COMMONWEALTH OF AUSTRALIA.

DEPARTMENT OF HOME AFFAIRS.

ANNUAL REPORT

OF

LANDS AND SURVEY BRANCH.

1913.

Commonwealth of Australia.

DEPARTMENT OF HOME AFFAIRS.

ANNUAL REPORT

OF

LANDS AND SURVEYS BRANCH.

PUBLISHED UNDER THE AUTHORITY OF THE
HONORABLE THE MINISTER OF STATE FOR HOME AFFAIRS

BY

CHARLES ROBERT SCRIVENER, I.S.O.,
DIRECTOR.

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DEPARTMENT OF HOME AFFAIRS.

ANNUAL REPORT

OF

LANDS AND SURVEYS BRANCH.

Lands and Survey Branch.

THE work of the Lands and Survey Branch for the financial year ending 30th June, 1913, embraces the following :—

Surveys, valuations. and acquisitions within the Federal Territory at Canberra.

Surveys and valuations at Jervis Bay.

Surveys in South Australia, and in Western Australia in connection with the boundaries of lands to be granted by those States along the route of the Port Augusta-Kalgoorlie Railway.

Surveys and acquisitions throughout Australia.

This being the first Annual Report printed, a brief account of progress since the first surveys were made in connection with the establishment of the Federal Capital at Canberra may not be out of place, and it seems proper that there should be some record of the beginning of survey work by the Commonwealth, and of the first step towards the creation of a Lands and Survey Branch.

On the 2nd March, 1909, camp was pitched on the southern side of the Molonglo River, and south-westerly from Canberra Church, within Klensendorlffe paddock on the Duntroon Estate, on the western side of a small watercourse some 20 chains from and almost due west of what is now known as Kurrajong Hill. On the following day the first tents of a camp arranged for the accommodation of visitors to the Federal Capital site of Yass-Canberra were pitched on the eastern side of the water-course and almost due west of the site selected later for Parliament House. This encampment was completed on the 5th March, 1909.

On the 22nd March was commenced, with Messrs. Sheaffe and G. Peachey as assistants, the preliminary contour survey of an area of about 36 square miles, with the object of providing data for the determination of the most suitable site for the Federal Capital.

Contours at vertical intervals of 50 feet were traversed, and the height of a sufficient number of points between these contours determined, to admit of the interpolation of contours at vertical intervals of 25 feet. The traverse work was connected with stations on a rapid trigonometrical survey, and contour heights were frequently checked by spirit levelling. Concurrently with the contour

survey, inspections were made of sources for water supply throughout a considerable area, also of Jervis Bay and St. George's Basin, and the practicability of a railway route between the Capital and Jervis Bay—a distance of 130 miles—was determined by a careful examination of the country between those points.

The survey work, plans, and reports were completed on the 22nd May, 1909.

No further survey work was undertaken within the Federal Territory until the 18th January, 1910, when a camp was again pitched near the 1909 site. In the interval the site for the city had been selected, and instructions were issued for the carrying out of a comprehensive contour survey of an area of about 12 square miles.

On the 20th January, 1910, Surveyors P. L. Sheaffe and A. Percival joined the camp, and Mr. Chapman took up office duty, but survey work was not begun until the 24th, Mr. F. J. Broinowski occupying the position of draftsman. The Field Staff was strengthened by the arrival on the 3rd February of Mr. Surveyor M. Martin, Mr. Surveyor R. J. Rain commencing duty on the 26th April, and Mr. Surveyor G. Marshall on the 24th May.

The field work of the City contour survey was completed during May, 1910. The first sheet of the plan was ready for reproduction on the 27th April, 1910, the second sheet early in May.

Drawing and clerical work were carried on in calico tents, 12 feet by 10 feet, until the 2nd May, 1910, when a transfer was made to a small office building of wood and malthoid, but all officers employed continued to live in tents until December, 1911. From that date, house accommodation has gradually been provided both for married and single officers, but the increase in the staff, not only of the Lands and Survey, but of other branches of the Department of Home Affairs, has been so rapid that tents are still necessary.

On the 22nd August, 1912, the new Administrative Offices were completed and occupied. These promised to meet all demands for some years, but are already proving unequal to requirements.

The contour survey of 1910, as already stated, covered an area of 12 square miles. It was undertaken first with the object of providing those competing for the premiums offered for designs for the Federal Capital with accurate information regarding the City site, and secondly, for use in the design and projection of works within the City area.

The method adopted in this survey was as follows :—

The angles of the triangles established in the survey of 1909 were more carefully observed; standard traverses were laid down, and lines of levels run at suitable intervals, pegs or spikes being left as bench marks at vertical intervals of 20 feet. The true meridian of Trigonometrical Station, Ainslie, was adopted as the azimuth of the contour survey. From each 20 feet interval a traverse was run, using the theodolite or tacheometer as a level, and from the

Home Affairs Department, Canberra.

The Federal Capital, April, 1910.

First building used as Lands and Survey Office, and part of the Survey Camp.

stations on that traverse a contour line 5 feet vertically above and two contours below at vertical intervals of 5 and 10 feet were fixed by the subtense method, the telescope of the instrument being kept carefully levelled during the whole of the observations, the staff holders, directed by the observer, moving up or down hill until the staff reading indicated the vertical interval desired.

The lengths of the traverse lines on the contours at each 20 feet vertical interval were determined both by chaining and by stadia readings, the latter as a check upon any misreading of the tape; the former with a view both to greater accuracy and to the early detection of any movement of the stadia wires.

Frequent connections were made either to trigonometrical stations or to stations on the standard traverse, and comparisons of azimuth; any small errors in the levels of contour stations were corrected by reference to the bench marks established by spirit levelling. The positions of all improvements were carefully determined, a traverse of both sides of the Molonglo River was effected, and the whole of the work was permanently marked by concrete blocks of the types shown on diagram.

From the date of completion of the contour survey of the City site in May, 1910, field work has been continuous; contour work has been extended to cover areas required in connection with City water supply and sewerage, weir sites for water conservation and flood mitigation, the Royal Military College area, and site for scientific observatories; while a modified and cheaper form has been and is being applied to the better class lands near to the City site.

The survey of the territorial boundary has been advanced; exhaustive investigations have been undertaken to determine the best routes for railways connecting the Federal Capital with the other capital cities of the States and with Jervis Bay; new roads have been projected and numerous routes examined with a view to securing in the future the best means of intercommunication, not only between all parts of the Federal Territory and the Federal Capital, but between that capital and other centres of population and places of interest beyond the boundaries of the territory.

Detail surveys embracing all works in progress have kept pace with construction, and the plans in all cases are either completed or well advanced.

Outside the boundaries of the Federal Territory the following surveys have been effected by the staff, and the plans prepared in the Lands and Survey Branch :—

Detail survey of Sydney Quarantine Station, embracing all buildings and other structures, together with a close contour survey of the whole area of about 800 acres.

Contour surveys in connection with the selection of a site for the Naval College at St. George's Basin, Jervis Bay, and Barrenjoey, near Pittwater, New South Wales.

Boundary and contour survey in connection with the Small Arms Factory at Lithgow, New South Wales.

During the financial year ending 30th June, 1913, topographical work has been systematically carried out. This includes exact information regarding the position of all improvements existing on the land, and a contour survey, which, while rapid, admits of the plotting of the contours at vertical intervals of 5 feet. This survey now embraces an area of 55,880 acres. In addition all natural features and improvements, as well as the heights of all the more prominent elevations and of the beds of water courses, have been fixed by survey over an area of 48,260 acres. Altogether an area of 155,984 acres has been valued and classified. The classification survey combined with the topographical provides all the data necessary for the projection of a design of subdivision in which the best possible means of access will be provided, and the exact areas of each class of land within any particular holding are definitely known.

Jervis Bay.

During the financial year 1912–1913, surveys of the boundaries of Commonwealth lands have been completed, the location of a road connecting the Nowra-Huskisson Road with Captain's Point has been carried out, and a contour survey easterly from Captain's Point and southerly to the range dividing Sussex Inlet from Jervis Bay has been commenced. This survey will provide a map with contours of vertical intervals at 5 feet or less over a great part of the area, and concurrently soundings will be taken to a depth of 40 feet. The data obtained will admit of the projection of a design for any works that may be contemplated.

Diagram No. 4 illustrates the nature and extent of all surveys at Jervis Bay. Survey work completed during the year, 1st July, 1912, to 30th June, 1913, is shown by red colour, previous work by blue colour.

Diagram No. 5 indicates the extent of Commonwealth Lands at Jervis Bay, and how acquired.

Geodetic Survey.

A sum of £1,000 was available during the year 1912–1913 for the above survey, but this was only sufficient to justify the ordering of a Repsold theodolite from Germany in preparation for work when a larger amount is set apart for this purpose.

Continuity of the operations is a necessity in geodetic work, since surveyors who undertake it should have a better knowledge of mathematics than is necessary in ordinary survey work, and must be not only naturally adapted, but also specially trained, if the highest results are to be obtained. It is not every surveyor who will make a good observer when great precision is required, as in this case, and unless the work is well done it were better not to undertake it at all.

Oldfield's House, Upper Cotter. Looking E. by N.

The Cotter River is flowing to the left, just behind the log fence. The low country is slate formation; the high hills are granite.

Oldfield's House, Upper Cotter. Looking northerly, down the valley of the Cotter.

Gingera Mountain in the distance.

With a sum of £3,000 for the first year, and of £5,000 per annum afterwards, good work could be done; the first year would be spent in obtaining the necessary instruments and appliances both for angular and linear measurements, in securing observers, and in the organisation of the field and office staffs.

Some work has been carried out within the Federal Territory, the instrument used being an 8-inch Bamberg theodolite, not now rated very highly; the results have been, however, fairly satisfactory, as the average closing error of the triangles observed, having sides averaging from 5 to 10 miles in length, is 1·1 seconds of arc.

Until a geodetic survey of Australia is carried out, the position of a considerable length of the coast line must be in doubt; it has been fixed from time to time by the determination astronomically, with relatively crude instruments, of the latitudes and longitudes of a certain number of the more salient points, the intermediate points and indentations being either determined by compass bearings or being sketched in with little aid from instruments. The more recent surveys of this class are no doubt fairly accurate, but results obtained in this way, where astronomical observation by sextant or the transfer of chronometers is depended upon for the determination of longitude, cannot be compared with those derived from a carefully conducted geodetic survey.

For the purposes of the Defence Department, a topographical survey is eminently desirable, if not an essential; it should on the eastern coast extend inland to the edge of the plains west of the Dividing Range and elsewhere from 100 to 200 miles inland from the coast line. The basis of such a survey must be some scheme of triangulation, as without that the value of the topographical work is very seriously impaired, and, indeed, the geodetic survey should be the foundation for every other class of survey, the standard to which all other work would be referred, and as it advanced, data would be provided that would admit of the discussion of important questions of scientific interest.

With improved instruments and appliances remarkably accurate results are now obtained with much greater ease and at less expense than formerly, while the introduction of wires with a very low co-efficient of expansion has led to a modification of method; base lines, which formerly were measured with great difficulty, being now more frequently introduced for the purpose of verification of the work.

The following resolutions were adopted at the Conference of Surveyors-General, held at Melbourne, during May, 1912:

Moved by Mr. Poate, Surveyor-General of New South Wales, and seconded by Mr. Spowers, Surveyor-General of Queensland, and unanimously adopted:—

(*a*) That the time has arrived when the Commonwealth should take its place in the scientific investigations of the world, not the least important of which are the determination of the figure of the earth, its density, and other cognate matters.

(*b*) That work of this character, involving the highest form of survey, should be effected under the supreme authority of Australia, as it is essential that it should be carried out with the greatest degree of accuracy on an uniform basis and a definite plan, the individual parts being co-ordinated and eventually forming one homogeneous whole.

(*c*) That the system which has hitherto prevailed by which the individual States carried out this work with instruments of varying character has resulted in divergent standards of accuracy, rendering the work, to a great extent, unsatisfactory, and, though much of it is of high grade, portions of it are impossible of reconciliation and co-ordination with a Continental scheme.

(*d*) That the desirableness of this work being undertaken by the Commonwealth Government is evidenced by the fact that the geodetic survey of the United States is carried out under the direct control of the Federal Government and that the South African geodetic survey is also under one central control.

(*e*) That such survey is absolutely necessary for the production of accurate maps, will be of high value in connection with cadastral and geological surveys, and form a basis for topographical work for defence and other purposes. It will, moreover, provide a standard of accuracy for surveys of every description throughout the Commonwealth.

(*f*) That it will afford an invaluable base to which settlement surveys already effected can be connected, providing data for re-establishing boundaries, which, with increasing density of settlement, becomes a matter of great importance. Further, as regards the sparsely-occupied areas of Australia, such a survey, if carried out in advance of settlement, will be of the greatest utility and assistance in effecting the settlement surveys which can at any future time be reproduced with a minimum error and at a relatively low cost, preventing litigation consequent upon other methods.

MAP OF AUSTRALIA.

The map of Australia has been compiled and drawn at the Department of Lands, Sydney, from information supplied by the several States. Proofs of the map were submitted to the Surveyors-General of all the States, and were returned with corrections which have been made, and it is anticipated that copies of the map will be available by the end of the present year.

In order that as great accuracy as possible may be secured, further proofs of the map have been forwarded to the Admiralty and to the Royal Geographical Society of England for any suggestions that they may desire to make; any necessary corrections resulting from the suggestions of these bodies will be made as early as practicable.

Reproduction of Plans.

The Lands and Survey Branch depends for the reproduction of plans either upon State Departments or private firms. This involves the tracing of important drawings, since the risk of injury is too great to permit of the originals being allowed to leave the office; apart from the delay, the cost of reproduction is greatly increased, and consequently no more work in this direction is carried out than is absolutely necessary.

The amount of information derived from survey work, not only within the Federal Territory and at Jervis Bay, but in different parts of Australia, has recently increased very rapidly, and it is desirable that a large proportion of the plans should be reproduced, both for the use of the public and for the Departments of the Commonwealth. Under existing conditions this is not practicable, but it is anticipated that a beginning will shortly be made with lithographic work as an offshoot of the Lands and Survey Branch, when the cost of producing maps from the original survey plans will be reduced, and gradually the whole of the lithographic work of the Commonwealth Departments will be undertaken. The volume of this work is now sufficiently great to keep a small capable staff constantly employed, and by this means maps would be produced both expeditiously and cheaply.

State Departments are not unfrequently overtaxed already, and the addition of Commonwealth work leads to congestion, and it cannot be expected that important State maps, that may be required for a special purpose, will be put aside in order that Commonwealth requirements may be met. Already some State Departments have intimated that no further Commonwealth lithographic work can be carried out, and it is not improbable that others will adopt the same attitude as the Commonwealth demands become more insistent.

Federal Territory.

Territorial Boundary.

The survey and marking of the boundary between the Federal Territory lands and those of the State of New South Wales, was started by Surveyor P. L. Sheaffe, at a trigonometrical station on Mount Coree, a prominent point on the range forming the western watershed of the Cotter River, having an altitude of 4,657 feet; from Coree a straight line was run to trigonometrical station One Tree, which has an elevation of 2,863 feet; on this line the lowest point reached is at the crossing of the Murrumbidgee River, 1,380 feet above sea level. On the southern side of the Murrumbidgee the country is either steeply undulating or rugged; north of the river it ranges between gently and steeply undulating. As this line intersects a number of old measured portions, it became necessary to practically re-survey the boundaries of every one, the amount of work involved being much greater than that of the survey and marking of the territorial boundary itself.

The chained length of the line between Coree and One Tree trigonometrical stations (about 20 miles) reduced to sea level differed from that derived from the trigonometrical survey by one link. From One Tree trigonometrical station easterly to the Goulburn-Cooma Railway line, the territorial boundary follows the summit of a range, having an average elevation of about 2,500 feet above sea level, which divides the Yass River from the Molonglo River, the country being more or less steeply undulating, and in places heavily timbered. From the point of intersection of the above range with the boundary of the Goulburn-Cooma line, the territorial boundary is coincident with the railway boundary for some distance beyond the town of Queanbeyan, the country passed through being either hilly or rugged for the greater part of the distance.

Data obtained during the course of the survey will admit of the plotting of a longitudinal section of the entire boundary, which will be useful in the future projection of roads of access.

The marking of the boundary is throughout of a permanent character; besides large posts at all angles and at each mile and half-mile on long straight lines, concrete blocks or galvanised iron pipes have been sunk below the surface at frequent intervals, the positions being indicated usually by mounds of earth or cairns, and where possible references to marked trees have been given in addition.

During the year ending 30th June, 1913, 25 miles of the territorial boundary have been surveyed and marked, and in connection therewith 109 miles of the boundaries of old measurements have been redefined.

Railway Surveys.

The survey of a line from Queanbeyan through the Federal City has been completed and permanently marked for a distance of 8 miles, with about 1 mile of branch lines to the sites of the power house and timber storage sheds.

The survey of the line between Jervis Bay and the Federal Capital has been advanced as rapidly as possible, having regard to the necessity for thorough exploration of country which is somewhat difficult on account of the dense scrub. The route has been marked as far as the 38-mile post from Jervis Bay, and has been explored for some 5 miles beyond this. The trial line first run had for 20 miles a ruling grade of 1 in 75, then 1 in 50 was introduced as the country became more difficult, and this for the time being was adopted for the ruling gradient, until Sassafras was reached; this is an elevated tableland some 2,200 feet above sea level, situated at the head of the Clyde River. Beyond this point no survey has yet been made, but it is anticipated that no difficulty will be experienced in securing a ruling grading of 1 in 75 between Sassafras and the Goulburn-Cooma railway near Fairy Meadow. As the introduction of gradients

as steep as 1 in 50 was considered objectionable, a further investigation of the section between 20 miles and Sassafras was undertaken, with the result that the gradient has been reduced to 1 in 66, which may be regarded as the ruling gradient between Jervis Bay and the Goulburn-Cooma line.

The minimum radius of curve introduced as far as the survey has been carried is 15 chains, and it is very improbable that any sharper curve will be necessary on the remainder of the route.

The heaviest section of the line is between Captain's Point and South Huskisson, but the route here is capable of modification. It was in a measure determined by the trial survey from Nowra to Jervis Bay effected by the Government of the State of New South Wales, with which survey a connection has been made.

So far as the line has been surveyed no tunnels are necessary, and on the rest of the route it is not expected that any but very short tunnels will be introduced. Mr. Surveyor Marshall has carried out the survey of the Jervis Bay line, and also part of the Queanbeyan-Canberra railway. The remainder of the latter line through the City site has been marked by Mr. Surveyor Sheaffe.

Survey of Lands along the Route of the Port Augusta-Kalgoorlie Railway.

Two survey parties have been employed upon the survey of private lands to be acquired in connection with the construction of the Transcontinental Railway between Port Augusta in South Australia, and Kalgoorlie in Western Australia. Mr. Surveyor Vance is in charge of the South Australian party, and Mr. Surveyor Rowe controls the Western Australian. On the completion of the survey of private lands these parties will mark the boundaries of the lands to be granted by the States of South and Western Australia, and advantage will be taken of the opportunity to make an accurate connection between these States; all field measurements will be made with wires of Invar, while latitude and meridian observations will be taken at short intervals with micrometer theodolites. If possible longitude will be determined later at Port Augusta by means of telegraphic signals between that place and Adelaide. At the Kalgoorlie end the initial point of the survey will be directly connected with one of the stations on the Western Australian triangulation, of which station the latitude and longitude can be determined with considerable accuracy.

As a telegraph line will be constructed as the railway advances, it will be possible to interchange signals between Port Augusta and Kalgoorlie and any intermediate points as the work proceeds.

The boundary survey will also serve as a base from which the positions of all prominent hills within the range of vision of the telescopes may be determined, and the data thus obtained will be

valuable in designing a scheme of triangles between South Australia and Western Australia; further, the topographical information collected during the course of the survey will add considerably to our knowledge of country of which, up to the present time, little is known.

Other Surveys Throughout Australia.

Throughout the year a number of surveys have been carried out throughout Australia in connection with the acquisition of lands for various Commonwealth purposes—defence, post and telegraph, quarantine, &c. These surveys are either performed by licensed surveyors in the several States or, in special cases, by the courtesy of the Surveyors-General, State staff officers carry out the work which is checked in the Lands Department of that State in which it is performed.

Topographical Surveys.

It is obvious that with the establishment of the Federal Capital at Canberra, and the transfer of the principal departments of the Commonwealth, a considerable population must be attracted. This will lead to a complete change in the character of the settlement on the lands surrounding the City site, and this change will extend for some miles in every direction. To meet the demands that must be induced the better class lands are being covered by a topographical survey, having for its object the fixation of the positions of all improvements, the determination of the boundaries between forest lands, plain country, and ringbarked areas, the collection of sufficient data to admit of the plotting of contour lines at vertical intervals of 5 feet, the tabulation of information relating to geological formation, the position of springs, and the character of soils and timbers. When the plans of these surveys are complete the projection of designs for subdivision for any particular class of settlement will present no difficulty. The best routes for roads, or if necessary for tramways, may be determined in the office, and in all subdivisions the exact nature of the land within any particular portion will be known, and to a large extent its capabilities, while a fairly accurate estimate of the cost of any proposed works may be made without any additional survey.

With the establishment of a greater number of trigonometrical stations it is proposed to use the Stanley plane table for topography with a view to the reduction of the office work, a scale of 20 chains to an inch being used in undulating country, and of 40 chains to an inch in the rougher districts.

One of the above instruments has recently been obtained, with Stadia points in the diaphragm of the telescope, these points being adjustable for inclination by turning a milled head, so that the horizontal distance between any two points is read off from the staff no matter what the inclination between these points may be.

The methods usually adopted are as under :—

In gently undulating country, where gradients rarely exceed 1 in 15, and accurate results are desired, the system adopted in the contour survey of the City site already described is no doubt the

best. In hilly country contour lines at vertical intervals of from 100 to 150 feet are carefully run and chained, the levels being checked by spirit levelling; between the contours spot levels are taken by the subtense method at all changes of gradient, and from these the intermediate contours are interpolated when the work is plotted.

In broken country it is often impracticable to traverse any particular contour line. It is then necessary to design the traverses to suit the country, the whole of the work being carried out by subtense measurement, and, if necessary, a suitably located traverse is run connecting with stations on the subtense survey to prevent the introduction of any serious error.

Another method is to take angles of depression or elevation from station to station, these being observed from the terminal points of each traverse line, and the differences of level are then computed, the traverse lines are chained, and the undulations of a belt of country up to 20 chains wide on each side of the traverse are determined by the subtense method. This gives very good results, and is rapid.

Through all work of this character lines of levels are run in carefully selected positions, and numerous bench marks are established. These serve to check the levels of traverse stations in which the ordinary error of close is less than 3 inches.

Whether the lengths of traverses are determined by the subtense method or by actual chaining the latitudes and departures of each line are computed, and as every traverse is a closed circuit there is a rigid check upon the work, and plotting is simplified.

Road Surveys.

In the designing of roads within the Federal Territory a ruling gradient of 1 in 20 has been adopted as the standard, and this gradient will only be exceeded in exceptional circumstances. It is found that ordinarily it is quite practicable to adopt 1 in 25, and when it becomes necessary to use 1 in 20 in order to lessen the cost of construction the gradient is broken by the introduction at intervals of about 10 chains of level lengths of about 1 chain, providing further for a reduction of the gradient on the sharper curves, and for level approaches to culverts and bridges. An investigation undertaken for the purpose of designing roads of access from the Federal Capital to all parts of the Territory, during which routes having an aggregate length exceeding 100 miles were examined, indicated that the ruling gradient of 1 in 20 will not be exceeded, though the range of elevations is about 2,500 feet.

Marking of Surveys.

The general principle adopted in all surveys is that the marking shall be of such a character that a sufficient number of points may be at any future time readily found, from which the re-establishment of the whole survey may be effected. The usual

types of permanent marks are shown in diagram (7). These are either in the form of a frustum of a pyramid with a solid top and side walls 2 inches thick or solid blocks 8 inches square. Where transport is difficult the blocks are made *in situ*, both stone and sand being usually found near the work.

Galvanised tubes ¾ inch in diameter and from 12 to 15 inches long and solid glass rods 12 inches long and ¾ inch in diameter with one end pointed are also used at minor stations.

No permanent mark is placed at an angular point or corner of any measurement, but at 10 links from it in the direction of one of the boundaries, and from the permanent mark a reference bearing is given wherever possible.

Two methods of marking trigonometrical stations are illustrated (diagram 7). Both are designed to admit of observation from the station without loss of time, thus avoiding the necessity for any reduction to centre.

The framed form of signal is used at the more important stations; under the central pole the theodolite may be set up, and if necessary a tent above it, the headway being 7 feet.

The tripod form is constructed of galvanised iron tubing bolted to an iron casting surrounding the central pole, and to concrete blocks sunk flush with the surface of the ground. Cap nuts and leaden washers are used in bolting down in order to exclude moisture.

This form of marking has not been sufficiently long in use to admit of a report upon its durability and stability.

In cases where shifting sands are met with a long concrete slab re-inforced with wire netting has been used in an endeavour to obtain permanence.

SUMMARY OF FIELD WORK PERFORMED.

Railways.

	Marked previous to June 30th, 1912.	Year, 1912–13.	Total.
	Miles.	Miles.	Miles.
Queanbeyan to Territory boundary ...	20	.....	20
Queanbeyan through City	.....	10	10
Capital—Bungendore	27	.....	27
Jervis Bay to Capital	.....	38	38
About Jervis Bay	Explored. 45	5	50
Queanbeyan—Bungendore...	15	.....	15

Total length of chaining for the year 1912–13 ... ... 148 miles.
„ „ levelling „ „ „ ... ... 134 „
Area covered by topography for the year 1912–13 ... ... 2,540 acres.

RECORD OF SURVEYS OTHER THAN RAILWAYS, COMPLETED DURING THE YEAR 1912–13.

Territorial Boundary—	
Permanently marked	25 miles.
Boundary Surveys—	
Permanently marked	42 ,,
Re-defined	109 ,,
Connections	9 ,,
Contour Surveys—	
Total area with contours at vertical intervals of 5 feet	29,000 acres.
Topographical Surveys—	
Levelling	111 miles.
Chaining	383 ,,
Area covered	48,260 acres.
Trigonometrical Survey—	
Total number of angles observed	2,615
Road Surveys—	
Permanently marked	10 miles.
Levelling	21 ,,
Chaining	32 ,,
Detail Surveys—	
The number of buildings the positions of which have been accurately determined	77
Total chainage	44 miles.
Feature Surveys—	
Locating improvements, natural features, and defining areas for special purposes—Total length chained	304 ,,
Town and Suburban Surveys—	
Number of allotments...	118
Area	50 acres.
Chainage	41 miles.
Permanent marks established (not including bench marks)—	
Concrete	78
Galvanised tubes	86
Special posts	358
On rock	56
Permanent bench marks—	
Established during year ending 30th June, 1913 ...	151

DRAWING OFFICE.

The total number of plans prepared during the year ending 30th June, 1913, some of which are yet unfinished, was 913. The number of plans reproduced by the heliographic process was 658, the number of plans mounted 633.

Particulars of these plans are given in the summary below.

Among the more important plans drawn are the following :—

Departmental Boards' design for the lay-out of the Federal Capital, and tracing copy.

Detail plan, Royal Military College—eight sheets.

Detail plan about Acton—four sheets.

Topographical and contour plans.

Plans and sections of 36 miles of railways.

Plans Prepared during Year 1912–13.

Classification of Work.

	Antiquarian, 54 x 30 inches.	Double Elephant, 42 x 27½ inches.	Imperial, 22 x 30 inches.	Foolscap, 15½ x 12 inches.	Half Foolscap, 7¾ x 12 inches.	Long Rolls, From 5 to 20 ins.	TOTALS.
Original plans—							
Territorial boundary	3	...	...	...	...	...	3
Railways, roads, water supply, &c.	8	4	15	8	...	7	42
Detail plans	9	...	...	...	...	...	9
Topographical	9	...	...	...	...	...	9
Subdivisions	3	...	1	3	1	...	8
Contour plans	16	11	3	2	...	...	32
(33 of the above are unfinished.)							103
Standard tracings (finished for reproduction)—							
Topographical	...	3	3	...	...	...	6
Subdivisions	...	1	...	2	...	...	3
Engineering surveys	...	4	15	...	...	...	19
Geological	...	...	...	2	8	...	10
							38
Charted lithographs—							
Record Purposes	26	17	120	12	...	...	175
Engineering surveys	...	...	5	4	...	...	9
Departmental purposes ...	19	12	8	8	30	1	78
Geological	...	2	3	...	...	...	5
Classification maps	3	12	10	70	85	...	180
							447
Tracings—							
Topographical	...	6	...	...	...	...	6
Subdivisions	...	...	3	3	...	...	6
Engineering surveys	8	...	...	8	...	13	29
Departmental purposes ...	...	...	4	...	10	...	14
							55
Diagrams—							
For leases and other purposes...	...	3	...	6	116	...	125
Rough tracings—							
For field or office use	7	17	15	40	61	5	145
Grand total...	...	...	...	...	...	...	913

REPRODUCTION OF PLANS BY HELIOGRAPHIC PROCESS AND PLAN MOUNTING, 1912–1913.

Sizes.	Heliographs.	Maps Mounte .
Antiquarian, 54 x 30 inches	70	3
Double elephant, 42 x 27½ inches	47	33
Imperial, 22 x 30 inches	116	435
Foolscap, 15½ x 12 inches	87	57
Half foolscap, 7¾ x 12 inches	310	48
Long rolls, from 15 to 20 inches...	28	57
	658	633

LITHOGRAPHS.

Ten thousand seven hundred and sixty lithographs have been printed for the Department during the year. The work has been undertaken by the Government Printer of New South Wales, the Department of Lands, Sydney, and by private firms.

The number of lithographs in course of preparation by The Government Printer, Sydney, is 8,000; by private firms, 400.

SUMMARY OF WORK IN THE CLERICAL SECTION.

No. of Letters Received.	Cards.				Despatched.		Postage Stamps used.	Tele-grams sent.	Reports made to Admin-istrator.	Instruc-tions issued to Surveyors and Inspectors, and Valuers.	Letters to—			No. of Valua-tions Re-ceived.	No. of copies typed.
	No. added during year.	No. pre-viously in use.	Total in use.	No. of entries made during year.	No. of Letters.	Parcels.					Public.	Govern-ment Depart-ments.	Miscel-laneous.		
							£ s. d.								
4,583	1,009	1,729	2,738	13,270	4,290	249	67 10 3	608	1,229	430	745	924	354	151	14,400

The staff of this section will shortly be strengthened by the appointment of a 3rd Class Clerk. The increase of work and the varied character of the duties carried out demand the services of a capable officer of wide experience.

VALUATIONS.

Federal Territory.

	Acres.
Area valued prior to 30th June, 1912	132,255
Area valued during year ending 30th June, 1913 ..	23,729
Total	155,984

JERVIS BAY.

	Acres.
Area valued prior to 30th June, 1912	896
Area valued during year ending 30th June, 1913 ..	Nil.
Total	896

All lands valued are at the same time classified; agricultural and grazing lands are divided into three classes, the former being distinguished by tints of red, blue, and purple; the latter by edgings of the same colors. From the rough sketches prepared by the valuator in the field office copies are produced, the work being transferred to topographical maps on a scale of 20 chains to an inch, where these are sufficiently far advanced. In other cases a compilation from original plans to the same scale is made. The classification details are shown thereon, and the map undergoes final examination by the valuator before passing into use.

Acquisitions.

Federal Territory.

	Acres.
The area of privately owned land acquired prior to 30th June, 1912 was	2,018
The area acquired during the year ending 30th June, was	92,202
Making a total of	94,220

Jervis Bay.

	Acres.
The area of privately owned land acquired prior to 30th June, 1912	220
Area of State lands acquired prior to the 30th June, 1912	5,100
Area of privately owned land acquired during the year ending 30th June, 1913	22
Total	5,342

FEDERAL TERRITORY.

Land Assessment.

Under Ordinances No. 2 and No. 3 of 1911 provision was made for the levying and expending of rates on land in the territory of the Seat of Government.

	Acres.
The area of rateable land within the territory on 30th June, 1913, was	439,140

	£	s.	d.
The revenue derived from freehold land and lands in process of alienation	2,120	15	9
Revenue derived from lands held under lease...	136	13	1
Total	£2,257	8	10

Leases of Acquired Lands.

Of the privately owned lands that have been compulsorily acquired, leases have been granted as under :—

Prior to June 30th, 1912	2,058 acres.
Year ending June 30th, 1913	28,260 ,,
Sum of annual rentals on the 30th June, 1913 ..	£3,716 17s. 2d.

REVENUE derived by the Commonwealth from Lands in process of Alienation, and Crown Lands held under Lease.

	Area. Acres.	Revenue. £	s.	d.
Lands in process of alienation ...	70,129	1,002	4	8
Crown Lands other than Conditional Leases held under various tenures...	174,487	486	19	4
	244,616	1,489	4	0

ANNUAL REVENUE DERIVED FROM LAND.

	£	s.	d.
Lands in the process of alienation	1,002	4	8
Crown Lands held under lease	486	19	4
Acquired lands held under lease	3,716	17	2
Rates on occupied lands	2,257	8	10
Total	£7,463	10	0

AREA OF FEDERAL TERRITORY.

	Acres.
Area of acquired lands to June 30th, 1913 ...	94,220
Area of alienated lands	89,225
Area in process of alienation	81,239
Area held under lease	248,206
Area unoccupied, including roads, &c.	55,336
Total	568,226

RABBIT DESTRUCTION, FEDERAL TERRITORY.

No ordinance has yet been gazetted dealing with the destruction of rabbits, and the only Act in force relating thereto, is the Pastures Protection Act of New South Wales, administered by the Pastures Protection Board.

Under the above Act every owner of stock within the Federal Territory is taxed in proportion to the number of stock he owns in order to pay the cost of the efficient administration of the Act.

It would appear to be undesirable that any outside body, in no way responsible to or under the control of the Commonwealth Government, should continue to levy taxes upon residents within Federal Territory. If it is still necessary for the Pastures Protection Board to carry out its duties within the territory, then taxation should be levied by the Commonwealth, and such proportion of the sum so raised should be refunded to the Board as might be agreed upon as adequate return for the service rendered. For some time at least it would appear that the administration of Acts relating to stock may be better administered by the State of New South Wales, but there appears to be no reason why that part of the Pastures

Protection Act relating to rabbit-proof fencing and rabbit destruction should not be administered by Commonwealth officers. The work would then be more effectively carried out, since there must be some diffidence on the part of a Board, some of the members of which are not resident within the Federal Territory, in dealing with matters that would be more appropriately attended to by the Commonwealth.

An inspector has been appointed who has an intimate knowledge of the administration of the Act, relating to stock and rabbits, but until an ordinance is gazetted he can do little in the direction of rabbit extermination.

Outside the areas enclosed by rabbit-proof fences rabbits are very numerous upon the holdings within the territory. Some are so badly infested that the return from the land is reduced to a minimum, and until concerted and well directed action is taken no improvement can be expected.

STAFF AT 30TH JUNE, 1913.

Federal Territory.

Director of Lands and Surveys.
Charles Robert Scrivener.

Field Staff.

Surveyors.	Articled Assistants.
P. L. Sheaffe.	E. J. Dowling.
A. Percival.	R. M. Kelly.
R. J. Rain.	E. V. Corlass.
G. Marshall.	C. G. Roberts.
J. D. Reid.	F. H. Chaplin.
L. J. Kelly.	

Valuer.	*Inspector.*
A. W. Moriarty.	J. C. Brackenreg.

Drawing Staff.

F. J. Broinowski ... ... Senior Draftsman.

Draftsmen.

J. G. Brown.	C. T. Young.
A. A. Andrews.	C. W. Pardey.
F. L. Hatfield.	F. L. Lynch.
C. S. Vautin.	E. D. Gilchrist.
L. Edwards.	R. Middlecoat.

Clerical Staff.

M. Hyde.	H. N. Bradshaw.
C. Seddon.	F. Kaye.

TRANSFERRED PROPERTIES.

Since the Agreement was entered into by the Commonwealth of Australia and the several States relative to the transfer by the States to the Commonwealth of properties used in connection with the carrying out of services transferred to the Commonwealth, under the Constitution, an arrangement has been made under which the Commonwealth pays to the States interest at the rate of $3\frac{1}{2}$ per centum on the total value of the properties transferred.

[*From photograph by Messrs. Howard and Shearsby, Yass.*]

[*From photograph by Messrs. Howard and Shearsby, Yass.*

Since the valuations of transferred properties were made it has been found mutually desirable to re-vest in the States certain of them not required for any Commonwealth purpose, and other properties have, since the original valuations, been transferred by the States to the Commonwealth under section 85, sub-section 1 of the Constitution.

The following schedules show the values of properties transferred by the several States, distinguishing between the site and structural values, and indicating the departmental disposition, and the value of properties since re-vested in the States.

TRANSFERRED PROPERTIES VALUATIONS.

Summary.

State.	Valuation of Structures.	Valuation of Sites.	Other Valuations.*	Total.
	£	£	£	£
New South Wales	1,640,476	825,166	1,209,006	3,674,648
Victoria	1,264,164	555,710	510,300	2,330,174
Queensland	555,889	348,395	617,584	1,521,868
South Australia	306,276	99,592	626,854	1,032,722
Western Australia	288,168	130,131	285,987	704,286
Tasmania	206,110	76,861	101,780	384,751
Totals	4,261,083	2,035,855	3,351,511	9,648,449

* Includes stores, equipment, furniture, and all other transferred property, except structures and sites.

Department.	State.						
	New South Wales.	Victoria.	Queensland.	South Australia.	Western Australia.	Tasmania.	Total.
	£	£	£	£	£	£	£
Postmaster-General—							
Structures	1,068,704	697,362	262,701	215,491	256,835	108,964	2,610,057
Sites	463,221	381,803	177,686	74,298	78,206	36,606	1,211,820
Other*	805,391	253,697	485,241	552,492	265,854	69,336	2,432,011
Defence—							
Structures	454,859	445,773	165,130	69,741	15,440	64,715	1,215,658
Sites	328,245	106,369	100,791	19,034	31,213	25,835	611,487
Other*	398,899	253,247	120,881	72,365	18,189	30,940	894,521
Trade and Customs—							
Structures	116,913	121,029	127,957	21,044	15,893	32,431	435,267
Sites	33,700	67,538	68,843	6,260	20,712	14,420	211,473
Other*	3,396	2,090	5,282	1,182	1,109	1,361	14,420
Home Affairs—							
Structures	.....	.....	101	.....	.....	.....	101
Sites	.....	.....	1,075	.....	.....	.....	1,075
Other*	1,320	1,266	6,180	815	835	143	10,559
Totals	3,674,648	2,330,174	1,521,868	1,032,722	704,286	384,751	9,648,449

* Includes stores, equipment, furniture, and all other transferred property, except structures and sites.

PROPERTIES REVESTED IN THE SEVERAL STATES.

	£
New South Wales	3,697
Victoria	6,210
Queensland	2,381
South Australia	3,239
Western Australia	5,021
Tasmania	445
	£20,993

MAPS AND DIAGRAMS.

The following maps and diagrams will be found in the pocket at the back of this Report :—

1. Topographical map showing the City Site and surrounding country.
2. Map illustrating the extent and character of survey work within the Federal Territory.
3. Map showing extent of acquired lands within the Federal Territory.
4. Map illustrating extent and nature of survey work at Jervis Bay.
5. Map showing acquisitions at Jervis Bay.
6. General topographical map of the Federal Territory.
7. Diagram showing some of the instruments and appliances used in connection with surveys.
8. Topographical map showing the City Site and surrounding country—scale, 40 chains to an inch.

LAND AND PROPERTY SECTION, MELBOURNE.

This section of the Lands and Surveys Branch deals with the whole of the acquisitions throughout Australia, with the exception of those within the Federal Territory and at Jervis Bay, which are, as far as possible, carried out at the Canberra Office, but even these pass through the Melbourne office before completion.

The accompanying Schedules show the purpose and the area of each acquisition made throughout Australia during the year ending 30th June, 1913, as well as the approximate aggregate value of the properties acquired, including those within the Federal Territory and Jervis Bay.

STATEMENT OF ACQUISITIONS OF LAND, &c., THROUGHOUT AUSTRALIA, EXCLUSIVE OF THOSE WITHIN THE FEDERAL TERRITORY AND JERVIS BAY.

DEFENCE.

Place.	Purpose.	Area.		
	New South Wales.	a.	r.	p.
Adamstown	Rifle Range	231	0	0
,, ...	Drill Hall	0	2	6
Liverpool	Manœuvre Area	45,613	0	0
,, ...	Artillery Remount Depôt	864	0	0
Port Stephens ...	Naval Base, Engineers' Camp	40	0	0
Waverley	Drill Hall	0	1	22
Forbes	,, ...	1	2	8
Ashfield	,, ...	1	0	0
Balmain	,, ...	1	1	36
Manly	,, ...	0	3	0
Marrickville	,, ...	3	2	0
Young	,, ...	1	2	0
Kurri Kurri	,, ...	2	2	0
		46,760	0	32
	Victoria.			
Echuca	Rifle Range	408	3	0
Camperdown ...	,, ...	18	1	0
Westernport	Naval Base	451	0	0
Colac	Rifle Range	19	0	0
Warrigul	Drill Hall	0	1	16
Elsternwick	,, ...	1	1	0
Chiltern	,, ...	0	2	0
Abbotsford	,, ...	1	0	0
Castlemaine	Rifle Range	4	0	0
Port Melbourne ...	Drill Hall	0	0	3
		904	0	19
	Queensland.			
Toowoomba	Rifle Range	500	0	0
Redbank	,, ...	217	2	0
		717	2	0
	South Australia.			
Port Lincoln	Naval Reserve	663	0	0
Mt. Gambier	Rifle Range	92	0	0
Kadina	Drill Reserve	3	0	0
Port Adelaide ...	Rifle Range	32	0	0
Noarlunga	Manœuvre Area and Remount Depôt ...	588	0	0
Gawler	Defence Premises	0	2	0
Norwood	Drill Hall	1	0	2
West Adelaide ...	,, ...	0	3	0
		1,380	1	2
	Western Australia.			
Leederville	Drill Hall	0	1	23
Dumbleyung ...	,, ...	0	2	0
Claremont	,, ...	0	2	0
		1	1	23

Place.	Purpose.	Area.		
	Tasmania.	a.	r.	p.
Launceston	Remount Depôt	418	2	0
Dowsing Point ...	Naval Purposes	51	1	0
Penguin	Rifle Range	2	2	0
Waratah	Drill Hall	0	1	0
		472	2	0
	POSTMASTER-GENERAL'S DEPARTMENT.			
	New South Wales.			
Gordon	Post Office	0	1	39
Ariah Park	,, ...	0	2	0
Bogan Gate	,, ...	0	2	0
Boolaroo	,, ...	0	1	0
Gidginbung	,, ...	0	1	0
Bondi Junction ...	,, ...	0	1	0
Turramurra	,, ...	0	1	11
Campsie	,, ...	0	1	7
Granville	Pole Depôt	0	0	19
Yerong Creek ...	Post Office	0	2	16
Mathoura	,, ...	0	2	0
Newcastle	Store Yard	0	1	20
Burwood	Pole Depôt	0	1	7
Kogarah	,, ...	0	1	0
Ryde	,, ...	0	1	0
Chatswood	,, ...	0	0	33
Bellata	Post Office	0	2	0
Drummoyne	Post Office—extra land	0	0	1
Rookwood	Telephone Exchange	0	1	0
Guyra	Post Office	0	1	0
		6	1	33
	Victoria.			
Winchelsea	Post Office	0	0	26
Toora	,, ...	0	2	0
Jeparit	,, ...	0	1	0
Sunshine	,, ...	0	2	0
Murrayville	,, ...	0	1	0
Merbein	,, ...	0	2	0
Melbourne	Parcels Post Office	0	0	9
Mirboo North ...	Post Office	0	1	25
Northcote	,, ...	0	0	1
		2	2	21
	Queensland.			
Kilcoy	Post Office	0	2	0
Tolga	,, ...	0	1	22
Brisbane	Wireless Station	1	0	0
,, ...	Telephone Exchange	0	1	0
,, ...	Mail Extension	0	1	0
Many Peaks	Post Office	0	2	0
Rockhampton ...	Wireless Station	2	0	0
Maryborough ...	Pole Depôt	1	2	0
		6	1	22

Place.	Purpose.	Area.
	South Australia.	a. r. p.
Blyth	Post Office	0 0 36
Cockburn	,, ...	0 1 0
Mount Gambier ...	Wireless Station	2 0 0
		2 1 36
	Western Australia.	
East Perth	Postal Stores	4 2 0
Perth	Post Office Drainage	.....
Dumbleyung	Post Office	0 2 0
Merredin	,, ...	0 2 0
Gimlet	,, ...	0 1 0
Mundijong	Pole Depôt	27 0 0
Fremantle	Wireless Depôt	3 0 0
Northampton ...	Post Office	0 1 0
Victoria Park ...	,, ...	0 1 0
Kojonup	,, ...	0 2 0
Geraldton	Wireless Station	3 2 0
Broome	,, ...	1 0 0
Dwellingupp	Post Office	0 2 11
Roeburne	Wireless Station	3 0 0
		44 3 11
	Tasmania.	
Hobart	Pole Depôt	0 1 0
Smithton	Post Office	0 2 0
Hobart	Postal Workshop	0 0 3
		0 3 3
	DEPARTMENT OF TRADE AND CUSTOMS.	
	Western Australia.	
Roeburne	Customs Office and Quarters...	1 2 0
	COMMONWEALTH BANK.	
Sydney	Commonwealth Bank	.....
	TRANSCONTINENTAL RAILWAY.	
Port Augusta... ...	Office Accommodation	0 2 0
,, ...	Railway Purposes	123 3 0
Kalgoorlie	,, ...	3 0 0
Parkeston	,, ...	18 0 0
		145 1 0
	GENERAL COMMONWEALTH PURPOSES.	
East Melbourne ...	Commonwealth Offices—additional land ...	0 0 2

SUMMARY OF AREA ACQUIRED THROUGHOUT AUSTRALIA, EXCLUSIVE OF THE FEDERAL TERRITORY AND JERVIS BAY, FOR THE YEAR ENDING 30TH JUNE, 1913.

	Defence.	Postmaster-General's Department.	Trade and Customs.	Commonwealth Bank.	Trans-continental Railway.	General Commonwealth Purposes.
	a. r. p.	a. r. p.	a. r. p.	a. r. p.	a. r. p.	a. r. p.
New South Wales...	46,760 0 32	6 1 33	.....	Bank site, Sydney.	.....	.....
Victoria	904 0 19	2 2 21	.....	.....	.....	0 0 2
Queensland ...	717 2 0	6 1 22	.....	.....	.....	.....
South Australia ...	1,380 1 2	2 1 36	.....	.....	124 1 0	.....
Western Australia	1 1 23	44 3 11	1 2 0	.....	21 0 0	.....
Tasmania	472 2 0	0 3 3	.....	.....	.....	.....
	50,235 3 36	63 2 6	1 2 0	.....	145 1 0	0 0 2

	a. r. p.	Approximate gross value.
Total Area for all the above purposes ...	50,446 1 4	£359,384
Federal Territory	92,202 0 0	329,112
Jervis Bay	22 0 0	100
Grand Total, inclusive of Federal Territory and Jervis Bay ...	142,670 1 4	£688,596

OFFICERS EMPLOYED IN THE LAND AND PROPERTY BRANCH, AS AT 30TH JUNE, 1913.

Professional.

J. T. H. Goodwin, Officer-in-charge.

W. M. Warrick.
C. L. Clarke.
L. H. Haslam.
B. H. R. Ziggel.
A. T. M. Potter.
V. Williams.

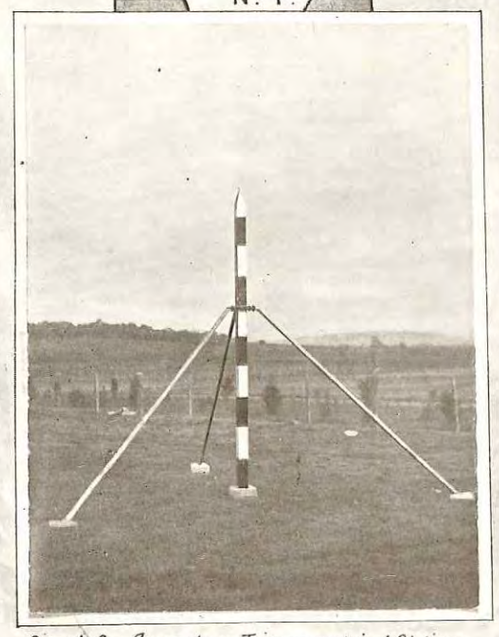
Clerical.

G. Whiteford.
H. E. Finney.
A. T. Wasley.
R. Cherry.
R. E. Harkness.
W. R. Pennington.
C. Binks.
A. D. Laughlin.
F. Bradshaw.
W. Burrows.

Sydney : William Applegate Gullick, Government Printer.—1914.

TYPES OF INSTRUMENTS USED IN COMMONWEALTH SURVEYS AND CHARACTER OF PERMANENT MARKS.

No. 1.

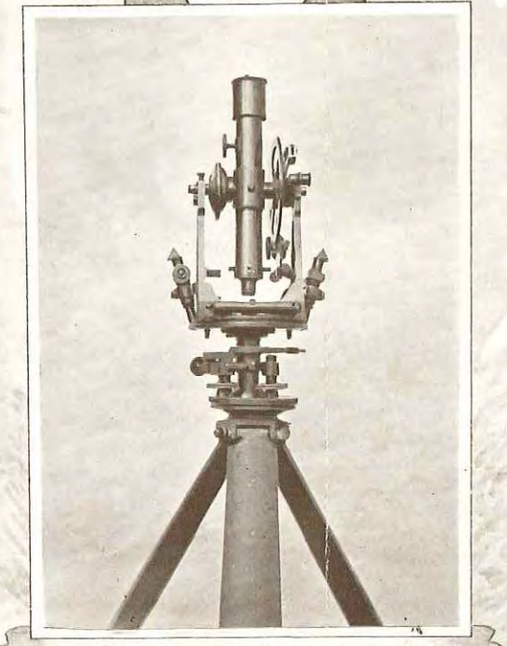


Signal for Secondary Trigonometrical Stations, Galvanized iron piping anchored to concrete blocks, and bolted to an iron casting, through which the pole passes, hole in bottom of pole fits into bolt in Station block, and the pole is readily removed.

No. 2.

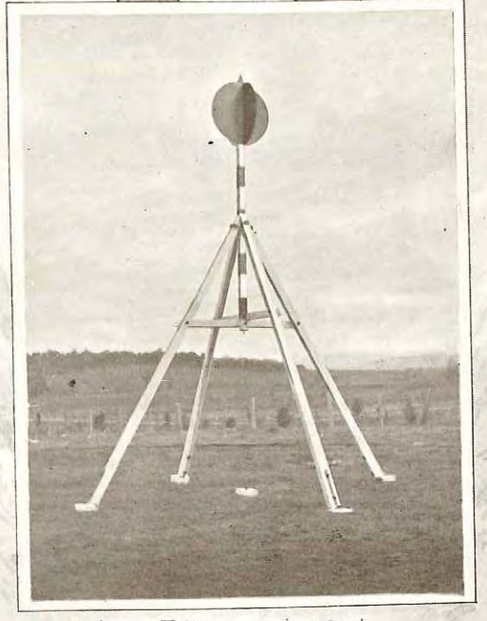
5 INCH TROUGHTON & SIMMS MICROMETER THEODOLITE.

No. 3.



5 INCH TROUGHTON & SIMMS MICROMETER THEODOLITE

No. 4.

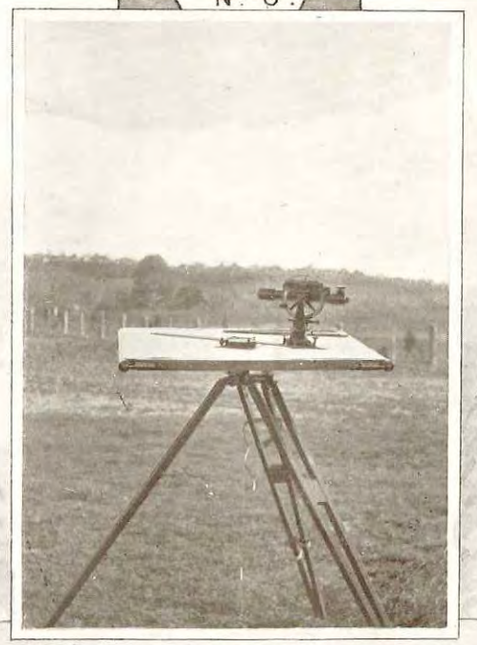


Primary Trigonometrical Stations. Frame work is bolted to Concrete blocks, and Instrument may be set over the Station without disturbing the Signal. Anchor blocks are usually at ground level, Station block about 12 inches below surface.

No. 5.

8 INCH BAMBERG THEODOLITE.

No. 6.



Telescopic Plane Table for Topographical work.

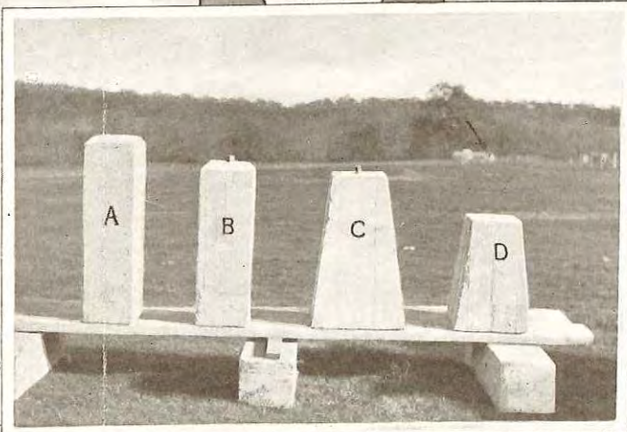
A

Block 30 inches long and 8 inches square with cup-headed bolt in centre at the top and a brass plate upon which, name or number of Station is stamped, as well as reduced level.

B

Block 8 inches square and from 24 to 30 inches long used as anchor blocks for minor Trigonometrical Stations

No. 7.



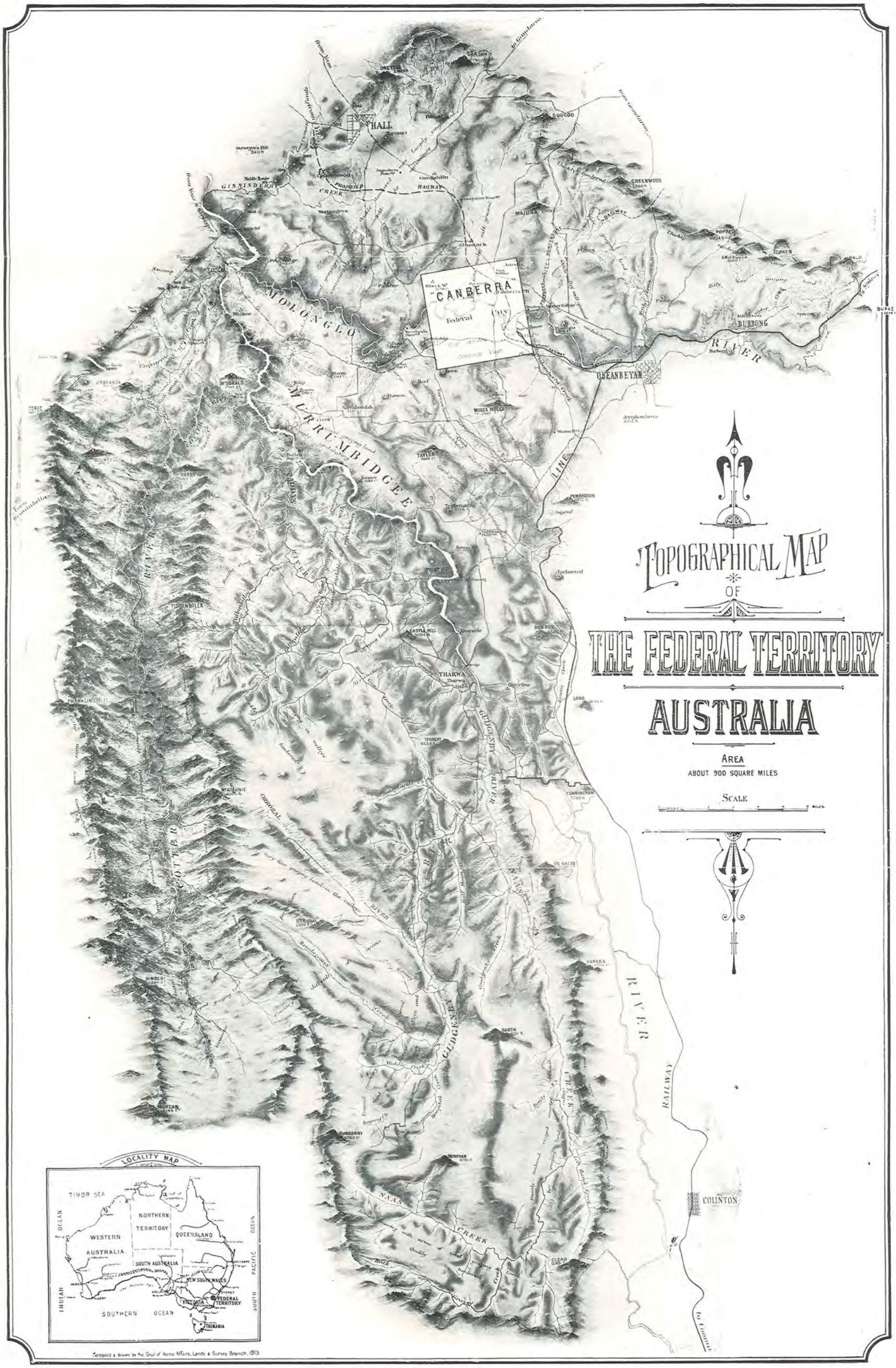
CONCRETE BLOCKS FOR PERMANENT MARKING

C

Block 8 inches square at the top and solid for about 8 inches, base 12 inches to 15 inches square according to length, walls of block about 2½ inches thick ¾ inch rod projects about 1½ inches from centre of top of block. This type is used for marking Trigonometrical Stations, a length of galvanised iron tubing, being set below the block.

D

Block 8 inches square at top solid for 6 inches, base 12 inches square, side walls about 2½ inches thick. Cup-headed bolt in centre of top for Station & Bench mark also a brass plate on which, number of Station, and reduced level are stamped. Used in marking contour and other Surveys.



NOTES

The **AREA** of the Federal Territory is approximately 900 square miles.

The **POPULATION** on December 31st, 1912, was 1940.

The **AVERAGE ANNUAL RAINFALL** over the whole Territory is 25·5 inches.

The **LOWEST POINT** in the Territory is about 1500 feet above sea level.

The **HIGHEST POINT** is Mt. Bimberi 6264 feet.

The **MEAN HEIGHT** is about 2500 feet.

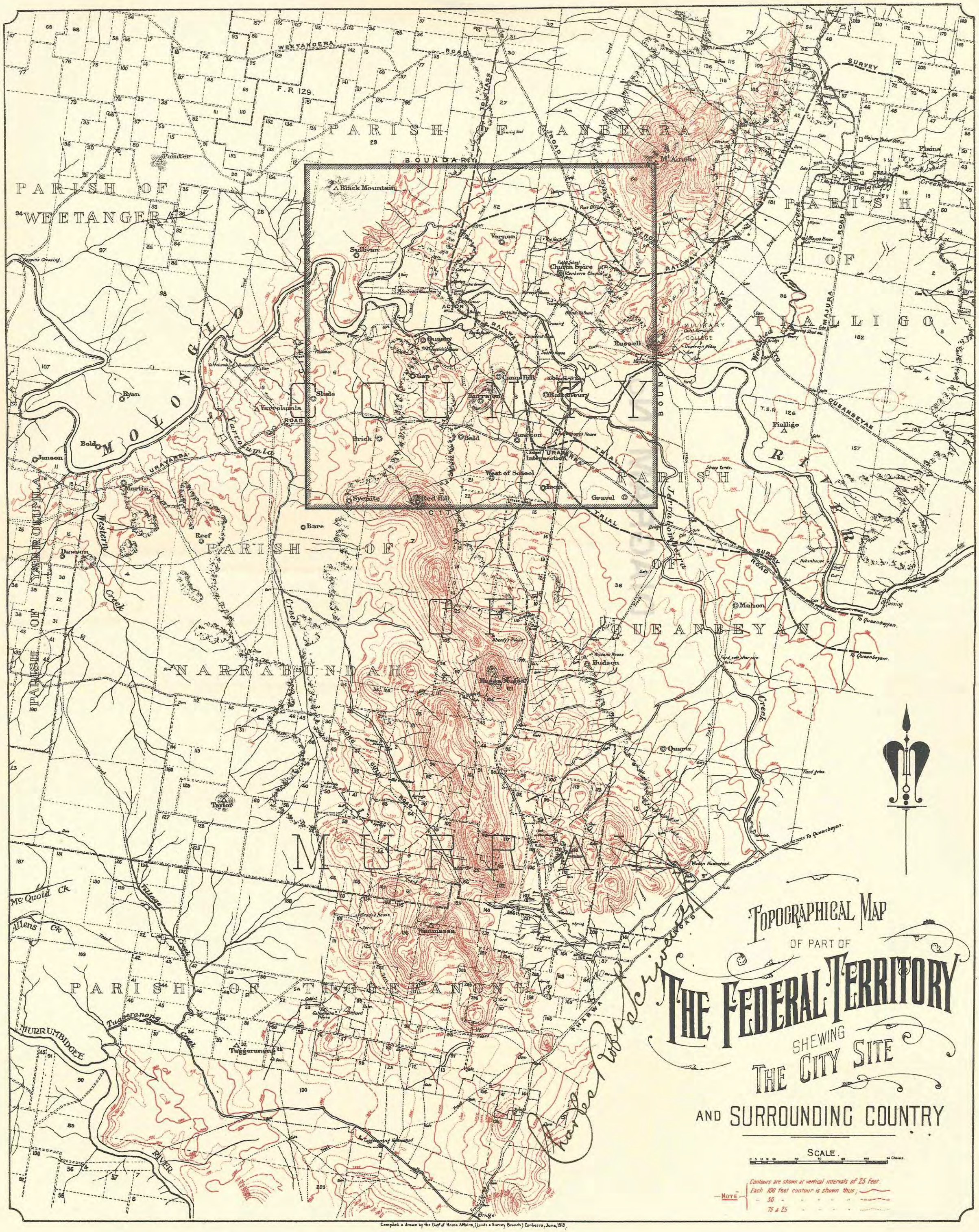
The **MAXIMUM SHADE TEMPERATURE** recorded is 104 degrees and the **MINIMUM** 11 degrees Fah.

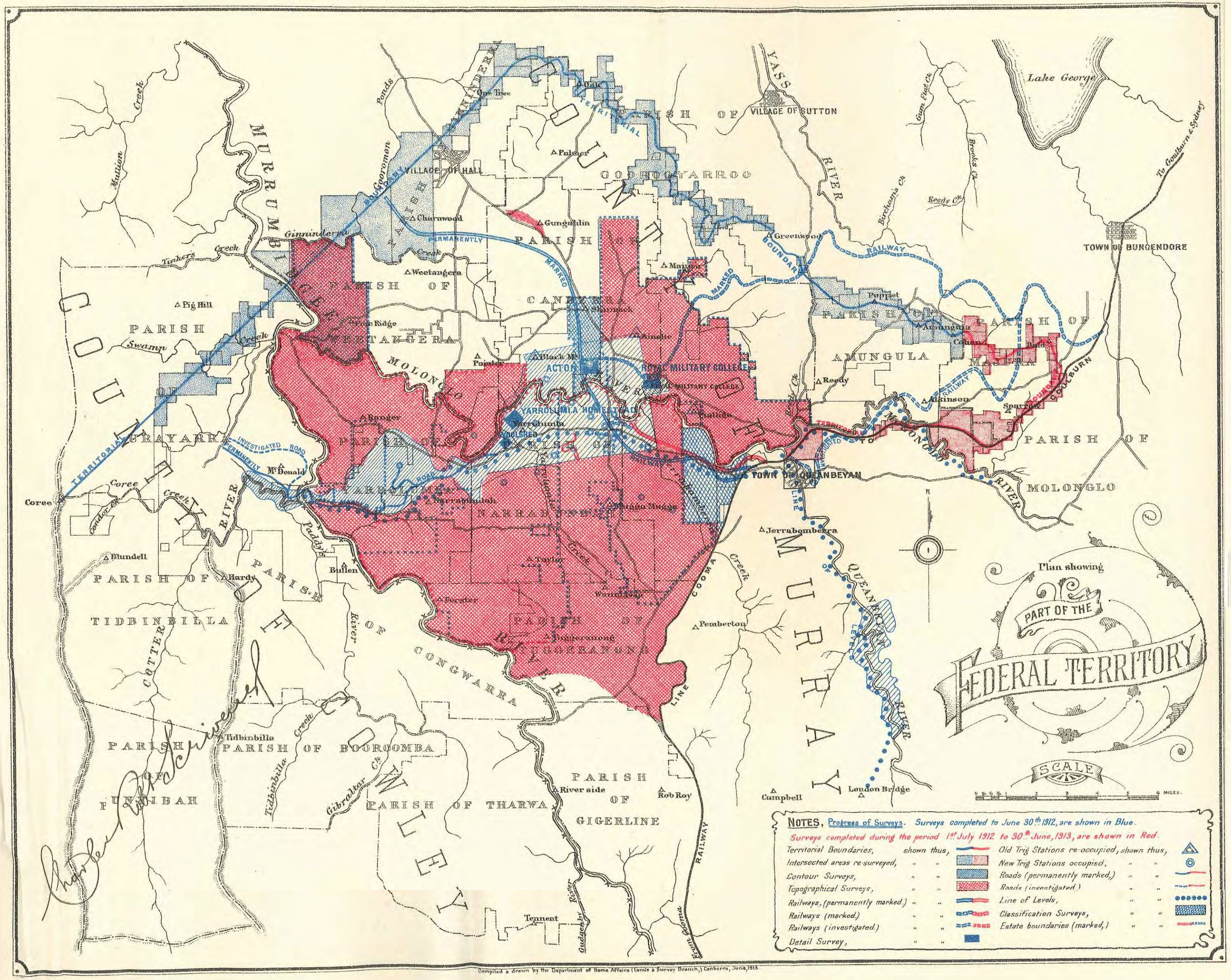
The **COUNTRY** is chiefly occupied for pastoral purposes.

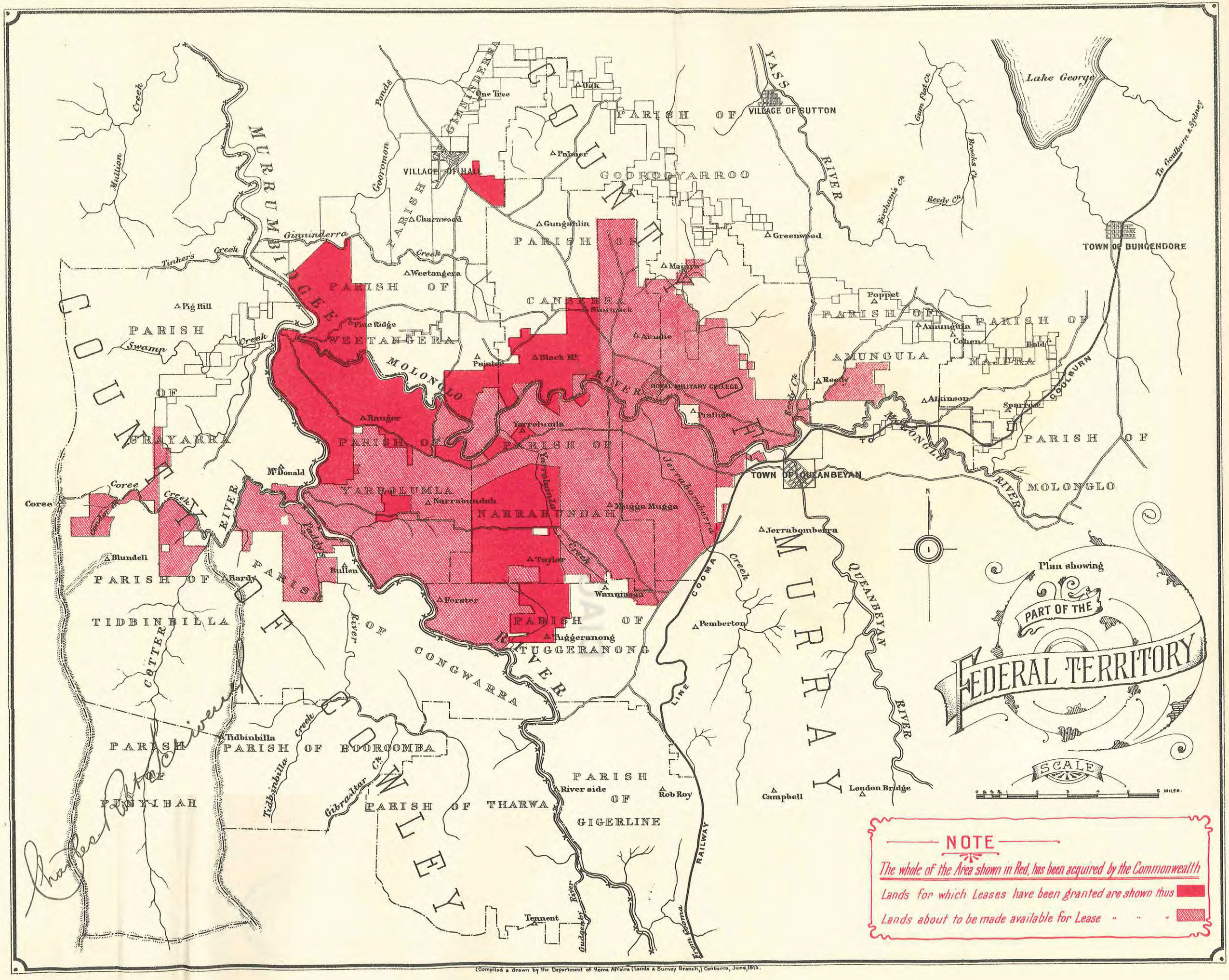
The **GEOLOGICAL FORMATN** is partly igneous, embracing granite quartz-porphyrys, etc, and partly sedimentary, including sandstone shales; slates; & limestone. Granites are found towards the South only.

CANBERRA is situated in latitude 35° 15′ S, and longitude 149° 15′ E on the western side of the MAIN DIVIDING RANGE; It is about 30 miles distant from that RANGE, and about 75 miles in a direct line from the Eastern coast of Australia.

CANBERRA is 204 miles from SYDNEY, 429 miles from MELBOURNE, 912 miles from ADELAIDE, and 929 miles from Brisbane.


TOPOGRAPHICAL MAP
OF PART OF
THE FEDERAL TERRITORY
SHEWING
THE CITY SITE
AND SURROUNDING COUNTRY
SCALE.
NOTE.
Contours are shown at vertical intervals of 25 Feet.
Each 100 feet contour is shown thus
50
75 & 25
PARISH OF WEETANGERA
PARISH OF CANBERRA
PARISH OF PIALLIGO
PARISH OF YARROLUMLA
PARISH OF NARRABUNDAH
PARISH OF TUGGERANONG
CITY OF QUEANBEYAN
MURRUMBIDGEE RIVER
Molonglo River
Black Mountain
Vernon
Sullivan
Russell
Pialligo
Mahon
Hudson
Quartz
Yarrolumla
Martin
Dawson
Reef
Bare
Red Hill
Gravel
Taylor
Tuggeranong
Weetangera Road
Yass Road
Majura Road
Queanbeyan Road
Tuggeranong Road
Survey Road
Trial Railway
Mc Quoid Ck
Allens Ck
Tillage Creek
Tuggeranong Creek
Jerrabomberra Creek
Woolshed Creek
Molonglo Gulf
Bridge
Compiled & drawn by the Dep't of Home Affairs, (Lands & Survey Branch) Canberra, June, 1913.


Plan showing
PART OF THE
FEDERAL TERRITORY
SCALE
MILES.
NOTES, Progress of Surveys. Surveys completed to June 30th 1912, are shown in Blue.
Surveys completed during the period 1st July 1912 to 30th June, 1913, are shown in Red.
Territorial Boundaries, shown thus,
Intersected areas re-surveyed, " "
Contour Surveys, " "
Topographical Surveys, " "
Railways, (permanently marked.) " "
Railways (marked.) " "
Railways (investigated.) " "
Detail Survey, " "
Old Trig Stations re-occupied, shown thus,
New Trig Stations occupied, " "
Roads (permanently marked,) " "
Roads (investigated.) " "
Line of Levels, " "
Classification Surveys, " "
Estate boundaries (marked,) " "
Lake George
TOWN OF BUNGENDORE
VILLAGE OF SUTTON
VILLAGE OF HALL
TOWN OF QUEANBEYAN
ACTON
ROYAL MILITARY COLLEGE
YARROLUMLA HOMESTEAD
PARISH OF GOORGOYARROO
PARISH OF CANBERRA
PARISH OF WEETANGERA
PARISH OF AMUNGULA
PARISH OF MOLONGLO
PARISH OF YARROLUMLA
PARISH OF NARRABUNDAH
PARISH OF TURAYARRA
PARISH OF TIDBINBILLA
PARISH OF CONGWARRA
PARISH OF TUGGERANONG
PARISH OF BOOROOMBA
PARISH OF THARWA
PARISH OF GIGERLINE
PARISH OF PUNJABAH
MURRUMBIDGEE RIVER
MOLONGLO RIVER
QUEANBEYAN RIVER
COOMA Creek
Gibraltar Cr.
Tidbinbilla Creek
Cotter River
Gudgenby River
Kowen Cooma
Paddys River
Coree Creek
Tinkers Creek
Swamp Creek
Ginninderra Creek
Molonglo River
Yass River
Lake George
Mulligan Creek
Ponds Creek
Goorooman Creek
Gum Flat Cr.
Brooks Cr.
Barkhams Cr.
Reedy Cr.
Eagle Cr.
Corridor Cr.
To Goulburn & Sydney
TERRITORIAL BOUNDARY
PERMANENTLY MARKED
MARKED
INVESTIGATED ROAD
RAILWAY
ROAD
LINE
Coree
Mt. Donald
Hundell
Hardy
Bullen
Forster
Tuggeranong
Tidbinbilla
Tennent
Taylor
Narrabundah
Mugga Mugga
Jerrabomberra
Pemberton
Campbell
London Bridge
Rob Roy
River side
Weetangera
Black Mt.
Pialligo
Ranger
Pig Hill
Fish Ridge
Gungahlin
Palmer
Oak
One Tree
Chairnwood
Weetangera
Mainwaring
Greenwood
Pialligo
Reedy
Atkinson
Sparrow Hill
Cooma
Bell's
Amungula
Sharnack
Amelie
Pialligo
Mt. Donald
Narrabundah
Hardy
Tidbinbilla
Tennent
Rob Roy
Campbell
London Bridge
Compiled & drawn by the Department of Home Affairs (Lands & Survey Branch,) Canberra, June, 1913.
PHOTO-LITHOGRAPHED BY W. A. GULLICK, GOVERNMENT PRINTER, SYDNEY, N.S.W.



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