East Holding	24 09 15	139 46 50	4
Evora	North-west corner portion 10v, parish of Bushinia	23 26 20	145 37 35	6
Eye	North-west corner Kalditwarry Holding	24 33 30	138 27 00	4
Farrer	Connemara Head Station	24 13 10	142 16 45	5
Fergusson	Banana †	24 28 48	150 07 40	8
Fernoy	North-east corner Gasmere South Block	23 03 51	142 54 35	5

TABLE OF COUNTIES, WITH THE COUNTY VALUATION AND INITIAL POINT FOR EACH—Continued.

County	Initial Point.	Latitude S.	Longitude E.	County Variation.
		° ' "	° ' "	
Fielding	Tree marked broad-arrow over Z over XVIII at north-west corner Roderick Holding	19 05 20	141 56 00	5
Fitzroy	Nanango†	26 40 23.64	152 00 26.1	8
Finders	Miriam Vale†	24 19 44.85	151 33 46.5	8
Fortescue	Taroona†	25 38 28.13	149 47 44.25	8
Foxton	Tree marked broad-arrow over A over 25 on Amelia Creek	21 06 00	145 40 50	6
Franklin	Vanook Head Station	16 57 55	141 56 30	4
Fraser	Sandy Cape †	24 43 50.27	153 12 37.65	9
Gayndah	North-west corner portion 1, parish of Clare	22 32 27	145 41 02	6
Georgina	South-west corner Cottonbush Holding	22 38 40	139 09 10	4
Gilbert	Georgetown†	18 17 18	143 32 34.5	5
Gladstone	South-east corner Camping Reserve (R. 34), parish of Barretts	19 48 25	147 08 02	6
Glanworth	North-west corner portion 1, parish of Behool	25 14 40	145 45 00	6
Glengyle	Tree marked broad-arrow over G over D.7 at corner rabbit fence at north-east corner of Doval Block	24 56 50	139 07 30	4
Glenora	Tree marked broad-arrow over C over G on Yappan River at north-east corner of Cowabunya Block	19 02 00	142 51 15	5
Gordon	South-west corner section 1, Erromanga	26 40 10	143 15 40	6
Gould	Tree marked broad-arrow over P over 1 at South-east corner Highbury Holding	16 34 05	143 13 05	5
Gowan	North-west corner portion 1, parish of Aubeg	25 20 30	145 03 10	6
Guanada	Donaldson Telegraph Station	19 53 00	140 21 00	4
Gregory	Landsborough's marked tree, marked broad-arrow over RTR over N 10 over 1892, on Gregory River	18 55 15	138 57 00	4
Grey	Whitula Head Station	25 22 20	142 16 45	5
Griffith	South corner of section VII., Pentland	20 31 30	145 23 50	6
Grosvener	Grosvener Downs†	22 02 57.15	148 07 57	7
Gunnawarran	North-west corner portion 2, parish of Kinmara	18 20 55	145 03 15	6
Haddon	No. 1 Well, near old Meeba Station, in Westby Holding	25 41 10	141 27 10	5
Hamilton	Hamilton (or Moulders) Government Tank	22 46 15	140 37 10	4
Hann	Muesgrave Telegraph Station	14 47 15	143 30 00	5
Herbert	Bowent†	20 00 47.85	148 14 44.55	7
Hodgkinson	Thornborough (Post Office)	16 56 05	145 02 40	6
Howitt	North-west corner portion 7, parish of Smithburne	17 02 00	141 14 45	4
Humboldt	North-west corner allotment 1 of section VI., Blackwater	23 34 48	148 52 40	7
Hunneburn	North-east corner portion 6, parish of Narraport	27 19 10	145 00 00	6
Hillalong	Tree marked broad-arrow over B over XXVIII on Broken River	20 57 42	148 21 10	7
Ifley	Ifley Head Station near tree marked broad-arrow over Y over V	18 52 20	141 12 30	4
Jardine	McDonnell Telegraph Station	11 38 55	142 27 00	4
Kalkah	Tree marked broad-arrow over Y over 13, at south-east corner Minka Holding, near junction of King and Coleman Rivers	14 54 45	142 56 40	5
Kamilleroi	North-east corner Morella No 11, at tree marked broad-arrow over M II over V.D.1	19 16 00	139 43 00	4
Kendall	North-west corner Meta Downs No. 4 Block, at tree marked broad-arrow over RES over MD4	13 41 30	141 58 00	4
Kennedy	Salamis Head Station, on Wallara Creek	26 54 40	147 41 30	7
Killarney	Collary†	22 02 12.25	149 11 11.1	7
Kimberley	Duaringa†	23 42 53.8	149 40 18.75	7
King	West corner Strathleven No. 1 Block	15 52 00	143 17 10	5
Koolahah	Tree marked broad-arrow over 25 over R on Mitchell River	15 17 10	141 53 00	4
Kungie	Post on Border Survey, ten miles west of Warrego River	29 00 00	145 30 20	6
Kyabra	North-west corner Wheoco Block No. 4, near tree marked broad-arrow over WH	26 05 25	142 57 30	5
Kyrama	South corner allotment 9, section XI., Kyrama	21 35 24	141 55 23	5
Kyrunda	North-east corner portion 3v, parish of Norley	28 03 40	143 16 45	6
Labouchere	Taroona†	25 38 28.13	149 47 44.25	7
Lamington	Tree marked broad arrow over Cab north-east corner Yapparton Holding	18 24 26	141 35 30	4
Landsborough	North-east corner Talawanta No. 4, at tree marked broad-arrow over A over 109 on Landsborough River	19 17 00	140 11 00	4

TABLE OF COUNTIES, WITH THE COUNTY VARIATION AND INITIAL POINT FOR EACH—continued.

County.	Initial Point.	Latitude S.	Longitude E.	County Variation.
Ang	North-west corner portion 19 (school reserve), parish of Bumba	18 08 40	142 51 50	5
Anglo	South-west corner portion 2v, parish of Langlo	25 41 05	145 39 00	6
Annex	Kilkivan†	26 05 05-96	152 14 43-5	8
Arara	North-east corner portion 1, parish of Defarge	23 11 33	149 20 28	7
Arbig	Marlborough†	22 51 26-16	149 52 44-1	8
Arivingsstone	Rockhampton†	23 22 42-8	150 50 56-4	8
Arjakin	Tree marked broad-arrow over RES over B3 on Edward River	14 40 20	142 00 02	4
Arjynd	Crossing Edinburgh Railway over Tate River	17 29 00	144 37 30	5
Arjyndhurst	Lyndhurst Head Station, near tree marked broad-arrow over E over XXVI, on Einiasleigh River	19 12 45	144 21 30	5
Arjynton	Jandowae†	26 46 59-32	151 06 39-45	3
Arackenzie	Geyndah†	25 37 32-6	151 33 42-75	8
Arakawa	Fence-post at south-east corner Eton Vale No. 2 Block	23 49 50	140 21 50	4
Araneroo	West corner portion 10v, parish of Evesham	23 11 23	143 37 45	5
Ararua	South corner portion 3, parish of Lara	26 13 29	141 37 51	5
Araruka	North-east corner portion 1, parish of Manuka	21 36 56	143 18 55	5
Araramie	North-west corner Clark's Creek Holding, near tree marked broad-arrow over XXXIII	16 07 20	142 26 45	5
Araranoa	West corner portion 3, parish of Dromone	27 34 30	148 07 30	7
Araranch	Maryborough†	25 32 12-46	152 42 16-12	9
Araranga	South corner Crewe Holding, near tree marked broad-arrow over XXI	17 05 00	142 24 40	5
Ararash	Ingleswood†	28 25 06-35	151 04 30	8
Ararayne	Durham Towers Out Station	23 53 00	142 19 00	5
Ararukinlay	Adevalet	25 54 39-48	144 36 01-05	6
Ararurville	Cape Bowen	14 30 40	144 40 00	5
Ararurvale	Mount Gammie*	28 07 03-38	151 42 30-81	8
Ararurpin	Selwyn Railway Station	21 32 25	140 30 15	4
Ararurxico	South-west corner portion 9v, parish of Burgovno	23 49 00	146 05 05	6
Araruritchell	South-west corner portion 4v, parish of Thornleigh	24 24 25	144 59 25	6
Ararurmontkira	Tree marked broad-arrow over Lover XXI on Mackhara Waterhole	24 49 20	140 38 00	4
Ararurmorstone	North corner Rocklands No. 7 Block	19 23 30	138 18 49	4
Mosman	Crossing of telegraph line over Kennedy River, at tree marked broad-arrow over B	15 25 45	144 11 05	5
Mowarra	South-west corner portion 9, parish of Drylands	24 57 06	142 18 33	5
Mueller	South-east corner Adavale Block, near tree marked broad-arrow over AV over AVI over HPS	18 29 10	138 12 45	4
Munga	North-east corner portion 7v, parish of Orkadilla	26 08 35	147 12 36	7
Mungallala	Box-tree marked broad-arrow over CW near south-east corner portion 1, parish of Yunneamen	27 59 10	147 06 20	7
Murchison	St. Lawrence†	22 20 47	149 32 14-4	7
Murray	Tree marked broad-arrow over 208 over C on Clermont-Ravenswood road	20 22 50	146 57 30	6
Musgrave	South corner portion 1, parish of Silcoe	23 29 35	143 30 20	5
Nares	Carins†	16 55 27-77	145 46 54-6	6
Nash	North-west corner Chad Holding, near tree marked broad-arrow over OH over GH	20 43 00	138 30 50	4
Nelbino	Iron rod, near north-west corner section III., Togo	28 51 00	146 47 12	7
Newcastle	Hawkwood†	25 47 00-19	150 49 04-05	8
Nicholson	Tree marked broad-arrow over C on Cliffdale Creek at crossing of Port Darwin road	17 35 45	138 26 30	4
Nickavilla	South-east corner of P.P.1, near Comongin Head Station	26 31 26	144 20 15	6
Nive	Post at angle in northern boundary portion 2, parish of Malte, 19 links from gum-tree marked broad-arrow over 2R	24 50 30	146 46 25	6
Noorana	South-west corner portion 3v, parish of Weetamura	28 23 32	146 12 00	7
Norley	Box-tree marked broad-arrow over K over B over B, near Teeballeh W.H., north-east corner Klandra Block	27 27 00	143 56 15	6
Norman	Normanton†	17 40 14-33	141 04 43-8	4
Nuanalla	65-mile post on Border Survey	29 00 00	144 35 47	6
Nyarna	St. Alban's Out Station at tree marked broad-arrow over U over 12	24 43 15	139 55 20	4
Oaklands	Blackbull Railway Station	17 56 35	141 45 15	4
O'Connell	Tree marked broad-arrow over XI on Burdekin River	19 9 54	145 28 23	6
Ondocroo	North-east corner portion 1, parish of Mills	22 07 50	143 07 25	5
Orvery	South-east corner portion 46v, parish of Hood	26 03 02	146 38 19	6
Pakington	South-west corner portion 7v, parish of Windah	23 35 26-7	149 59 42-1	8
Palmer	Wyandra Railway Station	27 15 06	145 38 38	6
Palmerston	North corner portion 6v, parish of Ewen (county Liebig)	22 39 20-5	150 18 23-5	8
Paluma	South-west corner portion 9, parish of Bowen Downs	22 37 15	144 52 50	6
Parfer	Royley Point	16 55 00	139 03 50	4

TABLE OF COUNTIES, WITH THE COUNTY VARIATION AND INITIAL POINT FOR EACH—continued.

County.	Initial Point.	Latitude S.	Longitude E.	County Variation.
Paroo	North-west corner portion 1, parish of Bierbank ..	26 47 00	145 02 55	6
Pelham	West corner portion 10v, parish of Scotia ..	24 28 46.9	150 34 47.9	8
Pender	Post at angle of rabbit fence at north-west corner of Ben Castle Block	26 40 00	141 24 00	5
Pera ..	Tree marked broad-arrow over RES over MD4 at north-west corner Meta Downs No. 4 Block	13 41 30	141 58 00	4
Perry	Tree marked broad-arrow over D over B1 at junction of Duffer Creek and Styx River	18 11 20	143 56 00	5
Philp	Wando Vale Station ..	19 39 40	144 54 00	5
Pitheroo	Angle rabbit fence at north-east corner of Whippa North Block, at tree marked broad-arrow over RP	28 09 00	142 39 50	6
Piturie	North corner section III., Unrandangi ..	21 36 30	138 19 00	4
Plantagenet	Eastern corner portion 44v, parish of Woodbine ..	23 44 00	147 30 00	7
Portchester	Burketown† ..	17 44 38.7	139 32 54.9	4
Portland	Longreach† ..	23 26 39.52	144 15 00.3	0
Pring	South-west corner of section IV., Southwood ..	27 46 15	149 58 33	8
Reglan	North-west corner portion 2v, parish of Annandale ..	24 05 08.9	150 28 04.8	8
Rawbelle	North-west corner section II., Rawbelle ..	25 01 41.2	150 50 36.6	8
Richmond	Richmond† ..	20 44 28.1	143 08 40.43	5
Rochdale	South-west corner Sowerby Holding, near tree marked broad-arrow over LS over R12	20 45 50	139 10 10	4
Rodney	South-west corner portion 2v, parish of Collier ..	23 06 49	144 51 18	6
Roper	South-east corner portion 39, parish of Myall Grove	27 03 40.53	150 04 43.72	8
Rosebery	Jumea Head Station ..	22 58 06	149 08 03	7
Rosebrook	North corner Town Reserve, Birdsville ..	25 53 00	139 21 20	4
Ross	South-west corner portion 6, parish of Matahna ..	23 08 50	142 15 50	5
Rupert	Sommariva Railway Station ..	26 24 55	146 36 03	6
Ruthven	Richmond† ..	20 44 26.1	143 08 40.43	5
Rutledge	North-east corner portion 2, parish of Moonda ..	24 12 00	143 50 43	5
	South-west corner portion 1, parish of Mendip ..	22 35 00	147 05 40	6
alshury	Bobwaba Railway Station ..	19 49 26.6	147 34 28.7	6
andringham	Sandringham Head Station ..	24 05 00	139 03 00	4
avannah	South-west corner East Creek Holding, near tree marked broad-arrow over Z over XVII	19 32 50	142 09 00	5
axly	Tree marked broad-arrow over E over XIV on Saxby River ..	20 00 13	141 57 43	5
elheim	Mount McConnell† ..	20 48 08.8	146 59 04.8	6
elwyn	Malbon Railway Station ..	21 05 15	140 18 50	4
elbarnie	Middle Peak ..	11 55 30	142 52 00	5
idmouth	Junction Ebegoolah and Northern Telegraph Lines, about 2¼ miles southerly from Coen	14 10 25	143 21 30	5
olander	Port Douglas† ..	16 29 00.93	145 27 56.13	6
omerset	Faterson* ..	10 48 07.9	142 23 52.1	4
tanley	Brisbane Observatory† ..	27 27 59.91	153 01 36	9
tokes	Tree marked broad-arrow over HP over B at south-west corner of Boongabee Block	18 15 30	140 38 25	4
trathleven	North-east corner Steathleven Holding at tree marked broad-arrow over TI over P3	15 54 25	143 32 15	5
trathmore	South corner Crewe Holding, near tree marked broad-arrow over XXI ..	17 05 00	142 24 40	5
turt	Tree marked broad-arrow over T over 4 at west corner Table-top No. 4 Block, Sandringham Holding	23 39 10	138 22 40	4
urray	Chrysdon† ..	18 12 13.69	142 14 58.35	5
alavanta	Tree marked broad-arrow over ND2 over D at south-west corner Endymion Holding	18 23 00	140 11 00	4
albot.	North-east corner section V., Lilyvale ..	23 12 42	148 20 52	7
aldora	North-east corner Taldora Holding, near tree marked broad-arrow over H over XCI	19 13 50	141 21 30	4
ambo	South-east corner portion 1, parish of Hawick ..	24 33 05	145 47 45	6
ambar	Tree marked broad-arrow over C over 70 on Cooper's Creek, at north termination of east boundary, Dalton Holding	25 49 00	142 12 00	5
ake	Mount Surprise Railway Station ..	18 9 13	144 18 45	5
awinga	Tree marked broad-arrow over ED1 on south boundary of Cresfield No. 2 Block	19 47 00	139 49 00	4
hunda	Thunda Head Station ..	25 29 43	143 06 04	5
ingarra	Tree marked broad arrow over A over XXI on Arcadia Creek, near north-west boundary of Arcadia North Holding	25 15 00	148 49 10	7
ltharoo	South-west corner Salsaire Block ..	28 39 45	143 21 45	6
loto	Tree marked broad-arrow over L over 18 on Linda Creek, near west corner Idamea Lakes No. 11 Block	22 39 00	138 22 45	4
omoo	Gun-tree marked broad-arrow in triangle, about 5 chains south of tree marked broad-arrow over M over 65 on Mungallala Creek	27 22 10	147 17 34	7

TABLE OF COUNTIES, WITH THE COUNTY VARIATION AND INITIAL POINT AND INDIAN POINT FOR OVER—continued.

County.	Initial Point.	Latitude S.	Longitude E.	County Variation.
Arkh.	Euloh Head Station	21 13 40	141 33 15	5
res.	Thursday Island †	10 35 07.48	142 13 14.4	4
erhill	North-west corner portion 8v parish of Eastfield	21 58 45	144 44 35	6
unda	North-west corner portion 11v, parish of Midlothian	21 23 57	144 42 48	5
hilla	South-east corner portion 2, parish of Lomax	27 03 12	146 41 33	7
	Tree marked broad-arrow over B over XIV on Thornton River, near Pioneer Hotel, Mount Margaret Station	19 22 45	138 51 20	4
gemont	Tree marked broad-arrow over K over XXX on Vergemont Creek	23 50 04	143 08 56	5
tot	Tree marked broad-arrow over G over XXXVI at junction of Percy and Gilbert Rivers	9 08 16	143 28 05	5
irama	Crossing of Ingham road over Burdekin River, near Oakhills Head Station	18 31 35	145 38 00	6
idgrave	Tree marked broad-arrow over E on road survey about two and a-half miles	26 34 31.32	148 47 11.5	7
lker	Tree marked broad-arrow over N over XXXIX at junction of Brown Creek and south-easterly from south-east corner portion 1, parish of Aberystye	21 49 30	145 15 45	6
lsh	Tree marked broad-arrow over B over XXXIX at junction of Brown Creek and Mitchell River	16 32 00	143 40 45	5
irbreacan	North-west corner portion 16, parish of Cheamsit	24 48 15	142 53 30	5
urton	Tree marked broad-arrow over C over XXIII on south-east boundary of Clarendon Holding	22 13 20	140 54 25	4
urton	Mount Tambourine	22 13 20	140 54 25	4
urton	South-east corner Kalkah No. 9 Block, at tree marked broad-arrow over K over 6	22 13 20	140 54 25	4
urton	South-east corner portion 9, parish of Ogilvie	25 22 00	143 22 00	5
urton	East corner Drummond Holding, near tree marked broad-arrow over 6	25 22 00	143 22 00	5
urton	XXXIII over C42 over SR 10.W.1.	12 15 00	142 03 20	4
urton	Tree marked broad-arrow over B over XXV on Batavia River	12 15 00	142 03 20	4
urton	Sweers Island (Incorporation Point)	12 15 00	142 03 20	4
urton	The intersection of Paroo and Leo streets, Eulo	28 09 50	145 02 40	6

Wentworth	Tree marked broad-arrow over I over II on Lagoon Creek, near crossing of Fort Derwin road	17 21 00	138 17 10	4
Werrina	Tree marked broad-arrow over A over 6 at south-east corner Grayshall Block	25 27 00	138 26 40	4
Werrina	Osoovy Station	25 16 40	138 32 45	4
Westgrove	North-east corner portion 21, parish of Simmie	25 41 45	148 40 45	7
Weymouth	Tree marked broad-arrow over ER over I at north-east corner of Big River No. 1 Block	13 08 00	143 10 45	5
Wicklow	Hawkwood †	25 47 00.19	150 49 04.05	8
Wilkie Grey	North-east corner portion 304, parish of Argentine	19 20 30	146 10 50	6
Wills	Bonilla †	22 54 45.43	139 54 30.9	4
Wilson	Angle of rabbit fence near tree marked broad-arrow over T over 24 on Dingera Creek	28 08 20	141 52 30	4
Windleyer	30-Mile peg, Alpha-Parabe road Survey	24 39 35	146 23 05	6
Windser	Normanby Station, at well	22 10 00	140 05 30	4
Windula	North-east corner Meadows Holding, at tree marked broad-arrow over HW	22 55 40	142 47 15	4
Wodehouse	Post Cooper (Nebo) †	21 41 23.5	138 41 32.1	7
Wokingham	Post marked broad-arrow over D over LIII at south-east corner Diamantina No. 4, and about one mile north-east of Mount Campbell	21 57 00	142 28 05	5
Wolsley	South-east corner portion 17, parish of Binera	24 25 10	143 28 40	5
Wondoola	Donor's Hill Head Station	18 42 50	140 33 30	4
Wongalee	Intersection south boundary Prairie Block and Prairie Creek	20 16 15	144 32 15	4
Wongalee	South-east corner Boonal Block, near tree marked broad-arrow over E over CXXI	20 08 50	138 21 50	4
Woolgar	North corner portion 10v, parish of Eyearah	22 18 50	141 42 00	5
Woolgar	North-east corner Marville Holding, near tree marked broad arrow over B over II	19 45 50	143 01 10	5
Wooloolah	East corner portion 1v, parish of Barriehale	24 59 30	145 21 34	6
Wootoola	Tree marked broad-arrow over S over H at Shotover Station	24 03 12	140 06 05	7
Wourra	Iron pin near the north-east corner of section I, Prairie	20 52 22	144 35 51	5
Wourra	Tree marked broad-arrow over G over MID at north-east corner Wretham Park Holding	16 29 20	144 09 00	5
Wyara	North-east corner Zenoni Block, at post marked broad-arrow over S	28 29 00	143 50 50	6
Yagoonya	Tree marked broad-arrow over 3† at junction Wyraba Creek and Staaten River	16 27 00	141 34 00	4
Yarpar	South-west corner portion 11, parish of Burleigh	20 18 20	142 47 40	5
Yarral	Eastern termination of north boundary portion 13v, parish of Delgaugals	25 06 22	151 19 50	8
York	Merituna Head Station	13 02 40	142 29 30	5
Youranigh	North-east corner portion 1v, parish of Montes	23 54 15	145 01 40	6

Appendix No. xxiv.

6309

Latitude	Convergence in Seconds - per Statute Mile						Latitude
	0'	10'	20'	30'	40'	50'	
10	9.18	9.34	9.49	9.65	9.80	9.96	10
11	10.12	10.28	10.43	10.59	10.75	10.91	11
12	11.06	11.22	11.38	11.54	11.70	11.86	12
13	12.02	12.18	12.34	12.50	12.66	12.82	13
14	12.98	13.14	13.30	13.46	13.62	13.79	14
15	13.95	14.11	14.27	14.44	14.60	14.76	15
16	14.93	15.09	15.25	15.42	15.58	15.75	16
17	15.91	16.08	16.25	16.41	16.58	16.75	17
18	16.91	17.08	17.25	17.42	17.59	17.75	18
19	17.92	18.09	18.26	18.43	18.60	18.78	19
20	18.95	19.12	19.29	19.46	19.64	19.81	20
21	19.98	20.16	20.33	20.51	20.68	20.86	21
22	21.03	21.21	21.39	21.56	21.74	21.92	22
23	22.10	22.28	22.45	22.63	22.82	23.00	23
24	23.18	23.36	23.54	23.72	23.91	24.09	24
25	24.28	24.46	24.64	24.83	25.02	25.20	25
26	25.39	25.58	25.77	25.95	26.14	26.33	26
27	26.52	26.72	26.91	27.10	27.29	27.49	27
28	27.65	27.87	28.07	28.26	28.46	28.66	28
29	28.86	29.05	29.25	29.45	29.65	29.85	29
30	30.05						30

Appendix No. xxv.

Tables of Lengths of a Degree, a Minute, and a Second of Longitude, for every Ten Minutes, from Latitude 10° S. to Latitude 30° S.

LATITUDE.	LENGTH OF ONE DEGREE—IN STATUTE MILES.						LATITUDE.
	0'	10'	20'	30'	40'	50'	
10	68.122	68.063	68.058	68.022	67.965	67.948	10
11	7.910	7.872	7.833	7.783	7.733	7.712	11
12	.671	.639	.586	.548	.500	.466	12
13	.411	.366	.320	.274	.227	.179	13
14	.181	.082	.039	6.963	6.933	6.882	14
15	66.991	66.779	66.726	66.673	66.619	66.565	15
16	.510	.456	.399	.342	.285	.228	16
17	.170	.111	.051	5.991	5.981	5.970	17
18	5.868	5.748	5.688	5.620	5.57	5.508	18
19	.428	.362	.298	.238	.182	.096	19
20	65.027	64.958	64.839	64.819	64.749	64.678	20
21	4.606	.534	.462	.389	.315	.241	21
22	.166	.061	.016	3.989	3.882	3.784	22
23	3.706	3.623	3.549	.470	.390	.309	23
24	.228	.146	.061	2.961	2.868	2.814	24
25	62.730	62.645	62.559	62.478	62.387	62.300	25
26	.212	.134	.086	1.947	1.857	1.767	26
27	1.676	1.585	1.494	.402	.309	.216	27
28	.151	.087	0.032	6.032	6.074	6.045	28
29	60.648	60.451	.363	.264	.165	.066	29
30	59.956	...	...	...	...	...	30

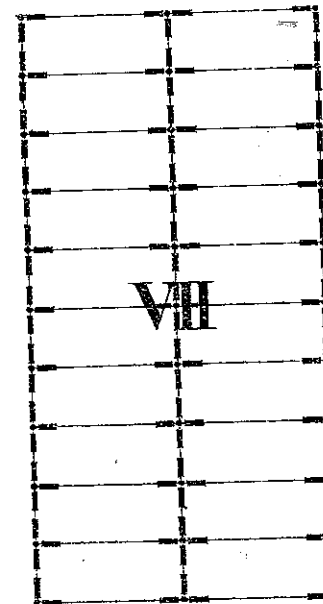
LATITUDE.	LENGTH OF ONE MINUTE—IN LINKS.						LATITUDE.
	0'	10'	20'	30'	40'	50'	
10	90.839	90.702	90.745	90.697	90.648	90.598	10
11	5.47	49.6	44.4	39.1	33.8	28.4	11
12	22.0	17.9	11.6	06.9	00.1	89.042	12
13	89.852	89.622	80.761	80.699	80.686	57.3	13
14	50.9	44.4	37.3	31.2	24.5	17.7	14
15	89.108	89.089	88.969	88.898	88.826	88.754	15
16	8.681	8.607	53.2	45.7	38.1	30.4	16
17	22.6	14.8	06.9	7.089	7.908	7.827	17
18	7.743	7.662	7.578	49.9	33.3	18	18
19	28.7	15.0	06.2	6.973	6.884	6.794	19
20	86.738	86.611	86.510	86.426	86.332	86.237	20
21	14.2	04.6	5.049	5.882	5.754	5.656	21
22	5.555	5.455	35.4	25.2	15.0	04.7	22
23	4.543	4.833	4.733	4.627	4.520	4.412	23
24	30.4	19.5	08.5	3.075	3.864	3.752	24
25	83.640	83.627	83.413	83.293	83.183	83.067	25
26	2.950	2.883	2.715	2.596	2.477	2.357	26
27	23.6	11.4	1.992	1.963	1.745	1.621	27
28	1.496	1.370	24.4	11.7	80.069	90.860	28
29	80.781	80.691	80.471	80.340	80.208	80.075	29
30	73.942	...	...	...	...	...	30

LATITUDE.	LENGTH OF ONE SECOND—IN LINKS.						LATITUDE.
	0'	10'	20'	30'	40'	50'	
10	151.40	151.22	151.24	151.16	151.08	151.00	10
11	150.91	150.83	150.74	150.65	150.56	150.47	11
12	.38	.29	.19	.10	.00	149.90	12
13	149.80	149.70	149.60	149.50	149.39	.29	13
14	.18	.07	8.96	8.85	8.74	8.63	14
15	148.51	148.40	148.28	148.16	148.04	147.92	15
16	7.80	7.68	7.55	7.43	7.30	.17	16
17	.04	6.91	6.78	6.65	6.51	6.38	17
18	6.24	.10	5.96	5.82	5.68	5.54	18
19	5.40	5.25	.10	.96	.81	4.66	19
20	144.50	144.35	144.20	144.04	143.89	143.73	20
21	3.57	3.41	3.25	3.09	2.92	2.76	21
22	2.58	2.43	2.26	2.09	1.92	1.74	22
23	1.57	1.40	1.22	1.04	1.00	1.00	23
24	140.51	140.33	140.14	139.93	139.77	139.59	24
25	139.40	139.21	139.02	138.83	138.64	138.45	25
26	8.25	8.06	7.86	7.65	7.46	7.26	26
27	7.06	6.86	6.65	6.45	6.24	6.03	27
28	5.83	5.62	5.41	5.19	4.98	4.77	28
29	4.55	4.34	4.12	3.90	3.68	3.46	29
30	3.24	...	...	...	...	...	30

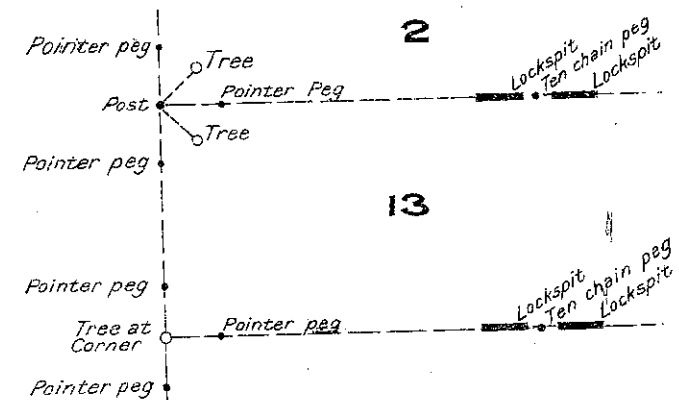
Table of Lengths of Half a Degree, a Minute, and a Second of Latitude, from Latitude 10° S. to Latitude 30° S.

Latitude.	Length of—			Latitude.	Latitude.	Length of—			Latitude.
	Half Degree.	One Minute.	One Second.			Half Degree.	One Minute.	One Second.	
10 0	Statute Miles.	Links.	Links.	10 0	10 0	Statute Miles.	Links.	Links.	10 0
to	34 363	91 63 6	152 72	to	10 30	34 394	91 71 8	153 86	to
10 30	864	63 8	73	10 30	20 30	396	72 3	87	20 30
11 0	365	64 1	74	11 0	21 0	398	72 8	88	21 0
11 30	367	64 4	74	11 30	21 30	400	73 4	89	21 30
12 0	368	64 8	75	12 0	22 0	402	73 9	90	22 0
12 30	369	65 1	75	12 30	22 30	404	74 5	91	22 30
13 0	370	65 5	76	13 0	23 0	407	75 1	92	23 0
13 30	372	65 8	77	13 30	23 30	409	75 7	93	23 30
14 0	373	66 2	77	14 0	24 0	411	76 3	94	24 0
14 30	375	66 6	78	14 30	24 30	413	76 9	95	24 30
15 0	376	67 0	79	15 0	25 0	416	77 6	96	25 0
15 30	378	67 5	79	15 30	25 30	418	78 2	97	25 30
16 0	379	67 9	80	16 0	26 0	420	78 8	98	26 0
16 30	381	68 3	81	16 30	26 30	423	79 5	99	26 30
17 0	383	68 8	82	17 0	27 0	425	80 2	100	27 0
17 30	385	69 3	83	17 30	27 30	428	80 8	101	27 30
18 0	386	69 7	83	18 0	28 0	430	81 5	102	28 0
18 30	388	70 2	84	18 30	28 30	433	82 1	103	28 30
19 0	390	70 7	85	19 0	29 0	436	82 8	105	29 0
19 30	392	71 2	86	19 30	29 30	438	83 5	106	29 30
20 0				20 0	30 0				30 0

NOTE.—The values for minutes and seconds here given are the lengths of these arcs at the middle latitude between the whole and half degrees—i.e., at 15 and 45 minutes respectively.

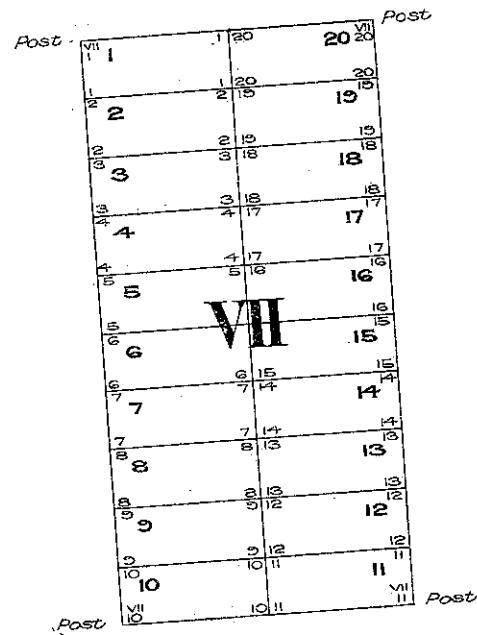


Town section with lockspits.



Corners of country portions showing posts, trees and pointer pegs; also ten chain pegs with lockspits.

Appendix No. xxix.



*Town section
showing method of numbering allotments.*