ADELAIDE ROYAL SOCIETY

STOCK ROUTE EXPEDITION FROM SOUTH TO WEST AUSTRALIA.

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JOURNAL of the STOCK ROUTE EXPEDITION from SOUTH to WESTERN AUSTRALIA, 1895-6, under command of S. G. HÜBBE.

November 11th, 1895.—Camp No. 1. Exchanged wires with city. Left Oodnadatta; joined party camped at Angle Pole waterhole, on Neales river. Mustered camels and tied them down for the night, in readiness to begin journey on the following morning.

Tuesday, November 12th, 1895.—Camp No. 2. All hands out at daylight, but, notwithstanding steady work, did not start until 11 a.m., Mount O'Halloran bearing 102° 40′, our course being 324° along north arm of the Neales; travelled over flat country subject to inundation, vegetation consisting principally of salsolaceous plants, few cotton-bush, and roley poley *(Salsola kali)* scarce but green, the country being heavily stocked with camels, cattle, and horses. Continued this course fifty chains; then altered bearing to 307°, with creek about fifteen chains to left; fair bush, but much eaten out by camels. Continued on this bearing two miles sixty chains, and then camped at waterhole in Neales Creek, Western Bluff bearing 44° 20′. Expected to cover more ground to-day, but camels gave much trouble, many of them being only half broken, and continually lying down and breaking their nose-nips. Distance three and a half miles. Discharged Sweeney (aboriginal), as he demurred at getting up at daylight to assist with camels.

Wednesday, November 13th, 1895.—Camp No. 3. After much trouble with young camels, started at 11·10 a.m. on bearing of 307°, travelling along north bank of north branch of the Neales. Proceeded two miles, and then altered bearing to 303°, passing over open saltbush and a little bunch grass, very stony tablelands to north; here noted a little poison bush *(Euphorbia Drummondii)*. Crossed Neales to south bank, and at one and a quarter miles altered bearing to 292°, passing a small waterhole (Uckajillina). Still following creek, at two and a quarter miles altered course to 294°, travelling across open plain covered with small and densely-packed ironstone resembling mosaic work. At one and a quarter miles altered course to 283°, the Sisters' trig. bearing 50°; at one and a quarter miles altered bearing to 260°; at three-quarter mile altered to 270°, and at half mile camped on creek; no water. Total distance, ten and three-quarter miles. Country travelled over consisted principally of inundated flats, intersected with numerous water channels, which necessitated alteration of course so often; tried the open tableland for a short distance, but found it far too stony for the camels' feet. Herbage consists of salt and cotton bush, roley poley *(Salsola kali)*, bunch and swamp grass, lightly timbered, with stunted box lining banks of the creek, with gidyea (bastard myall) on the inundated flats, and a few clumps on open tableland. After being turned out, camels started fighting and were separated with difficulty; "Eringa" badly bitten on cannon and pad of off front foot; dressed it at once with carbolic oil. This is a misfortune, as he is one of our strongest and best packs, and probably will be lame for some time.

Thursday, November 14th, 1895.—Camp No. 4. "Eringa" brought in very lame, but, as we had camped without water, resumed journey at 9·45 a.m. on bearing 255°, along broken channel of the Neales. At one quarter mile left creek on the right. At two miles Neales' sub-trig. bearing 214°; creek forty chains to north. At two and a half miles altered course to 215°; three-quarters of a mile Sisters' trig. bearing 64°. Travelled over open plains, stony surface, salt and cotton bush, bunch and Mitchell grass *(Astrabele trinitacoides)*, and dry roley poley *(Salsola kali)*; Mitchell grass, dry on top, but green at butts; banks of creek fringed with stunted box and luxuriant gidyea. At 4·1 miles small creek running S.E. and entered small clumps of gidyea and other bushes. At five miles altered course to 220°, and crossed the small creek running S.E. At 6·4 miles altered course to 242°; at 8·4 miles to 250°, following small creek to avoid stones on tableland; and at 9·9 miles bore towards Mount Malua, 270°, Neales sub-trig. bearing 140°. Travelled along small creek running in general direction of course. At ten and a quarter miles creek branches to left. At 10·4 altered bearing to 260°, and at 12·8 miles camped. ("Eringa" being very lame, and young camels tired and continually lying down.) Mount Malua bearing 294°, about two miles distant, Neales sub. 109°. Country for last four miles absolutely devoid of timber, but well covered with cotton and milk bushes, roley poley, and Mitchell grass; stones plentiful on surface; soil loose friable loam of great depth, dry, soft, and powdery in summer and times of drought, very boggy after rain. Saw no animal life of any description, and only a few diamond sparrows and parrots.

From 15th to 28th November, 1895, Camp No. 3 was left in charge of one man whilst self and remainder of party were employed in searching for and recovering lost camels.

Thursday, November 28th, 1895.—Camp No. 5. Resumed on bearing of 298°. At forty-eight chains crossed creek running about 280°, at one and three-quarter miles Mount Malua bearing 173°, creek about half mile to left. Country consists of stony tableland, carrying salt and cotton bush, Mitchell and bunch grass. At 3·1 miles

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miles creek about eight chains to north (head of the Wooldridge) running 70°. At four and a half miles altered bearing to 285°, running up north side of the creek, passing through abundant Mitchell grass and various good fodder bushes. At 4·9 miles altered bearing to 315°; at 5·2 to 304°, and travelled over stony tableland covered with buck and cotton-bush, Mitchell grass, and in places remains of nardoo. At six and a half miles country deteriorates; dry bunch grass is still fairly abundant, but bushes are much more scanty and less luxuriant in growth. At nine miles altered bearing to 297° towards north end of Mount Jane. At nine and three-quarter miles altered bearing to 342°. The description of the country is as above, with addition of a few scattered mulga at eleven and a quarter miles. Camped for the night on one of the branches of the Wooldridge. With the exception of two and a half miles the whole of to-day's travelling has been over excessively stony tableland.

Friday, November 29th, 1895.—Camp No. 6. Continued journey on bearing of 284°. At 0·4 miles entered red sandy country covered with abundant bunch grass and open mulga scrub. At 0·5 miles entered flat, with little surface gravel. At 0·7 miles low red sandhills covered with mulga and hakea and abundant bunch grass. At 1·1 mile passed small claypan filled by recent rain, but rapidly evaporating; open plain to south. At one and a quarter miles entered open plain covered with cotton-bush, Mitchell *(Astrabele trinitacoides)* and bunch grass; open to south for at least six or seven miles. At two and a half miles crossed small box creek running about 50° N.E. At three-quarter mile country alters to level stony tableland, with fringe of mulga about eighty chains north and one and a half miles south carrying fair cotton-bush and Mitchell grass. At 3·8 miles crossed small watercourse running about 35°. Mulga along course of creek, with good cotton-bush and bunch grass. Then country deteriorates, being very stony, carrying a little dry cotton-bush and grass, with frequent bare patches of closely-packed small ironstone. At five miles enter small belts of dwarf mulga, hakea, and dry roley poley. This class of country continues until main channel of the Wooldridge is crossed at six and three-quarter miles, running in direction of about 18°. Box, mulga and good herbage along course of the creek. At seven and a half miles small creek running about 20° N.E. is crossed; country stony; herbage scanty, but fair amount of dry bunch grass. Country open for five or six miles to south, with low stony hills covered with stunted mulga three-quarters of a mile to north. At eight and a half miles altered bearing to 292°. At ten miles country still open, with occasional patches of mulga and moderately good feed (cotton-bush and grass). At ten and and a quarter miles open country, vegetation sparse, but fair dry bunch grass; open to north for three miles and to south about one mile to low range of sandy hills. At eleven and a quarter miles Mount Jane bearing 306°. At twelve miles herbage still scanty, but abundant dry bunch and a little Mitchell grass. I am convinced that after a good rain these tablelands carry an abundant supply of good, nutritious feed for all descriptions of stock. At 12·9 miles camped on a crooked gidyea and mulga creek bearing 42° and 230°, fringed with a little saltbush. Mount Jane bears from camp 311° 30′.

Saturday, November 30th, 1895.—Camp No. 7. Resumed journey on bearing of 293°, passing over country covered with salt and cotton bush, and a little dry grass. At 0·8 miles crossed small mulga creek running about 40° N.E., with low stony hills one mile to south. At 1·6 mile Mount Jane bearing 323°, open low stony hills. One mile south, salt and a little cotton-bush and dry grass, open to north about two and a half miles. At 2·4 miles Mount Jane bearing 234°, distant about one and a quarter mile. At three and a quarter miles altered bearing to 270°, Mount Jane about one mile north. Foot hills to same about twenty chains south; fairly abundant saltbush up to this. At 3·8 miles crossed large gum creek; at four and three quarter creek about five chains south, running west; then open stony tableland to hills about two and a half miles south. Mount Jane here bears 41° 30′. At five miles altered bearing to 296°; country stony; fair saltbush; creek about twenty-five chains to south, visible for about four miles, trending a little south of west, low hills about two and a half miles south; here saw three kangaroos. At six and a half miles creek running 320°. At seven miles altered course to 250°, passing over stony country covered with fair saltbush and Mitchell grass, also a little milkbush. At 7·3 miles altered bearing to 288°, and at 7·6 miles reached brow of flat-topped high tableland. At 7·8 miles altered bearing to 275°, at eight miles to 300°, and at 8·3 to 294° on top of high tableland towards point of hill, passing through fairly abundant bunch grass, little Mitchell grass and roley poley. At 8·6 miles altered bearing to 308°. At 9·1 miles to 273° towards long table-topped hill south of the Alberga Creek, at 10·1 altered course to 301° down the Oolarinna Creek, and at 11½ miles camped on the creek for the night.

Sunday, December 1st, 1895.—Camp No. 8. Resumed journey on bearing of 277°, crossing creek and flat subject to inundation, clothed with mulga, hakea, and beanbush. At 0·3 miles left the broken channel of Oolarinna Creek and entered slightly stony plain. At 0·5 miles passed three good claypans filled by recent rains; here altered bearing to 295°. At 0·6 miles entered stony country carrying fair bunch grass and saltbush. At one and a quarter miles altered course to 300°; here vegetation improves, good Mitchell grass and saltbush being plentiful. At 2·1 miles passed out of stony country and entered a flat extending to the Alberga Creek, situated about three-quarter mile north, and to hills about two and a half miles south; this flat is covered with scattered clumps of mulga, the undergrowth being Mitchell and bunch grass, with occasional patches of poison weed *(Euphorbia Drummondii)*, through which we carefully shepherded the camels. At 3·1 miles altered course to 268°; Alberga Creek being about one-quarter mile north. At 3·4 miles creek trends northerly; abundant bean tree and mulga, with box trees, in channel of creek. At three and three-quarter miles crossed creek, and at 3·8 miles altered bearing to 284°, passing through mulga, currant, cotton and salt bush, with large patches of luxuriant *Euphorbia Drummondii*. At 6·1 mile altered course to 290°, following north side of creek, passing over stony country covered with mulga and saltbush—this class of country extending in a northerly direction—whilst on the south side table-topped hills approach to within fifty chains of the creek. At 6·3 miles crossed the creek and altered bearing to 260° along south side of creek, travelling through fairly dense mulga and good grass; lunched here under the first corkwood I have seen since leaving the Macdonnell Ranges in 1879, the shade proving comforting, as the day was very hot. On resuming journey altered bearing to 270°, passing over red sandy soil covered with mulga and good grass; at seven and three-quarter miles creek was quarter mile south. At eight and a quarter miles altered bearing to 295°, mulga and grass abundant; creek about thirty chains to south. At nine and a quarter miles mulga and good grass, with a few corkwoods and Leichhardt lilies, the latter having flowered and died off; here altered bearing to 284°, creek being about fifteen chains to south. At 9·6 miles creek still fifteen chains to south. At 9·8 miles altered bearing to 320°. At 10·1 miles same class of country obtains, and altered course to 315°; at ten and a quarter miles to 300°. At ten and a half miles passed large waterhole (in main channel of the Coongra Creek) twenty chains long by 7ft. deep. After a heavy flood this hole would be fifty chains long by

by a depth of from 20ft. to 25ft. Teal, black, wood duck, and widgeon were numerous on the water, whilst the banks were lined with water hens. At 10·9 miles altered bearing to 313°. At 11·6 miles crossed creek and camped at the Aliambo waterhole. This is a fine waterhole; at present the water is from 5ft. to 6ft. in depth, shallower in places, with a bank of coarse gravel showing in the middle. When filled by floods it is from 20ft. to 30ft. deep, and for all practical purposes can be regarded as permanent.

December 2nd, 3rd, 4th, 1895.—Remained at Camp No. 8 resting and recruiting tender-footed camels.

Thursday, December 5th, 1895.—Camp No. 9. Mr. Murray, Mahar, and self with four camels left camp and travelled up Coongra Creek to examine waterholes and to observe if the country is suitable for a stock route. Cut off bend in the creek to foot of hills, and travelled two miles across open flat subject to inundation, carrying good cotton and salt bush, a little Mitchell grass, and a few scattered clumps of mulga; then struck the creek and ran it for two miles, passing and examining Bonyundinna waterhole; crossed creek to avoid rough stony country, as the camel I rode showed signs of becoming tender-footed, and ran up the creek on softer country to a large waterhole, also avoiding broken up country caused by rough watercourses coming in from table-topped hills about sixty chains to south. Lunched here, and camels drank as heartily as if they had been unwatered for four days, although they have had free access to a large fresh waterhole and done no work for three days. On resuming, travelled on over deep red loamy soil covered with loose stones and carrying good herbage, cotton and salt bush, Mitchell and bunch grass; creek fringed on both sides with good mulga, stunted gum and box in the channel. This continued for four miles when Indinnathurra waterhole was reached, when, as Mr. Murray became very unwell (headache accompanied by violent diarrhœa), we camped at 4 p.m., his illness being aggravated by the heat, which was great. The country examined to-day is good pastoral land, but so stony and rough as to render it doubtful if drovers would adopt it as a stock route, although so far feed and water is plentiful, as I am satisfied that the waterholes examined to-day, when filled, will last for twelve months if not overstocked. Distance travelled, including bends in creek, eighteen miles. Indinnathurra is an excellent waterhole; the creek has evidently not been in flood for fully twelve months, and at present the hole is twenty-five chains long by three chains wide, and ranging in depth from 6ft. to zero, with an exceedingly strong soakage in the sandy bed on west side of the waterhole and north end, the east side and bottom being composed of rough conglomerate. Mr. Murray very unwell all night, and thinks he has fever and ague.

Friday, December 6th, 1895.—Camp No. 9. Mr. Murray still very unwell and unfit to travel; therefore continued examination alone, leaving Mr. Murray with Mahar at the waterhole, with instructions to await my return. Left camp at 7 a.m. and ran up the south bank of the creek; found the country considerably rougher than that passed over yesterday for four miles from Indinnathurra, but still carrying good feed; at this point the table-topped hills close in on the south side to within ten chains of the creek, and the roughness and stoniness increases; this continues for one mile and a half, when the hills again recede and open. Well-grassed country extends for from one to two miles on either side of the creek, the main channel of which is filled with well-grown and luxuriantly-foliaged white gum, but very crooked; I saw very few which could be utilised for telegraph poles. The banks are fringed with dense mulga and a few prickly acacia, with good saltbush and roley poley *(Salsola kali)*, but all very dry, on the open patches. Passed Coolpitcharrinna waterhole; ran on to Pallarina waterhole, and thence on to Pendelcharinna waterhole. The former contains, at greatest depth, 4ft. of water by twenty chains by three chains, whilst the two latter holes were completely dry. Beyond the last-named waterhole the creek splits into several small channels, coming out of a low, rough, stony range of hills, from the top of one of which I noted Mount Randolph, bearing 325°. Further to the west and south, as far as I could see with a powerful field-glass, the appearance of the country was most rough and uninviting, and was covered with a dense growth of mulga and other scrub. I therefore came to the conclusion that a stock route on this line is impracticable, as fat stock travelled over such rough stony country for any distance would inevitably lose condition. I therefore reluctantly relinquished this line. Shall fall back on Aliambo, cross to the Alberga, travel up that creek to its junction with the Indulkana, and thence on to the spring of thatname, from where, if possible, I will proceed to Lindsay's Extinct Mound Spring. In addition to the waterholes enumerated above, passed three small soakages, which, if opened out, would give a greater supply. On arriving at the above determination, I returned direct to Indinnathurra, finishing the last five miles on foot, my camel being dead lame. On reaching camp, was pleased to find Mr. Murray much better; he is still unwell, but assures me he will be able to travel to main camp to-morrow. Distance travelled, twenty-five miles. Saw one very large pirinthie (species of iguana) fully 8ft. long and proportionally bulky, one emu, and recent tracks of rabbits; no natives, but a gum tree which had recently been ascended by one.

From December 7th to 10th, 1895.—Delayed at Camp No. 8 by rain, which rendered ground too boggy for camels to travel. Marked large white gum tree at east end of Aliambo waterhole S.R. to W.A., ANGLE POLE, 60 MILES, E.S.E.

Wednesday, December 11th, 1895.—Camp No. 9. Resumed journey and crossed the Coongra in quarter of a mile, travelling on bearing of 309°, striking for north end of Mount Alberga. Continued for four and three-quarter miles, and then altered bearing to 316° to clear point of stony hills. Country traversed is good, being specially suited for depasturing cattle, consisting of good, firm, red loamy soil, luxuriantly clothed with green bunch grass and succulent herbage; the mulga is of the best description, is not too dense, and is interspersed with good patches of prickly acacia. At five miles from Aliambo the country changes slightly, but the feed is still excellent; travelling also good, over firm red soil with occasional patches of water-worn stones. At seven miles entered an open saltbush plain, extending about five miles S.E. to low table-topped isolated hills. At 7·8 miles altered bearing to 318° to avoid stones, passing over open saltbush and good grass; stones increasing, but less water-worn. At nine and three-quarter miles good feed, mostly Mitchell and bunch grass. Country much rougher and stones sharper, causing some of the camels to limp badly. At ten and a quarter miles two small hills to S.W. half to one mile distant, open to N.E. At eleven and a quarter miles open for about seven miles to S.W.; here altered bearing to 355° to avoid stones, which have become more numerous, sharp, and gritty, and country is generally inferior, the mulga being stunted, with scanty undergrowth and very little grass. At 11·4 miles struck Carruthers' old camel pad, bearing 320°, passing over gravelly soil, open stunted mulga, fair grass, and little salt and cotton bush. At thirteen miles hills about sixty chains to west, open saltbush and roley poley, few scattered mulga and currant-bush. At fifteen and a quarter miles struck and followed up the Alberga Creek on bearing of 280° to Lambinna Soakage, and camped.

Thursday

Thursday, December 12th, 1895.—Camp No. 10. Whilst men were after camels Mr. Murray and self walked to and examined Lambinna Soakage; found it to contain a strong supply of excellent fresh water at a depth of 3ft. below the surface; sand in the main channel of the creek. I consider the water here to be permanent, as I am informed by Mr. Burney that when this country was occupied by the Alberga Pastoral Company a well 10ft. deep was sunk a few chains west of this soakage and 500 cattle were watered for three years during which the creek did not run. This well is now completely silted up, having been filled with sand by last January floods, and a long line of large hewn gum troughing, from which the cattle received their supply has been washed out of position. The timber in the Alberga is white gum, large and well grown, but so far I have seen only a few trees suitable for telegraph poles. Resumed journey on bearing 295°, Mount Alberga bearing 194°, to camp on north side of the creek, distant about one mile. At thirty chains left bank of the creek after passing through abundant feed, comprising mulga, swamp cane, and Mitchell grass, herbage reeds and rushes. At seventy chains altered bearing to 333°, entering open mulga with abundant grass and a little parakylia *(Portulaca)* in flower. At 0·9 miles altered bearing to 300°, following Carruthers' old pad, which was visible in places. At three and a quarter miles entered open stony grassy plain, saltbush, and a little roley poley, extending to about one mile south; low hills about two miles south, our course being generally N.W. At 4·4 miles entered rising stony ground, dense mulga with scanty undergrowth (inferior country). At six and three-quarter miles again closed in on the Alberga, here bearing 280° at junction of the Warrengudinna Creek, and stopped for lunch at waterhole at junction of the two creeks. Good herbage along banks of both creeks; only a limited quantity of green odorous water on the surface, but a good soakage exists in the sand, which is of considerable depth. We had no difficulty in obtaining good drinking water in a few minutes by scratching holes in the sand. Resumed journey on bearing of 255° travelling on south bank of the Alberga. At 6·9 miles crossed Alberga on bearing of 310°. At 7·2 miles followed north bank of the creek on bearing of 295° through good fairly dense mulga, other fodder bushes, and abundant grass; soil loose, red sandy loam. At seven and three-quarter miles altered bearing to 270°, passing over sandy soil, mulga, and excellent green grass. At nine miles altered course to 295°, with creek about fifteen chains to south. At nine and a quarter miles again got on to bearing of 270°, and at 10·3 miles altered to 260° with creek about thirty chrins to south, still passing through good greer. grass and herbage. Here the creek is from fifteen to twenty chains wide, the main channel being fringed with large white gum, from which a few telegraph poles can be obtained, but the majority are too large and crooked. Outside the line of gums a deep fringe of well-grown mulga, bloodwood, currant-bush, and occasional corkwood and bean trees are met. At eleven and a half miles, creek about forty chains to south; at twelve miles, bearing 253°, country still good. At 12·8 miles struck north bank of the Alberga, here bearing 302°, white gum, cane, and swamp grass, also a vividly green bush bearing a bright yellow pea-shaped flower, which the camels devoured ravenously. Here the creek is from ten to fifteen chains broad, and a small soakage exists, at which crows, parrots, and diamond sparrows were numerous; good mulga, grass, and herbage on flats and sandridges, extending on both sides of the creek. At fourteen miles camped the party; self rode on and examined country on south side of the creek towards Mount Vaughan, and found that the good sandy soil, well clothed with vegetation, extended on this side to the foot of the table-topped hills, when the inferior stony country crossed S.E. of Lambinna (between there and Aliambo) again encroached. Failed to pick up Mount Vaughan trig. pile, which I suppose has fallen down, as I am satisfied from compass bearings and distance traversed I was under the hill. Crossed Carruthers' pad when making for the tableland, and on return ran it to within half a mile of the soakage, and then as the sun was sinking crossed the creek to north side, and returned to camp, reaching there at dusk. Saw many tracks of emu, kangaroo, and turkey; also old traces of rabbits. Distance by party, fourteen miles; self, twenty.

Friday, December 13th, 1895.—Camp No. 11. Resumed journey on bearing of 235°. Crossed creek to south side, and in one and a quarter miles struck Carruthers' pad and followed it by altering course to 270°; travelling through open mulga, abundantly grassed. At one and a quarter miles few corkwood with Mitchell grass and everlasting flowers; also other herbage, the latter old and dry. At three and a quarter miles low stony hills closed in on the creek. At four miles, creek bearing 250°, still travelling on good sandy soil, through feed as above described. At six miles lunched and watered camels at a strong soakage (unmarked on plan). On resuming, at eight miles, on bearing of 220°, the soil was still good, but grass and herbage much drier and more withered; we are now entering a belt where evidently there has been no or little rain for a lengthened period. Creek about thirty chains to north, stony hills about one mile to south. At nine and three-quarter miles, Mount Randolph, bearing 142° 30′, the mulga and sandy country extending to the tablelands about four miles south. This is superior pastoral country, covered with a superabundance of feed; emu, kangaroo, and turkey tracks numerons. Our course all day was a little south of west, being generally determined by the windings of the Alberga. At twelve and three-quarter miles, camped on Carruthers' old pad, south of the Alberga Creek, which was distant five chains to north. Here, although no surface water was found, we obtained a strong soakage, at which camels drank heartily, and in a short time the water rose to its original level in the sand.

Saturday, December 14th, 1895.—Camp No. 12. Continued journey by travelling along south bank of Alberga on bearing of 240°. At one mile altered to 250°. At one and three-quarter miles stony country; approached to within a few chains of the creek channel, and the soil deteriorates, mulga stunted with scanty foliage, grass short, and of poor quality; here lost all trace of old track. At two and three-quarter miles the travelling became so rough on the camels' feet that we crossed to the north side and struck for north end of Mount Mystery, bearing 262°, about eight miles distant. On this side of the creek the country improves, mulga being much better, grass and herbage plentiful and good, and prickly acacia and bloodwoods were numerous and flourishing, whilst a few corkwood and fresh water titree were noticed on the sandy flats clear of and distant from the creek ten to fifteen chains. At four and a half miles low red sandhills on north side of creek, with good grass, fair scrubs and herbage; on south side stony inferior country, creek here bearing 295°. At five and three-quarter miles altered bearing to 300°, still passing through abundant grass and herbage, amongst which there were a few well-grown and fully-developed plants of parakylia, which the camels assimilated with remarkable avidity, although not thirsty. At seven miles creek bore 280°. At ten miles struck junction of Alberga and Indulkana creeks and bade farewell to the former creek. Country to south consists of low stony rises covered with stunted mulga and other inferior bushes; to north of low sandy rises, good mulga, acacias, various fodder plants, good grass and herbage. At twelve miles Indulkana Creek; about five chains to south good mulga, Mitchell and bunch grass on both sides of creek. At 14·1 miles Mount Mystery, bearing 171° 30′, creek about eight chains to south. At fifteen miles camped. Good

soakages

soakages are marked on plan as existing at junction of Alberga and Indulkana creeks, and from the quantity of water obtained both at marked and unmarked soakages lower down the Alberga I fully anticipated obtaining a supply there for our casks, and therefore, in order to ease the camels, only brought on sufficient water to comfortably supply the party to that point, but on proceeding to the soakages was disappointed to find them quite dry, and on digging in the sand clay was reached without obtaining a drop of water.

Sunday, December 15th, 1895.—Camp No. 13. Resumed journey on bearing of 259°, travelling through good open mulga on firm sandy soil, well grassed, with fair herbage interspersed, the latter, however, being dry. This country continued for six miles, when inferior soil covered with small stones took its place; this obtained for two miles, when loose sandy soil again occurred, and vegetation improved. At twelve miles struck the Indulkana Creek, at point where soakages are marked. Mr. Murray, black boy, and self here left remainder of the party with camels and turned into the creek, traversing its channel, which was carefully examined for signs of water. Found the soakages as marked on plan, but no surface water, and on sinking at six of the most likely spots four of them proved dry, whilst at the other two a little damp sand was met when clay was reached. These soakages and the ones at junction of the Alberga cannot therefore be regarded as permanent, and so far I am of the opinion that permanent water does not exist in the Indulkana Creek, as wherever tested the depth of sand in the creek bed has been insufficient to store water and provide against the excessive evaporation caused by the hot summers which obtain in this district. Rejoined camels, and at thirteen miles entered more open country, carrying saltbush, roley poley *(Salsola kali)*, and grass. At fourteen and a half miles crossed small mulga creek and entered open saltbush plain; bunch grass, and a few clumps of mulga, with gravelly quartz on surface. At fifteen and three-quarter miles crossed another small mulga creek running about 330°, coming from low stony hills about three miles distant in a northerly direction; also low stony rises about three-quarter mile to south. At seventeen and a half miles creek about ten chains to south, with stony ridges abutting. At seventeen and three-quarter miles crossed a large gum creek (not shown on plan) bearing 300°; here found a large gum tree marked E. H. on north bank of the creek. At eighteen miles entered sloping country falling to the west, with quartz rubble on the surface, occasional stony ridges and quartz reefs, mulga, fair grass, saltbush, and roley poley. At twenty and a half miles camped on small rough watercourse, fringed with mulga, acacia, willow, and other good camel bushes. Mr. Murray then ascended small hill ten chains N.N.W. of camp and took round of angles to Mounts John, Chandler, and Mystery, and fixed the gum creek, which is an affluent of the Indulkana.

Monday, December 16th, 1895.—Camp No. 14. Vines and native out at daylight after camels. At 7 a.m. the black boy returned with four camels and a message from Vines that camels had rambled off three miles to large gum creek crossed yesterday, and then split up in all directions. Immediately dispatched the black boy on riding camel with waterbag and food to Vines, and then, as we have only two small bags of water left and the day promises to be very hot, sent Mr. Murray and Langman on to Indulkana Spring, with casks to return with water; Langman to remain at and clean out the spring. Mr. Murray to visit and if possible obtain water at the soakage, which is four miles nearer, but of this I have no hope. At 12·20 p.m. followed on Mr. Murray's track, being four hours twenty minutes behind = ten miles. Started on bearing of 250°. At 0·9 miles altered to 260°, travelling through undulating stony rises covered with rubbly quartz and sandstone, low, stunted mulga, and and a little bunch grass. This country continued for one mile, when extreme south point of Mount Chandler bore 248°. Similar country extends to 1·2 miles, when grass gives place to saltbush. The soil is less stony, and low table-topped hills surround us on all sides. Here altered bearing to 240°. At two miles country the same, but falling slightly in a westerly direction, and opening out. Mulga improves in size and foliage; noted a few corkwoods. At 2·2 miles altered bearing to 255° and crossed small acacia creek, with wide flats of red sandy soil subject to inundation, covered with abundant bunch grass and herbage of every description, but very old and dry. At 2·5 miles country again changes, saltbush giving place to dense bunch grass, open mulga and a few corkwoods, with hills again gradually closing in on line of march. Here altered bearing to 245°. At three miles country much more broken up, and intersected with small rough watercourses; mulga higher and more luxuriant. Altered bearing to 250° and at three and a half miles entered loose red sandy soil. Mulga fairly dense, with grass and herbage improving in quantity and quality. Altered bearing to 248°. At five miles country similar, but opening out. In two miles met Mr. Murray and camped for the night. Distance travelled—Vines, after stray camels, sixteen miles; Mr. Murray, for water, seventeen; party with loading, seven.

Tuesday, December 17th, 1895.—Camp No. 15. Proceeded direct to the spring, which was reached at 9 a.m. Camels watered, all casks filled, and camp established one mile north of the gorge in which the spring is located, the gorge being unsuitable for a camp, whilst the camels do better on soft level country and are more under supervision. When travelling to the spring crossed Indulkana Creek at the soakage and examined same; found Mr. Murray had sunk 5ft. in the sand when trying for water yesterday, when clay and loam was reached; it was therefore useless to sink further, and my impression that permanent water does not exist in the Indulkana Creek is confirmed. Here saw a large white gum tree marked D. STOCK 11/4/94 The country examined to-day consists of loose red sandy soil, covered with mulga and corkwood, well grassed, and with plenty of herbage, but all old and dry.

Wednesday, December 18th, 1895.—Camp No. 15. Resting camels. Men employed in repairing saddles. Mr. Murray, on plan; self, journal.

Thursday, December 19th, 1895.—Camp No. 15. Self and Mahar walked to spring in order to clean out the top hole and test the quantities of water, which is green and stagnant. We threw out 200 2½gall. buckets of water—500galls.—in twenty minutes, when the hole was forked; therefore the spring (?) makes very slowly. We then set to work and removed sand, rubbish, &c. This occupied us until 12·4 p.m., by which time the holding capacity had been doubled = 1,000 galls.—provided the water rises to its original level. I ascended the various branches of the small creek on which this water is situated, and finally climbed the Indulkana Range to obtain a view of the surrounding country, which, however, did not repay the trouble, the view being limited as the hills were not of sufficient altitude to overlook the adjacent heights. Then returned to the spring (?) and found it had made very little water; that, however, which had come in was perfectly pure and fresh, and did not contain the slightest trace of mineral matter—was percolating through red creek sand from the east side of the water channel, and I am satisfied my first impression is correct, viz., that this so-called spring is merely a soakage sufficient to water, in a dry season such as now obtains, from thirty to forty camels for a limited time only, and which, if continually stocked during a dry season, would entirely disappear. From a careful examination of the creek, hills, and surrounding country, I

I am convinced permanent water can only be obtained at a depth of from 150ft. to 200ft., and recommend that a bore or trial shaft be put down at a spot indicated on plan (twelve miles east of the spring). Revisited hole cleaned out at 6 p.m.—six hours—and found it had only made 60galls.—10galls. per hour. The Indulkana Range is composed of grey and a little red sandstone and grits, the hills being rugged, and from 200ft. to 300ft. above base are covered with a stunted growth of mulga, pine, and bastard box, the undergrowth being rough worthless bushes and spinifex.

Friday, December 20th, 1895.—Camp No. 15. Left Mr. Murray and men in camp engaged on various works in connection with loading and equipment, and walked up to the spring for the purpose of noting increase, if any, of the water in both holes, viz., the one from which the camels had been watered and the one cleaned out; found that the former had risen to within 3in. of its former level. At 8·20 a.m. visited the one cleaned out and found it had made 240galls. since 6 p.m. yesterday. At 9·20 a.m. it had risen $\frac{1}{2}$in., so that it is evident that, although the water comes in very slowly, a reserve is contained in the creek sands. During this time the depth of water in the lower hole had increased 1in., which leads me to infer that the cleaning of the top hole has opened a channel by which the water escapes and is led into the lower hole more rapidly than it did prior to removal of *debris* from the top hole, and this in part may account for the slow rate at which the top hole is being replenished; at 4 p.m. the water had risen $\frac{1}{2}$in. in the top hole and 1$\frac{1}{2}$in. in the lower hole. Then returned to camp, when Mr. Murray informed me that, when out amongst the camels, he had seen fresh aboriginal tracks skirting the range. Mr. Murray, self, and the black boy ran their trail and picked the party up close to the water; it was composed of one man, three women, and three small children. They only knew a few words of pigeon English, and our boy could not understand their language. Gave them some tobacco, and shortly after they established their camp close to ours, when we regaled them with scraps from our table, for which they, especially the children, were grateful. They were sturdy and well made, although of small stature. Their food consists of snakes, lizards, worms, land snails, and seeds, with an occasional kangaroo, emu, and dog, when they are fortunate enough to secure one, so that "whitefellow's tuckout" to the children must be a treat. We afterwards learned they had come from Ernaballa, Musgrave Ranges, eighty miles distant as the crow flies, and that there is no water between here and there, except in a small native well, insufficient for our camels; also, that there was no water at Illbillie, and that it generally was very scarce to the south and south-west; the majority of the natives being collected at Ernaballa (Glen Ferdinand of Ernest Giles), there having been no rain for a lengthened period—how long, I cannot learn, as I have always found it to be exceedingly difficult to obtain information from the Australian aboriginals as to time and quantities. This information decides me to, on leaving here, make direct for Glen Ferdinand, where I shall establish a depôt, leave the weakest and lame camels, and then make south to Lindsay's Mound Spring, for the purpose of putting down a bore.

Saturday, December 21st, 1895.—Camp No. 15. During the night was attacked with violent diarrhœa, and to-day suffer with pains in muscle of legs and back; imagine I caught a chill after working in water and slush when cleaning out the waterhole; was poorly all day, ate nothing, and during the afternoon pain became so great that I was vigorously rubbed by Mahar with St. Jacob's oil, which in due course gave relief. Mr. Murray on plan and adjusting instruments, the screws in one of our sextants being specially defective. Men engaged in various jobs about the camp.

Sunday, December 22nd, 1895.—Camp No. 15. Self again all right, except for a few aches in different spots. Released camels at 4 a.m. and turned them away from water; at noon they all returned, avoiding the camp, and making up to the gorge over the very rough stony foothills, and, finding they were determined to evade us whilst loose, had them brought in and tied up, where they shall remain until nearly sundown; then made final dispositions for start in the morning. Filled casks from clean hole. Self and Mr. Murray marked white gum tree near water at north end S.A. to W.A., S.R., LAMBINNA, E. 62 M. Then visited top hole and found the water had risen to within 6in. of the original level. I therefore judge it will not reach its full height until Monday= eighty-four hours in which 1,000galls. is stored and becomes available=200galls. in twenty-four hours= one-fourth of the quantity this spring (?) provided when Mr. Carruthers was camped here; and, as that gentleman had eighteen months' experience of this water, I am confirmed in the opinion that rain sufficient to replenish this *soakage* has not fallen for at least twelve months.

Monday, December 23rd, 1895.—Camp No. 16. Resumed journey at 8·27 a.m., on bearing of 308°. Travelled through open saltbush plain, good, but very dry few loose stones on surface, open bushes, and a little roley poley. At fifty chains crossed a small gum creek (affluent of the Indulkana), along the banks of which were growing mulga, prickly acacia, Mitchell and coarse bunch grass; Indulkana range, bearing 301°, forty chains south, with low hills twenty chains to north; then passed over flats subject to inundation, carrying good grass and herbage after rain, and crossed main channel of the Indulkana Creek on bearing of 260°. Here saw Carruthers' camel pad distinctly where it crosses the loose shifting sand of the creek bed; it is therefore evident the creek has not been in flood since he left in September 1892, and it is not surprising we found the soakage perfectly devoid of water and the spring (?)in the gorge so low. Here altered bearing to 282° following the old pad. At one mile left pad on south side of creek and altered bearing to 292°, passing over open saltbush and mulga. At one and a quarter miles again crossed Indulkana Creek, pad again showing plainly. Here altered bearing to 264°, travelling through open mulga and fair bunch grass. At 1·4 miles crossed small mulga creek. At one and three-quarter miles altered bearing to 340°, travelling over undulating country with loose gravel on surface; open mulga, bushes, and fair grass, but all very old and dry. At 1·8 miles altered bearing to 306°. At 2·1 miles again reverted to 296°, passing through undulating stony country with patches of fair grass, but so dry as to crumble to powder when touched either by foot or hand. At 2·7 miles altered bearing to 335°, at three miles to 310°, travelling through level open mulga country, fair bush and roley poley (*Salsola kali*) and noted a few small patches of spear grass (the first seen on this trip). At 3·3 miles again reverted to bearing of 296°. At four miles passed over a small open bluebush flat, and continued on this bearing to seven and a quarter miles through fairly open to dense mulga, interspersed with open saltbush, bunch grass, and a few corkwoods; soil very patchy, varying from red sand to dark loam, with occasional porphyritic outcrops. At eight miles altered bearings to 294° entering on a grassy plain with a few scattered bushes and a little saltbush. At 8·3 miles again entered fairly dense mulga, carrying patches of moderately good grass on burnt ground, but very dry; no birds, reptiles, or animals seen to this point, this strip of country appearing to be absolutely dead. Continued to thirteen miles on the last bearing, when the mulga became larger and more

more dense, with fair patches of very dry spear and bunch grass. At thirteen and a half miles entered open plain; grass, little saltbush, and a few inferior bushes, the foliage of which crumbled to the touch. Here altered bearing to 270°. At fourteen miles left plain and entered open mulga, and bushes with a little inferior bunch grass. At fifteen and a quarter miles crossed a small hungry-looking quartz reef bearing 35°, and a few chains further west another and wider one running on the same strike; soil hereabouts very inferior with porphyritic and sandstone outcrops rising on every side of the low stony undulations we were crossing; large stony hills about five miles off to the north. At seventeen miles altered bearing to 260°, travelling through open mulga and fair but dry bunch grass, with occasional porphyritic outcrops. This class of country continued to twenty-two miles, when we camped for the night ten chains west of the native well at S.W. end of the chain of hills of which Moorilyana hill is the most prominent. One mile prior to camping Mr. Murray left the party, climbed the hills, and took round of angles to Mounts Ferdinand, Illbillie, Chandler, and Chambers' Bluff, whilst I, directing the party to follow my tracks, went on to and examined the native well. On reaching found it to be a rain-water soakage, located at the foot of and five chains from the end of a low chain of porphyritic hills, the catchment area being formed by the bare hills, and about half an acre of flat porphyritic rock sloping sharply to the S.W. The excavation is one and a half chains from this rock, and has evidently been sunk to its present depth (10ft.) by the natives following down the water as it disappeared by use and evaporation. In the rough decomposed porphyritic gravel which contains the water the excavation has been carried down at an angle of 45°. No water was visible on my arrival, but I surprised a half-grown native dog who was busily engaged in scratching for water. This well if opened out will in a good season prove useful for watering a few horses or camels, but in my opinion a permanent supply in this locality is not obtainable. After examining the well returned to and brought up the party which had been delayed by breaking of nose nips.

Tuesday, December 24th, 1895.—Camp No. 17. Resumed journey on bearing of 298°, travelling through open mulga, fair bunch and spear grass, red sandy loam with porphyritic outcrops, and a very prickly salsolaceous plant whose spines have a most penetrant and irritating power; there were also good patches of salt and cotton bush, but herbage of every description, including trees and bushes, were in a most dry and and withered condition. Here passed the bodies of many small birds recently dead, which I imagine had died through effect of the heat or had perished for want of water. At four and a half miles saw two polygnum bushes (first seen), and at five miles country changes, soil being darker and inferior, and covered with rubbly quartz, very little grass, all dry and containing no nutriment. At six and a half miles struck and crossed a wide shallow watercourse fringed with blood and beef wood and mulga, the channel being filled with Mitchell and bunch grass, prickly acacia and other good camel and cattle bushes, but all exceedingly dry, withered, and without succulence. The belt of country we are now passing through is, without exception, the driest I have met with during twenty-six years' experience attained in travelling through the unsettled portions of Australia, but notwithstanding this should a good fall of rain come the country as a whole is so good that bush, grass, and herbage would in a few weeks become so abundant and succulent that stock of every description would fatten in an incredibly short time. From here to some sandstone rises at ten miles the soil is of better quality, being light red loam with fair grass and herbage, but still very dry. At ten and a quarter miles stopped for lunch, and whilst it was being prepared ascended a sandstone rise, from which Illbillie in the Everard, and Ferdinand in the Musgrave Ranges could be descried. Resumed course on bearing of 300°, and at 10·5 miles cleared the sandstone rises and entered upon salt and blue bush plain, with a few stunted mulga, other bushes, and a little grass. At 11·5 miles entered a strip where a shower of rain had fallen at a comparatively recent date, the grass, herbage and bushes being greener and more luxuriant. This continued to 13·5 miles, when the dry, parched appearance of the country was again painfully apparent. At 16·5 miles the mulga increased in height, bulk and denseness; this continued to twenty miles when we camped for the night on a fair patch of prickly acacia.

Christmas Day, December 25th, 1895.—Camp No. 18. Continued journey on bearing of 300°. At half-mile passed through prickly acacia camped on last night, and entered open saltbush plain with a few iron-cotton-bush interspersed. At one and a quarter miles passed some small dry claypans covered with ironstone rubble, and surrounded with small iron and sandstone hillocks. At one and a half miles entered open mulga, with a few cork and beef wood. Good bunch grass herbage and minor bushes, the majority of which were dead. At two miles, Pine Ridge, trig. bearing 8°, entered salt and blue bush, and at 2·6 miles crossed small creek, bearing 280°, and continued through salt and blue bushes to 6·8 miles, when we crossed a shallow watercourse, fringed with blood wood. At seven and three-quarter miles Pine Ridge bearing 44°, crossed a low sandhill. At eight and a quarter miles another presented itself. At nine miles cleared sandhills and entered a large dry cane grass swamp. Then crossed a fairly high densely-scrubbed sandhill, and ran up a long gully leading into the swamp through the sandhills. In the gully there are some well-grown, luxuriantly-foliaged bloodwoods (the best I have yet seen), and I have no doubt fresh water at a shallow depth could be obtained here, but only in limited quantity; but as to south and west of the swamp the country is of a harder nature; a good catchment area to the swamp exists, and here a good reservoir could be obtained at a minimum cost. At eleven and a quarter miles Mount Ferdinand bore 299° 30′. At eleven and three-quarter miles entered open patches of rubbly soil, carrying good grass of recent growth and fairly green. At twelve and a quarter miles passed a small open flat to the south. At twelve and a half miles crossed a limestone ridge covered with low, worthless bushes and withered saltbush, the rain which had brought up the grass a short distance back not having extended to this point. At twelve and three-quarter miles met firm sandy soil, carrying mulga and fair grass. At thirteen and three-quarter miles (6·25 p.m.), stopped to rest camels. At 7·25 p.m. resumed and travelled on by moonlight until midnight—nineteen miles—and tied the camels down for remainder of the night.

Thursday, December 26th, 1896.—Camp No. 19. Resumed journey on same bearing, viz., 300°. At 0·3 miles travelled over light red sandy soil, dense short scrubby mulga, 50 per cent. of which was dead and lying on the ground, making the passage difficult for the camels; bunch grass and herbage all old and dead. At two miles passed some well-grown green and umbrageous blood woods; this tree appears to do well in even the driest climate, and under existing circumstances its vigor and verdancy is refreshing to the eyes wearied by so much sombre grey; this line of country extends to 4·9 miles, when a quartz reef 7ft. wide was crossed. At five miles a small rise composed of decomposing porphyry and ironstone was passed, Mount Echo bearing 88° 30′; then entered light red sandy soil with usual mulga, grass, and herbage. This continued to 10·5 miles, when we stopped for lunch at a small rockhole on a small open plain. On resuming passed over same class of country to sixteen miles, when we entered a spinifex plain, carrying a few scanty mulga

mulga and other bushes. Travelled over this plain on bearing of 300°, striking for a leading gully in the range east of Mount Ferdinand. We had hoped to get clear of the spinifex and camp under the range to-night, in order to get the camels to water early to-morrow; but at 4·30 p.m. "Eringa," whose throat is getting worse, and who is rapidly losing what little condition he had, was seized with a trembling of the hind quarters, as was one of the young camels, and as it would have been inhuman to compel them to carry their loads further without a drink, as well as impolitic, I at once camped; and as they would assuredly make back on their tracks for the water last known by them if left to their own devices, I reluctantly gave orders to tie them down for the night, and to-morrow shall take them direct to water without loading, returning to pick up equipment, &c., after they have have had a good drink and some feed. Total distance to-day nineteen miles. Mount Ferdinand bears from this camp 289°; Mount Woodroffe, 272° or 275°.

Friday, December 27th, 1895.—Camp No. 20. Left Langman and the native in camp to look after and protect equipment and stores, with a week's supply of water, and, with all camels and remainder of party, started for Ernaballa; struck for the leading gully east of Mount Ferdinand. At one and a half miles got clear of the spinifex and entered dense mulga, bunch grass, and a little dry parakylia, evidently the result of a shower some months previously. Reached foot of the range in four miles, and struck a small gum creek debouching from the gully we were steering for. Ran this up for thirty chains, when, finding it was trending too far east, left it and crossed low chain of hills. Then entered a jumble of small hills of decomposed granite, intersected with numerous small watercourses, rendering travelling very difficult. Here "Eringa" fell and refused to move, an example promptly followed by old "John" and two of the young camels, and as we were still a considerable distance from known water, I felt grave doubts of getting all the camels in; but, being loth to abandon any, directed Mr. Murray to remain with the men and camels until it became cooler, when, should I not return, he was, if possible to push on with all the camels to Ernaballa (Glen Ferdinand). Then took riding camel and went off to search for water in some promising-looking gullies to the north, about one mile and a-half distant, and when steering for a gully north-west from our position noticed a number of crows and diamond sparrows flying towards a small gorge about one mile to the east of the line I was riding; therefore decided to investigate in that direction first. On reaching the gorge it was literally alive with diamond sparrows and rock pigeons, but too rough to ride a camel up with safety; therefore tied him down and ran the gorge up on foot. At twenty chains, came upon the water from which the birds obtained their supplies. It was only a small stagnant pool, a few inches deep, but being in sand gave promise of a soakage. However, a short examination satisfied me it was insufficient to supply the wants of even the sick and knocked-up camels and four men, for by this time we had only 1gall. left; therefore continued the search up the gorge and, in twenty chains, came to an impassable wall, and turned back disheartened so far as this gully was concerned. On the return journey and when within 10yds. of the small pool, when stepping upon what I supposed to be *terra firma* covered with a small grey creeper, carrying a blue flower resembling the forget-me-not *(myosotis)*, I suddenly found myself immersed to the knees in cool, refreshing water, and, on removing the creeper, discovered a limpid pool of excellent water, quite sufficient for all the camels and our own requirements; but the problem was to get them within reach of the water. I therefore made a careful survey of the configuration and face of the rocks, and finally decided that the camels could be got within reasonable distance of the lower water, and, with the aid of buckets and expenditure of considerable work, a drink could be obtained for them. Then at once returned to Mr. Murray. After some difficulty, got "Eringa" and "John" upon their feet, and, with Mahar, the above two, another camel, and three buckets, returned to the water; Mr. Murray to follow with the remaining camels directly they moved. On reaching the gorge, the camels seemed to know the water was there, for they livened up wonderfully, and without the slightest hesitation surmounted all obstacles, and in a few minutes were on the platform where I had decided it was unsafe to take them further. Gave these three camels 15galls. each, and hobbled them on the flat. Then returned to assist Mr. Murray and Vines in bringing up the others. They arrived at 4 p.m., and from that time until 9 p.m. we were fully occupied in supplying their wants. Then hobbled them all out on the flat and camped in the mouth of the gorge. Distance—by party, nine miles; self, five additional = fourteen.

Saturday, December 28th, 1895.—Camp No. 21. As the camels absolutely required a rest and some feed before again carrying loads, after scrambling and slipping about in the gorge, started for Ernaballa, where I shall spell then until Monday morning and then return to pick up Langman and the loading. Returned for some distance on yesterday's tracks to a leading gully south of Mount Ferdinand, hoping it would shortly trend in a northerly direction, and thus enable us to reach the water quickly. This, however, it did not do; and, being enclosed in the range, we were compelled to continue in a south-westerly course until the valley of the Ferdinand was reached. By this time we were at a greater distance from the water than when we started in the morning. Then struck direct for Ernaballa, hoping to reach there before dark, but at 7·15 p.m. were compelled to camp in dense mulga and bushes after having travelled twenty-four miles, when, had we been able to proceed on a direct course, it could have been made in nine miles. Mr. Murray very unwell during the afternoon and all night. Let camels go in long hobbles as we are close to water and they will make in under any circumstances during the night. The country passed over to-day consists of deep alluvial valleys formed by detritus from the surrounding hills from twenty to sixty chains wide, carrying (except in patches where the scrub is dense) a few mulga, cork and blood wood trees, with a strong undergrowth of Mitchell and bunch grass, edible bushes, everlasting flowers, and herbage of every description, but all excessively dry and so burnt up as to afford little or no nutriment to stock.

Sunday, December 29th, 1895.—Camp No. 22. Mr. Murray still being unwell, left him in camp; Vines, Mahar, and self going on tracks of camels, who had again rambled off. Tracked them to Ernaballa, where they had just arrived, and were fighting for possession of the best stand at the water. After they had had a satisfactory drink sent Vines back with six to bring up Mr. Murray, water-casks, &c., they arrived at 11·30. a.m. Mr. Murray still unwell, but slightly better. After lunch left camels on good feed. Walked out and examined country north of Ernaballa with a view to observe if a shorter route from the plain through the ranges could be obtained to the water than that followed by us during the past two days. Followed a leading gully in a north-easterly direction, and am of the opinion the water can be reached more easily from the plain in that direction, but, as I have not yet examined the country east from the valley of the Ferdinand in a southerly direction to camp where loading has been left, shall not decide until such is done; and to do so shall return *via* that route, and then bring up the camp through the gully examined this morning, when I shall have a knowledge of three distinct routes, embracing a radius of twenty-five miles around the Ernaballa Water (Glen Ferdinand). That this water is a permanent one I feel assured,

assured, although Mr. Carruthers in his 1890 report thinks otherwise, as from the appearance of his camel pad, where it crosses the main channel of the Ferdinand, I am satisfied that not only the main creek, but many of its affluents, have not been even in partial flood since the date of his departure, September, 1892; the pad being distinctly visible in many places in the loose shifting sand of the creek bed. Ernaballa Water is now, no doubt, much lower than when last seen by white men; the high-water mark now showing on the rocks being 3ft. above the present water level, and Giles' marked tree, which Mr. Carruthers' places at 60yds. from the water, is now 140yds. distant, but sufficient water is showing above the surface to supply the wants of upwards of 1,000 head of great cattle, and large reserves exist in the deep sand forming sides, ends, and bottom of the waterhole, which is fringed for a depth of several feet with a dense growth of bulrushes, from 5ft. to 10ft. high, with an average diameter of 1¼in. at the butt. In regard to pasturage for stock, the country surrounding and abutting on the Ferdinand is excellent, consisting of long and wide alluvial flats formed by the detritus from the surrounding hills, covered with good salt and cotton bush, mulga, prickly acacia, and other good fodder bushes, and, after rains, Mitchell and bunch grass, with herbage of every description. The country being unstocked, notwithstanding the protracted drought, all the above are plentiful, but so dry and withered as to afford little or no nourishment. After making the above inspection returned to camp. Smoke close to N.E. and N.W., but saw no natives. Distance, twenty-two miles. Mr. Murray still unwell, but improving.

Monday, December 30th, 1895.—Camp No. 23.—Left one pair of casks at water and started with all camels to return to Camp No. 20 for Langman and loading. Travelled in a south-westerly direction down the valley of the Ferdinand on east bank of the creek. Travelled on until 7·15 p.m. through dense mulga, on light red sandy soil with good bunch grass, when it became too dark to get the camels along. Camped on a strip of fairly good green parakylia, the result of a comparatively recent shower, which had covered a strip about six miles wide; this the camels ate with avidity. I therefore anticipate no trouble in mustering them in the morning. Distance, twenty-seven miles.

Tuesday, December 31st, 1895.—Camp No. 20 (revisited). Bar. 5 p.m. 27·80, attached ther. 97. Camels all in sight of camp at daylight, thus showing their appreciation of the parakylia. Started at 5·50 a.m., and, travelling over country similar to that described yesterday, viz , dense mulga—very trying to the temper and one's clothes—for six miles, when the western edge of the spinifex plain on which the camp is located presented itself; this was crossed in three miles and the camp reached; found all well. Distance, nine miles.

Wednesday, January 1st, 1896.—Camp No. 24. Bar. 10 a.m., 28·86.; attached ther., 99°. Resumed journey, Mr. Murray going on foot due north whilst I with the party kept to the north-east, making for the leading gully examined by me on the 29th ultimo. From Ernaballa camels travelled well after getting clear of the spinifex, but many of them, notwithstanding the greatest care on Vines's behalf, are developing bad backs. Travelled through one and a half miles open spinifex plain, few mulgas and bushes; then entered dense mulga with dry bunch grass herbage and a little parakylia. This continued two and a half miles = four miles to foot of range, when we entered the gully we were steering for, and struck Mr. Murray's track, and so learned he had failed to find a more direct route. In three-quarters of a mile overtook him, when he stated there was no passage for camels to the north. His notes are:—"Started on bearing 345° through spinifex and open mulga. At 0·7 miles leave spinifex and enter dense mulga, wire, and a little bunch grass. At three-quarters of mile Mount Ferdinand bearing 274° altered bearing 255°. At four and three-quarter miles struck pad bearing 320° through rather dense mulga; fair bunch grass." After Mr. Murray rejoined the party and at 6·3 miles altered bearing to 10°, at seven and a half miles to 357°, and ran up a narrow gully from twenty to thirty chains wide, with low porphyritic and sandstone hills on either side. Usual good vegetation in gully, but very dry. Hills covered with spinifex, stunted scrub, and other worthless bushes. At ten miles reached end of this gully, crossed low stony ridge, and entered dense mulga, which at ten a quarter miles became more open. Here altered bearing to 330°. At this point I left the party and walked on one mile to top of a hill to obtain a view of the surrounding country. Saw Tietkins' Birthday Creek and a long wide gully trending north-westerly by which I was satisfied we could reach the gully examined on the 29th ultimo, and thence to the water with little trouble, as hills which I knew to be west of Ernaballa were plainly in view. Then returned to the party and camped for the night.

Thursday, January 2nd, 1896.—Camp No. 22 (revisited). Resumed journey on bearing of 335°, travelling very open saltbush plain forty chains wide with low porphyritic hills on either side; this continued one mile, when hills closed in to eight chains and country became scrubby, with a few stunted corkwoods; here altered bearing to a prominent conical hill 316°, Mount Ferdinand bearing 293°. Continued through country as above-described, with addition of a little dry roley poley for three-quarters of a mile, when dense mulga was entered; also noticed a few freshwater titree *(Melalucca)*. At two and a half miles altered bearing to 262°, passing through saltbush, little roley poley *(Salsola kali)*, and bunch grass. At two and three-quarter miles bore 307°. At four miles altered to 265°, along flat, with hills close in on both sides; grass and herbage, with few stunted mulga, prickly acacia, and corkwood. At five miles saltbush flat, little mulga, and bunch grass. At six miles altered bearing to 240°, through mulga, roley poley, and bunch grass, all dry as tinder. At seven and a quarter miles altered to 257°, passing through open mulga, 50 per cent. of which was dead and lying on the ground; prickly acacia, bunch and wire grass. Here crossed a wide shallow watercourse carrying old dry Mitchell and bunch grass, roley poley, and a little cane grass. At nine and a half miles altered bearing to 266°; at ten miles to 230°; at 10·3 to 165°, the Ferdinand being five chains to our right, and followed the creek down to Ernaballa, which was reached at eleven miles from the spinifex plain camp, and which we had previously been forced to travel thirty-seven miles to reach; bearing of waterhole from Mount Ferdinand, 157°.

From 3rd to 8th January, 1896, party was camped at Glen Ferdinand recruiting camels and repairing saddles. Self and Mr. Murray were engaged in examining country and waters in the vicinity, result of which is embodied in reports. A large white gum close to water on east side of creek at Glen Ferdinand was marked—

S.A. to W.A.
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S.E., 87 M.

January 8th, 1896.—Camp No. 25. Resumed journey on bearing of 190° along Ferdinand Creek. At quarter mile altered to 203°, still following bank of creek through abundant dry grass, acacia, and other good bushes. At three miles altered bearing to 248°; at five miles to 227°, travelling through dense mulga and a little grass, Mount Ferdinand here bearing 91°. At seven and a half miles camped on the best acacia and mulga we have as yet had for the camels. Could have made a few miles further westerly as the camels were travelling well, but was unwilling to pass such good feed. Mount Ferdinand bears from camp 83° 30′, Mount Spec 312°. Dry thunderstorm came up at 4 p.m., few drops of rain. Two young natives insisted on accompanying the party from Ernaballa and camped close to us for the night.

Thursday, January 9th, 1896.—Camp No. 26. Bar. 9 a.m, 27·49°; attached ther., 91°; 3 p.m., bar. 27·38°, attached ther. 113°. Resumed journey on bearing of 227° travelling through prickly acacia and a little mulga, scanty grass and a little herbage forming the undergrowth. At one mile crossed a shallow watercourse running S.E. at 1·6 miles, low porphyritic hills close in on both sides. At 2·1 miles entered open patch of grass with a few scattered acacias. At two and a half miles mulga fairly dense, with a little roley poley and abundant dry bunch grass. Mount Ferdinand here bears 74° 30′. At 3·1 miles struck gum creek bearing 300° to hills and 125° to junction with the Ferdinand about three miles east. Here entered open country with plenty of prickly acacia, few mulga and bloodwood, dry grass, and abundant herbage. At five miles entered mulga with patches of saltbush. At six and a half miles altered bearing to 222°, travelling through open mulga, fair bunch grass, and a little saltbush. At eight and a half miles crossed small gum creek bearing about 210°. At nine miles altered bearing to 240°. At nine and three-quarter miles crossed a small gum creek bearing 155° and lunched. Resumed journey on bearing of 295°. At ten and three-quarter miles struck Carruthers' old pad to Owallina Springs, bearing about 270° through dense mulga; followed it for quarter mile, then bearing 300°, still through dense mulga At 12·8 miles struck creek and altered bearing to 295°. At thirteen and a half miles altered to 270°. At fourteen and three-quarter miles resumed bearing of 295°, passing through open saltbush, with patches of mulga and firm dark loamy soil, along course of the Officer (Giles) Creek. At sixteen miles hills narrowed in on each side and travelling became rough and stony for the camels' feet. At eighteen miles altered bearing to 4°, passing over stony inferior country, scanty mulga, bunch and wire grass. At eighteen and a quarter miles Mount Woodroffe bears 307°, and at nineteen and a half miles arrived at and camped at the Owallina Springs. Found these springs (?) to be difficult of access although approachable by stock, and not in position as shown on plan. Mr. Carruthers in his 1892 report describes Owallina as running water, and on his plan shows the creek on which they are located with a south-easterly trend through the ranges to its junction on the plain with the Ferdinand. We found its course to be distinctly south-west, the bearing of the creek from the springs (?) being 203° roughly speaking, 30° west of south, whilst instead of running water we found in the centre of a dense growth of high bulrushes a mere film of stagnant water, in no place exceeding ½in. in depth, the area covered by rushes being approximately ten chains by 40ft. At one time (two or three years ago) the water has been running strongly down the creek for many months for fully one and a half miles. After camping sank a hole in the creek bed below a shelf of limestone rock where the sand was moist and clear of bulrushes; in 9in. struck the water, and in sinking 1ft. deeper obtained a plentiful supply of good pure water for ourselves.

Friday, January 10th, 1896.—Camp No. 26. Bar. 9 a.m., 27·49°; attached ther., 91; 3 p.m., bar. 27·24, attached ther., 102. Threw out and logged up a hole in the creek for camels 15ft. x 6ft. x 2ft. deep. At 7 a.m. they were all satisfied, and, although they all drank freely, aggregating 300galls. between them, they failed to appreciably lower the water in the hole, and five minutes after they discontinued drinking it had risen to its standing level. It is therefore evident that large reserves of water are contained in the sandy creek bed, and in order to satisfy myself on this point I tried its depth and succeeded in putting a crowbar down 4ft. 6in. below the water level, and am confident the sand is still deeper and carries water throughout, but, notwithstanding this, I am fully convinced this so-called spring is simply a strong soakage, which, after heavy floods, presents the appearance of a spring for some months, when, if not replenished by rains, the surface water disappears and that which can be considered to be permanent (as this creek has not been in flood for three years) is protected from evaporation by the deep sand in which it is stored, and in this respect is similar to all the so-called springs I have so far inspected in the Musgrave Ranges, and even this water, should the drought continue during the present summer, will in my opinion, entirely disappear. Whilst writing on the subject of water, I would mention that in this district I found the information obtained from natives to be as unreliable as it is in other parts of Australasia where I have travelled. As an instance, when leaving Ernaballa for Owallina a young native was very anxious to attach himself to the party, and, pointing in the direction of Owallina, repeated the words "Karpi poondoo, cameli drink em, me show em. Ow, ow." He then very creditably drew a diagram in the sand showing a long waterhole and running water in a creek, and again repeated his words as above—which means, "Plenty of water for the camels; I will show it you. Yes, yes,"—with the result, as stated, we had to dig for every drop of water we obtained. That the aborigines give the information in good faith I have no doubt, as, judging from their own requirements, a small quantity of water suffices, and they, regarding us and our camels in the light of superior beings, imagine our requirements are not as great as their own. Their *bonâ fides* in this respect are also borne out by the remark of the same blackfellow who insisted on accompanying us, exclaiming when we reached a small unimportant rockhole "Karpi poondoo" with notes of admiration in his voice, and he appeared to be quite surprised and pained when I replied "Karpi wiya" (only a little water), when he could have no possible motive in deceiving us or in any way hope to effect his purpose did he so desire. Mr. Murray climbed the range, took bearings to Mounts Woodroffe and Ferdinand, and sketched in the true position of the Officer Creek and Owallina Springs (?), Men washing clothes; self patching boots; shall soon be barefoot, as I am wearing my last pair. The tablelands, hot sand, and rough hills travelled over between here and Oodnadatta having completely worn out two pairs. Mr. Murray has still one good pair in stock, whilst the men are also all wearing their last pairs.

From January 11th to 13th remained in camp at Owallina Springs preparing for flying trip to Lindsay's Extinct Mound Springs, south of Everard Ranges.

Monday, January 13th, 1896.—Camp, No. 27. Bar. 4 p,m. 27·72; attached ther., 98°. Started for the Mound spring, leaving Mahar and Vines to look after camels and camp. I had intended to leave only one man in camp, as Mahar's services would have been useful on the trip, but as the number of natives have increased considerably around our camp, and other arrivals are daily expected, I do not consider it wise to leave the camp unprotected during Vines's necessary absence, when hunting up the camels. After giving

Mahar,

Mahar, who is in charge of the depôt, instructions to be very careful and firm with the natives, we left on bearing of 174°. At 0·3 miles altered to 222° towards gap in hills, the Officer being five chains to N.W. At seventy chains Mount Woodroffe bore 307°, rough stony travelling through dense mulga, fair dry grass, and roley poley *(Salsola kali)*. Here passed much dead mulga and some young dead gum saplings in the creek—another evidence of the long-continued drought. At 3·2 miles altered bearing to 177°, at three miles Mount Woodroffe bearing 322°. At three and a half miles altered bearing to 168° along course of the Officer. At four miles bearing 186°, at four and a half miles 147°, Mount Woodroffe bearing 325°; very good saltbush, roley poley, with wire grass along course of the creek and on both sides, but all old and dry, also a fine belt of native cherry trees. At five miles Euenyarrina trig. bore 161°, Mount Woodroffe 326°. At seven miles, the Officer Creek being about twenty chains to east, stopped for lunch. Resumed at 1·15 p.m., travelling through bloodwood, corkwood, a few edible bushes, and a little dry bunch and wire grass, with an occasional bunch of Mitchell grass showing between. After clearing the range, which we did by passing over open alluvial flats running between detached porphyritic hills (not shown on Carruthers' plan). At ten miles from one of these hills Mount Woodroffe bore 331° 30″, Ferdinand (?) 26° 30′, Euenyarrina 162°, point of main range 74°, about four miles distant. Here altered bearing to 173°, and entered high dense mulga with a little dry withered grass. At twelve miles camped, as a smart shower fell, rain having threatened all the morning, but as we were travelling across clayey patches the heavily-loaded water camels slipped about so badly I anticipated disaster by one or more of them falling and severely injuring themselves if we continued travelling. The rain which caused our halt was trivial to the downpour which assailed us half an hour later (4 p.m.). Before 5 p.m. fully 1½in. had fallen, and steady rain continued all night. At 11 p.m. I awakened to find the rain still falling, and in the morning Mr. Murray informed me he had heard heavy thunder at 2·30 a.m. (Tuesday) from the direction of the Everard Ranges. As the previous storm came from there we hope for another one, and that a deluge has fallen in those hills and to the south, as if so it will render matters much more pleasant both for ourselves and the camels.

Tuesday, January 14th, 1896.—Camp No. 28. Bar., 9 a.m., 27·87; attached ther., 82°; 3 p.m., bar., 27·76; attached ther., 108°. Remained in camp; camels unable to travel over boggy ground.

Wednesday, January 15th, 1896.—Camp No. 29. Bar., 9 a.m., 27·82; attached ther., 84°. Resumed journey at 7·55 a.m. on bearing of 170° (general), as the mulga and other scrubs were far too dense to allow a straight course being kept. For one mile passed through fairly open mulga, with occasional dense patches; the undergrowth comprised good salt and cotton bush and a little bunch and Mitchell grass, which already showed the invigorating effects of yesterday's rain; occasional small patches of inferior country between, carrying low mulga with scarcely any foliage, the undergrowth being scanty and inferior wire grass. This class of country extended ten miles, when we stopped for lunch on a Bay of Biscay hole on a small saltbush flat, which contained excellent clear rain water, sufficient for all our camels, and to fill our casks. At 1·35 p.m. resumed on bearing of 172°; passed over the saltbush flat and entered fairly open mulga, with inferior wire grass and a few scattered bunches of good Mitchell grass. Then struck for a rise forming a prominent object in the sea of mulga which was nearly in our course; this was reached at 3·35 p.m.—4·2 miles since lunch—and we found a small rockhole containing 20galls. of water. Ascended rise and took bearings to Euenyarrina, Illillina, and Illbillie, and whilst taking these bearings noted some flat rocks thirty chains distant, bearing 84°; walked down to them and found a good rockhole, 20ft. x 4ft. x 4ft. mean measurement, the deepest part being over 6ft.; estimate it contains from 1,500galls. to 2,000galls. of water, and that it holds well, as, though filled by the recent rains, it evidently contained water before, as, although comparatively pure, it had a distinctly green tinge, and was slightly odorous, so that fully one-third of the water must have been standing for a long time. Distance travelled to-day, fifteen miles.

Thursday, January 16th, 1896.—Camp No. 30. Bar. 9 a.m., 27·88; attached ther., 88. Resumed journey at 7·22 a.m., taking our course direct for Illillaina, on bearing of 193°. Travelled over flat for ten chains to avoid sandhills, and then squared away on our course, over sandflats clothed with short green grass —so rapid is the growth in this district after heavy rain—open mulga, interspersed with other acacias, and good stock bushes. At 9 a.m., Euenyarrina bore 50°. At 10·5 a.m., the same hill, 43° 30′; Mount Woodroffe, 343° 30′. At 10·25 a.m., crossed the Currie Creek (native name, Earlywanyawana)—this creek is evidently very much out of position on plan—bearing 325° and 140°. Country traversed up to this, dense mulga, low sandhills running about N.W., with intervening sandy mulga-covered flats, averaging about twenty chains wide; grass and herbage generally of poor quality, with occasional bunches of good Mitchell grass *(Astrabele trinitacoides)*. At 11·20 a.m., Woodroffe bore 346°; Euenyarrina, 37°. At 11·50 a.m. entered sandy flat, covered with parakylia *(Portulaca)* of recent growth, perfectly green, fresh, and succulent. At 12·15, stopped for lunch, Euneyarrina bearing 34° 30′. Resumed journey at 1·35 p.m., on bearing of 193°. At 3 p.m., Woodroffe bore 349°. At 3·30 p.m. crossed narrow strip of firmer sandy soil, covered with limestone nodules. At 4·5 p.m., left small open patch of spinifex, half a mile broad, to west of line of march. At 4·10 p.m., Woodroffe bore 351°. At 5 p.m. altered bearing to 187°, in order to examine a prominent stony rise, showing up through the mulga, to S.E. of our course. At 5·45 p.m. camped, as heavy rain set in and continued through the night. Distance travelled, twenty miles.

Friday, January 17th, 1896.—Camp No. 31. Bar. 3 p.m., 27.81; attached ther., 96. Rain ceased entirely at 11·30 a.m. Then had camels brought in, pack-saddles dried, and, as the country ahead appeared to be sandy, at 2 p.m. resumed journey on bearing of 186°, travelling over flat sandy soil, dense mulga, 50 per cent. of which was dead, and added much to the discomfort of threading our way through it. That still alive was stunted and of poor foliage, with undergrowth of rough, poor-class wire grass. Touched edge of spinifex flat at 3·15 p.m., and then reached foot of the prominent rise we were unable to make last night. Mr. Murray and self climbed to the top 100ft. above base, and took round of angles as follows:—Illilla, 187° 30′; Woodroffe, 355°; Euenyarrina (?), 15°; Illbillie (?), 104° 30′. The two hills queried are doubtful, being enveloped in mist. From top of this rise noted what appeared to be a claypan, about half a mile north, which we had passed unseen owing to the denseness of the mulga. To this Harry was dispatched with water bags, and to see if there was sufficient for the camels, this being their fifth night without water. Harry returned at 4 p.m. and reported there was plenty of good water in a shallow, granitic basin (not a claypan as we supposed), and excellent feed on the surrounding sand rises. Therefore, camped on the high ground at foot of the rise, as heavy showers were falling to S.E. and N.E. Rain set in steadily at 7 p.m., and continued heavily all night. Distance travelled, three miles.

Saturday, January 18th, 1896.—Camp No. 31. Bar. 3 p.m., 27·81; attached ther., 96. Remained in camp, being unable to travel on account of heavy rain which fell steadily during night and up to 11·15 a.m. Sunday,

Sunday, January 19th, 1896.—Camp No. 31. Bar. 9 a.m., 27·98; attached ther., 89; bar. 6 p.m., 27·94; attached ther., 92. Remained in camp, unable to travel on account of rain.

Monday, January 20th, 1896.—Camp No. 32. Bar. 9 a.m. 27·96; attached ther., 9·2; bar. 3 p.m. 28·00; attached ther., 96. Resumed journey at 7·15 a.m., on bearing of 175°; travelled through dense mulga, 50 per cent. of which was dead, coarse wire grass (very green at butt), on loose red sandy soil, rendered firm by recent rains, with low red sandhills running nearly east and west at intervals of about forty chains; the dead timber lying on the ground making our course very devious and progress consequently slow. Undergrowth poor wire grass, with patches of spinifex, but country improves at three miles from the Illillaina group of hills (portion of the Everard Range), being low, undulating flats and rises, covered with a good growth of mulga, quondong (native peach), and other good fodder bushes; the undergrowth being still wire grass with occasional patches of excellent Mitchell grass, and fairly frequent patches of roley poley *(Salsola kali)*. At 12·30 p.m. stopped for lunch at rockhole where D. Lindsay formed his depôt, his camel pad being plainly visible. We found a pole erected by his party, which has fallen. The rockhole has been filled by the recent rains. Its dimensions are 30ft. x 15ft., by a mean depth of 4ft., the deepest place being 7ft.; but this area of water will, I have no doubt, be considerably reduced in a few days by evaporation, as, apart from the deeper parts of the hole, the basin is shallow. Resumed journey at 2·15 p.m., Mr. Murray going on on foot to ascend hills to obtain bearings. When striking for Lindsay's Rockhole, six miles east of Illillaina, self took on camels to abreast of hills, and then, seeing that Mr. Murray would be some time, I ascended a broken detached hill. Here found the bare surface of rock in many places quite wet, and in others a stream of water $\frac{1}{8}$in. deep several yards wide running for several chains. This, of course, was the result of recent rains, and probably will last only a few days. Further on, on one of the highest points, found a small rockhole 3ft. in diameter by 12in. deep, quite circular in form; it appears originally to have been a small natural depression in the surface of the rock, and has evidently been deepened and enlarged by the natives, as the marks of their implements, probably a stone of harder nature than the decomposing granite, are distinctly discernible, and, the position of the hole being otherwise hard of access, they have placed stepping-stones against the side of peak to render the ascent more easy. Then joined Mr. Murray, whose bearings are as follows:—"Ascended small hill bearing 200° from Lindsay's depôt and took bearings as follows: Woodroffe, 355°; peak at last camp (No. 31), 357° 30′; Euenyarrina, 14° 30′; Bonnybonninna, 105° 30′; Illilla, 252°." Rejoined camels, and resumed journey on bearing of 185°. Struck Lindsay's pad when he was travelling south to Tietkins' farthest north. This follows a line of granite ridges, and, leading us away from our course, we soon left it, and resumed our bearing of 185° to about five miles, when, finding Illillina was bearing 336°, and Lindsay's given bearing to his rockhole being 327°, bore off to south of east until nearly sundown, when we camped for the night, having evidently overshot the rockhole. Country traversed to-day generally poor, and has suffered severely from effects of the long drought; dense mulga, 75 per cent. of which was dead, very old dry herbage and little bunch grass, the principal undergrowth being poor-class wire grass; but the country will now rapidly recover, as the soil is generally of fair quality, and the late rains being heavy, and, so far as I can judge, general.

Tuesday, January 21st, 1896.—Camp No. 33. Bar. 9 a.m., 28·92; attached ther., 90. Gave all the water in casks to the camels, who drank heartily; then loaded up and ran due east until we got on bearing of 327° to Illillaina, and ran back on that bearing one mile, when we struck Lindsay's Rockhole. Whilst casks were being filled with good rain-water, Mr. Murray took bearings; I searched for and found the mulga tree marked DL, on west side of the rockhole. This was too small to carry our usual mark; therefore cut an H on a twin stem to that carrying Lindsay's mark, but did not measure hole, as Lindsay gives full description. Mr. Murray's bearings are as follows:—"From point twelve chains N.E. of rockhole, Illillaina, 324°; hill from which bearings were taken yesterday, 343°; Carmena, 69°; Bonybonninna, 80°; rockhole to point where bearings were taken (twelve chains N.E.), 252°." From which we find Lindsay's 5°, as given in his journal as the bearing he travelled on for six miles from this rockhole to his depôt, should be 345°. Resumed, on bearing of 172°, for the spring, camels travelling at the start at the rate of one mile in twenty-five minutes. Country traversed until 11·25 a.m. consists of open mulga flats, divided by low sandhills running about east and west. Here undergrowth and herbage was very inferior. Then entered open spinifex, with low, scattered mulga; this extended fifteen chains on our course and ten chains to east and west. At 11·55, Illillaina bore 236° 30′; Bonybonninna, 58°; and some rocky outcrops, about one mile and a quarter distant, 66°. These I shall visit on return from the spring. They are not mentioned by Lindsay, and are considerably to the east of his track. Then entered a jumble of low sandhills, trending a little north of west, covered with dense mulga and scrubby undergrowth, with a few clumps of water root; mallee on tops of the sandhills, the intervening flats carrying taller mulga of a better quality; but a large percentage of which was dead undergrowth, poor-class wire grass, patches of spinifex, and a few stunted poorly-topped quondongs—the smallest I have ever seen. Here there were also patches of limestone-rubble on the surface, at frequent intervals. At 12·55 p.m., altered bearing to 88° to examine a rocky outcrop; and at 1·5 p.m. struck a claypan, several chains in length and width, by about 3in. deep, containing good clear rain-water. Left party here to prepare lunch, and went on to examine the outcrop, half mile to the east, which proved to be of limestone, possessing no features of interest. A little further east (a few chains) a granite outcrop occurs, on which there were a few shallow rockholes, filled by the recent rains; these are of no value to any but aboriginals, as they contain only a few gallons each when full. Here, as at Illillaina, the natives had been assisting nature by enlarging and deepening these holes, as the stones which had been used to pulverise the granite were lying on the rocks adjoining the holes. The country traversed to reach these outcrops was of better quality, and carried good succulent saltbush, prickly acacia, and other good bushes. Rejoined the party, lunched, and at 2·20 p.m. resumed course, on bearing of 172°, travelling through open mulga and saltbush. At 2·35 p.m., passed more outcrops, half a mile to east, with natives' old encampments numerous on the adjoining flats. From a passing view they appear to be summer wurlies, and strengthen the opinion I have formed that one of their main waters is in the vicinity, which has been missed by Lindsay. I shall, therefore, make an exhaustive examination of this locality before finally departing, and after the spring has been visited; the line we are now on being unexplored, as we are considerably east of Lindsay's track when he returned to his depôt from the spring. At 2·40 p.m., Bony-bonninna bore 31°, Carmena 44°, Illillaina 339° (about). The country here is superior, being rich soil, with limestone rubble on the surface, carrying a good growth of mulga, prickly acacia, quondong, and a bush known in Queensland as whitewood, which camels and cattle eat readily and do well upon. At 3·8 p.m., entered sandy country; fair class mulga and a few scattered quondongs, with occasional patches of stunted spinifex.

spinifex. This continued one mile, when stronger, darker soil, covered with limestone rubble was crossed. Here the mulga, acacia, and other bushes were of lower growth, but more luxuriant foliage than on any of the country traversed this morning. Heavy shower passed us at this time to N.W., which would touch Illillaina. At 4 p.m., country was fairly open, with abundant various acacias, salt, and other good bushes, which is fortunate, as we are now close in to the spring, and this will provide a good feeding ground for the camels whilst we are engaged in boring. At 5 p.m., altered bearing to 95°, and descended into the valley, which contains the mound spring, and in a few minutes caught sight of the mound as described by Lindsay, when the storm, which had threatened a downpour the whole afternoon, culminated in so heavy a fall that before we could unload, we were drenched and standing ankle deep in mud and water. At 5·5 p.m., altered bearing to 50°, and at 5·8 p.m., camped; Bonybonninna bearing 29° 30′.

Wednesday, January 22nd, 1896.—Camp No. 33. Bar., 9 a.m. at foot of mound, 28·44°; attached ther., 90°; bar. 3 p.m., at foot of mound, 28·30°; attached ther., 106°. Mr. Murray and self walked across to, and examined the mound. Saw the tracks of Lindsay and his camels distinctly, and the place from which he had taken samples of the surface incrustation, although it was on 16th June, 1894—four years and seven months between the dates of his and our visits—but could see no trace of the spot where Mr. Lindsay states the natives had been digging for gypsum. This is probably covered by water which flowed into the swamp last night. We also found that, owing to last night's storm, the swamp was far too boggy to allow a loaded camel being taken across to the mound with the boring plant, and that, owing to the friable nature of the gypseous soil of which the mound is composed, the short iron stays supplied for securing wire guys to the derrick would be useless. Therefore, whilst Mr. Murray took bearings and aneroid readings, I returned to camp, fifty-three chains distant, and instructed Langman to cut sufficient black oak posts to stay the derrick and have them in readiness when the swamp was passable. Then rejoined Mr. Murray and we compared notes. The mound is almost circular in form with a top diameter of three and a half chains, height from base 15ft. We then examined the mound, swamp, and adjourning features closely, and regretfully came to the conclusion that, although water might be obtained by boring, it would not be artesian, and probably of very inferior quality, as the only resemblance we could discover to the mound springs surrounding Lake Eyre was the presence of gypsum, with an exceedingly faint deposit of saline matter on the surrounding swamp, whilst the fine powdery earth, impregnated with soda, magnesia, sulphur, and other chemicals, invariably found on such springs was utterly absent. We have both seen thousands of acres of similar swamps in the South-East and the West Coast, where artesian water, at shallow depth, or reaching the surface is unknown. To me this mound simply appears to have been portion of what at one time was a gypseous peninsula jutting into the swamp from what may be termed the main land, this peninsula being cut, not into one, but several mounds by action of wind and water, and thus offering a superficial resemblance to the Lake Eyre mound springs, which, on a close inspection, disappears. However, as there is a possibility of obtaining water, and we have travelled so far with a boring plant, I decided to bore. Therefore, at 5 p.m., finding the swamp sufficiently firm to cross, loaded two camels with plant, posts, and tools, and transferred them from camp to mound. Will erect derrick and begin operations to-morrow.

From January 23rd to 30th was occupied in putting down a bore at Lindsay's extinct mound spring and in packing water with camels. During this time an excellent rockhole, previously unknown, was found, which contained 5,500galls. of water. Position of this is shown on plan and result of boring operations embodied in reports.

Thursday, January 30th, 1896.—Camp No. 33. Bar. 9 a.m., 28·47; attached ther., 84°; bar. 3 p.m., 28·35; attached ther., 101°. Leaving Langman dismantling the boring plant, at 7 a.m. Mr. Murray and self started on bearing of 129° for a high point in a black range (probably sandhills). After crossing the swamp, found that the gypseous formation extended for three-quarters of a mile, when a jumble of low, red sandhills was entered. These were covered with a dense growth of inferior mulga, bastard wattle, stunted quondong, and black spinifex, the undergrowth being poor wire grass, the whole forming very inferior country. This class of country extends to the high range we were steering for, with occasional clumps of water-root mallee on the tops of the sandhills. The highest point of the range, which, as anticipated, proved to be sandhills covered with inferior mallee and mulga, was reached and ascended at 9·45 a.m. = five and a half miles. From this point we took bearings to Illillaina, 334° 30′; Bonybonninna, 10°; Carmena, 38°; Illbillie, 43°. We also obtained an extended view to N.E., N., and W., but to E., S.E. and S. the view was limited by another high ridge of sandhills, four miles distant. With the exception of the country situated to the west of our position, that overlooked has already been described in this journal. The view, extending fully forty miles over the unknown region was by no means exhilarating, for nothing but a rolling sea of mulga and other scrubs, growing on red sandhills and intervening flats, met the gaze, not a single point of interest rising out of this sea to relieve the monotony. Turning eastwards and south another high range obstructed our view. This bore 91°, and to this we proceeded, and from there obtained an extensive view of to E., S.E., and S., the country traversed to reach this point being most inferior for one mile, when a small patch of harder soil, covered with ironstone nodules, was crossed. Shortly after, some low ironstone outcrops, almost covered by the encroaching sand, were passed. These extended for a quarter of a mile, and the soil was evidently of a better description, as there were some exceptionally large and vigorous black oak *(Casuarina glauca)*, and here also noted quite a number of shell parrots, but, although we searched the surroundings most carefully, we found no water, and came to the conclusion that, the day being cool, these birds had come out some distance in search of seeds, &c. After passing these outcrops, the eternal sandhills and poor mulga again asserted themselves. We reached the top of the highest point of the ridge at 12·15 p.m., from whence Illillaina bears 324°, Bonybonninna 355° 30′, Carmena 32° 30′, From here the view to east was much more extensive, the horizon being open for fully thirty miles, but no change was noticeable—no prominent object met the eye, not even one sandhill rising higher than another—and the country appears to be absolutely waterless, as well as most inferior. Southwards the view was more prescribed, as ten miles off the sandhills are about the same level as the one we are standing on. No improvement was visible in this direction, and, as a practicable stock route on this line is evidently not obtainable, the examination was discontinued, and we started to return to camp on a bearing of 354°, travelling over spinifex and through dense mulga, very dry and withered, as we are now outside of the heavy rain line. At quarter of a mile passed a low limestone outcrop surrounded by sandhills, and altered bearing to 317°. Then crossed spinifex plain half a mile wide and one mile long, with a few scattered clumps of inferior mulga; Illbillie here bears 325°, Bonybonninna, 1°. Then entered comparatively level country carrying poor mulga, wire grass, and old dry herbage. At two miles crossed small patch with ironstone on surface, intermixed with quartz, on which grew black oak, acacia and quondong, very stunted and poorly topped. Here Illbillie bore

bore 329° 30′, Bonybonninna 17° 30′. Then again entered sand, dense mulga, and spinifex, which continued until we cut our outgoing tracks, reached camp at 6·45 p.m., having been on camel back eleven hours, travelling over the heaviest and most inferior country so far met on the trip. Our two camels were evidently very tired, as they laid down immediately they were let go, and remained much longer than usual before going off to feed.

From January 31st to March 20th were occupied in returning from Lindsay's Mound Spring to Owallina, and awaiting Mahar's return from Oodnadatta with rations and stores, a considerable quantity of which had been rendered unfit for consumption by rain and sultry weather. This time was occupied by self and Mr. Murray in examining all waters in the vicinity, the result of which is embodied in reports.

Friday, March 20th, 1896.—Camp, No. 37. Resumed journey westward at 3·45 p.m.; crossed the Officer, and ran it down for one mile, when we again crossed, and took up a course for Oolperkinta Springs, travelling through rough stony foothills to the main range, splendidly grassed with tussock and Mitchell grasses, herbage of every description, including excellent vetch and parakylia, and a few small patches of luxuriant saltbush. Travelled for three and a half miles, and then the prospect ahead for a good camp being unpromising, as we are running a gully which is rapidly narrowing and becoming rougher, at 5·30 p.m. camped on a small open grassy patch surrounded on all sides by dense mulga and other shrubs, bearings on which we travelled, after clearing Owallina Gap, at 0·3 miles 222°. At one and a quarter miles crossed Officer on bearing of 238°, heading for gorge, in which we camped.

Saturday, March 21st, 1896.—Camp, No. 38. Bar., 9 a.m., 27·84; attached ther., 73. Resumed journey at 11 a.m., travelling along the gully followed yesterday, which, contrary to expectation, instead of proving rougher and more difficult to traverse, afforded good travelling for the camels, by opening out into a wide deep alluvial flat, beautifully grassed and covered with green, succulent herbage, the larger growths being represented by clumps of good mulga, other acacias, bloodwood, and other innumerable good fodder bushes, in places so dense we had at times, but for short distances only, to deviate from our course. Stopped for lunch at 1 p.m., ten chains east of the Currie Creek (native name Earlywanyawana), the gorge in which the large rockhole is situated being three-quarters of a mile north. This I did not visit, it being too rough for cattle or camels, and we did not require water (the natives report it is now full to overflowing). Resumed at 2 p.m. on bearing of 259°, and continued on a generally westerly course for eleven miles (total distance) when we camped at 5·15 p.m. The whole of the country traversed to-day carries very excellent feed, in many places being exceedingly luxuriant, and no better pastoral country, with the same rainfall, exists in Australia. On some of the flats subject to inundation marching with and conterminous to the Currie, from half to three-quarters of a mile wide, saltbush was especially good and succulent, many of the plants being fully 10ft. high, and so tender and toothsome we had difficulty in getting the camels through. Bearings taken to-day at four and a half miles. Crossed gum creek not shown on plan, bearings 225°. At six miles crossed Currie. At seven and a half miles altered bearing to 270°. At nine miles to 215°, and kept same to camp.

Sunday, March 22nd, 1896.—Camp No. 39. Resumed on bearing of 270°, passing over country equally as good as that traversed yesterday, pasturage of every description being abundant, with good open mulga, prickly acacia, and other fodder bushes. At one and a half miles crossed the Levinger Creek, having to run it down several chains south of our course to get loaded camels over. Here, in addition to the generally excellent pasturage, gigantic saltbush was plentiful; creek bears S.W. from hills. At seven miles lunched, on a good strip of parakylia, on which the camels regaled. Just prior to lunching, passed a small rockhole five chains north of our course; it only contained a few inches of stagnant water. When full it holds 3ft., with a capacity of about 150galls., and will be useful to travellers on this route after a shower. Resumed at 1·38 p.m., on bearing of 290°, passing over good strong soil, and through open mulga, excellent grasses, good salt and cotton bushes and parakylia. At seven miles crossed a large gum creek issuing from Jacky's Pass; continued on through open mulga on rich soil clothed with very abundant vegetation of every and the best description. At nine and a half miles struck a creek coming from hills east of Mount Davenport (not shown on plan), bearing 340°, on which, at 6·40 p.m., we camped, it being too dark to travel, in abundant grass, roley poley, and good camel bush of every description. Mount Davenport bearing from camp by my compass 320°, by Mr. Murray's 318° 30′. Travelled since lunch eleven and a half miles, total eighteen and a half. Bearings on which we travelled for the day—At 10 a.m. altered to 275°, at 11·5 a.m. to 256°, at 11·30 a.m. to 293°, at 1·38 p.m. to 290°, which was continued to camp.

Monday, March 23rd, 1896.—Camp No. 40. Resumed journey at 8·20 a.m. When on bearing of 235° we struck to clear gap in foothills. Continued on this bearing for 0·3 mile, then on 305° for 0·3 mile, then altered to 270° for 0·6 mile, then to 280° for one mile, then to 317° for 0·8 mile, and finally to 60° for ten chains = three miles seventy chains, when Oolperkinta Springs were reached, and camels turned out and watered, and we camped for the day, as I wish to examine the water. Country traversed to-day similar to that passed over yesterday, but slightly rougher and more stony. Slopes of the range covered with stunted pine, tussock, bunch and wire grasses, extending to the summits, which here run from 200 to 700 feet high. I noted with surprise there was no spinifex on the hills. Oolperkinta Springs (?) are located at the head of the Oolperkinta Creek which debouches from the range about one and a quarter miles S.W. from Mount Davenport. The water first issues from a small gorge coming from the face of a hill of rough decomposing porphyry about 500ft. high. There are two distinct soakages, one being 40ft. up the face of the hill, the other and main one on a level with the gorge which afterwards forms the Oolperkinta Creek. The water from the upper soak is simply an ooze which, after trickling over a bare rock, is lost in the detritus at foot of the hill; the water at the lower level is running strongly for a distance of fifteen chains, and in that length forms three fair-sized waterholes in the rocky bed of the creek. It then disappears in sand, and re-appears, still running strongly. A few chains further down forms another fair waterhole, and this is repeated for thirty chains from the hill where the water takes its rise. At present there is sufficient to supply the wants of a large herd of thirsty cattle, and during ordinary seasons this water, in my opinion, may be relied upon as permanent, but in a season of drought the supply will be very considerably lessened. The country surrounding Oolperkinta is magnificently grassed with kangaroo, Mitchell, and tussock grasses, and herbage of every description abounds. The growth of timber is not so good, the pines which cover the hills being sparsely scattered and of scanty growth, whilst the white gum in and fringing the creek, although green, healthy, and vigorous, are stunted and crooked. I also noticed two milk bushes growing close to the water, the first I have seen since leaving the tablelands S.E. of the Alberga. Marked the largest white gum I could find close to the water on south side of the creek— S A to W A

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Tuesday, March 24th, 1896.—Camp No 41. Resumed journey at 9 a.m., on bearing of 240°, for Titania Springs; travelled down the Oolperkinta Creek through abundant kangaroo and a little Mitchell, tussock, bunch, and wire grasses, and very green well-grown roley poley *(Salsola kali)*. At 9·20 a.m. altered bearing to 247°; Mount Davenport bearing 37°, distant about two and a quarter miles. At 10·30 a.m. crossed large gum creek not shown on plan, and altered bearing to 265°; camels travelling at the rate of two miles in forty-eight minutes. At 12·15 p.m. lunched, three and three-quarter hours=nine miles. The country traversed to this point comprised rich red sandy soil, open mulga, splendidly grassed, and carrying good herbage, with occasional patches of exceedingly dense mulga and other scrubs, through which we had difficulty in forcing a way for the loaded camels; corkwoods here increased in size and straightness. At 1·50 p.m. we were on bearing of 270°. At 2 p.m. bearing 279°. At 3 p.m. 270°. Up to this the country traversed comprised open well-grassed mulga; then entered open plain, with scattered clumps of good acacia and other fodder bushes, extending to foot-hills, running out from the Mount Morris group of hills, and for several miles in a southerly direction. At 4 p.m. Mount Morris bore 343°. At 4·30 p.m. changed bearing to 296°. At 5 p.m. to 323°; and at 5·25 p.m. camped on a splendidly grassed flat, good herbage and fodder bushes of every description, bloodwood, corkwood, and bastard box. Travelled since lunch three hours thirty-five minutes = eight and three-quarter miles. Total for day, seventeen three-quarter miles. Mount Morris bears from camp 359°; Titania Spring, 276°.

Wednesday, March 25th, 1896.—Camp No. 42. Whilst camels were being loaded, Mr. Murray and self walked up to and examined the Titania Springs. Found them to be located in a small, rough gorge; the first water met with being twenty chains up the gorge from the flat on which we are camped. Followed water up to its source, where it oozes out from the side of a hill, about 200ft. above the level of the plain. At present there is sufficient good, pure water to supply the wants of 200 head of great cattle; but it is difficult of access, and under no circumstances can I imagine this to be a spring, all the evidence going to show it is simply a slight soakage, and, should no rain fall during the next two months, I have little doubt the water will entirely disappear. The timber in and surrounding the gorge, with exception of two magnificent native fig trees *(Ficus platypoda)*, consists of stunted pine, bastard box, and a few stunted corkwood. This alone satisfies me the water is not permanent, otherwise the timber close to the water would be of better growth. But from the dip and inclination of the hills and outcropping rocks on the flat, I believe that a good supply of fresh water can be obtained by sinking on the plain, at a spot half a mile out from the gorge in which the Titania Springs (?) exist. The native name of this water is Palaydidurra; it bears from Camp No. 41 276°. The two fig trees referred to resemble, in one particular, the banyan tree of East India, inasmuch as whenever a branch comes in contact with the ground roots are thrown out, and the tree reproduces itself without being detached from the parent stem, so that a perfect thicket is formed, affording on a hot day grateful shade to the weary traveller. The fruit in no way resembles a fig, except that it is full of seeds, as it is round, about the size of a cherry, and, when quite ripe, the colour of a pomegranate; it possesses a pleasant acid flavor. We searched for Giles' and Forest's trees here, but failed to find them, the timber being so small and the length of time elapsed since they were marked, the trees have probably decayed and fallen. Returned to camp, and at 8·30 resumed journey, and as I find that both Oolperkinta and Titania Springs cannot be regarded as absolutely permanent, decided, for the time, to leave the route as laid down on the plan and visit the Opperana Springs, which are situated about seventeen miles north from here, as the three natives who are still with us are most enthusiastic in their assertion that at Opperana, "karpi" is "poondoo" (water abundant); should this be the case and other circumstances favorable, the expense of well-sinking between Owallina will be obviated. Started on bearing of 350°. At one mile and a quarter altered to 312°, crossing over a fine plain, extending about four miles east, of rich red sandy soil, the vegetation upon it being so dense that the camels' feet hardly, if ever, came in direct contact with the ground. At one mile and three-quarters altered bearing to 329°, the team travelling at the rate of one mile in twenty-five minutes. At 2·1 miles Mount Morris bore 5°, distant about three miles and a half. At two miles and three-quarters crossed Moffatt's Creek, bearing 275°, and from three to five chains wide; heavy sandy bed, fringed with stunted corkwood, white gum, and bastard box. At three miles and a half Mount Davenport bore 100° 30′. At four miles altered bearing to 323°, left plain and crossed stony saddle in a fairly high chain of hills, extending from Mount Morris and connecting that group of hills with the eastern end of the Lungly Gully group. At five miles altered bearing to 8°. Have now cleared saddle and hill. and are running up a long leading gully, between two high chains of hills, leading into the Opperana waters This gully is well grassed, contains considerable herbage, some good saltbush, fair mulga and prickly acacia, and quite a forest of corkwoods; but the soil is not by any means as rich as that of which the large flats and plains traversed yesterday and this morning are composed. At 1 p.m. stopped for lunch, having travelled four hours thirty minutes=ten miles and a half. At 2·15 p.m. resumed journey, on bearing of 20°. At one mile altered to 17° 30′, which course was continued to six miles, when Opperana Springs were reached, at 5 p.m., the country traversed being similar to that described, after crossing the rough stony saddle, four miles north of last night's camp. Total distance to-day, sixteen miles and a half. When crossing the large rich flat this morning, noticed the three natives busily engaged in collecting and eating something I could not distinguish from the camel's back, therefore dismounted and went over to them. Then discovered they were regaling on berries closely resembling Cape gooseberries, in size, shape, and color. With accustomed hospitality, they selected some of the best and handed them to me with the remark, "Indutu miie" (very good food), and on tasting them I quite agreed with their ruling, the flavor being superior to that of the Cape berry, approximating closely to that of the rock melon. The plant bearing these berries does not grow so high as the Cape bush, being more of a creeper, has leaves of a pale green sage color, and carries a heliotrope-colored flower with yellow corolla.

Thursday, March 26th, 1896.—Camp No. 42. Bar., 9 a.m., 27·51; attached ther., 62° Rested camels one day whilst Mr. Murray sketched surroundings of Opperana, and I examined the water supply. Left camp at 8 a.m., and on foot examined Opperana Creek to its exit on plain, through the gorge, where it bears about 20° degrees, with hills extending about four miles north. Found water to be running for a distance of three-quarters of a mile from its source to where it disappears in sand. The greater part of this distance the water runs over bluish grey flat rock (slate), through which wide diorite dykes appear at irregular intervals. The water is running strongly, forming, in many places, good drinking holes of limited area and depth in the depressions in the rock. In two other places large, deep holes are formed by the sand being washed out where the creek bends under high cliffs in the gorge (east side), one of these being particularly deep and dangerous, as Mahar found to his cost by incautiously approaching too close to the bank,

bank, when the sand upon which he stood gave way, and it was only by quickly throwing himself upon his back that he escaped a ducking and maybe worse, as the hole is very deep and he informs me he cannot swim. From the large quantity of water running down this creek and the reports of the natives camped here, I consider this to be one of the most permanent waters yet examined by me in the Musgrave Ranges, although I cannot agree in the opinion that it is a perennial spring. The approaches for stock of every description is easy, and the surrounding country carries abundance of pasturage. I therefore consider that, although a day's direct travelling will be lost in making into this water, so slight a delay will not be regarded as detrimental by owners and drovers, when their stock can obtain a good drink, whilst, should the route be laid down direct from Owallina past Titania Springs, as instructed—there being no permanent water between those two points—a well would be required, which will entail expense. After examining the water I climbed the range, in order to obtain a view of the surrounding country. The altitude attained was sufficiently elevated to enable me to see Mount Olga and Ayer's Rock had the day been clear, but as the sky was overcast and a light rain falling, my view was limited to about twenty-five miles. In a northerly direction the country appeared to be fairly level, carrying open mulga, with small isolated hills cropping up occasionally. To the S.W. extensive well grassed plains occur between high chains of hills. These plains run in the direction of Day's Gully, so there is every probability of a good, easy route being obtained in that direction, when the line, as laid down on plan, will again be picked up. I shall, therefore, continue my examination across these plains and come out at Day's Gully, as, from present appearances, this appears to be the better course. On reaching Day's Gully, should I find the route between there and Opperana impracticable, I will strike back until my tracks are cut at Titania Springs. After returning to camp, wrote up journal and marked a large leaning white gumtree— S.A. TO W.A.

S.R.

OOLPERKINTA, 23 M.

S.E.

Friday, March 27th, 1896.—Camp No. 43. Resumed journey at 8·15. a.m., on bearing of 260°. At 9·30. a.m., entered eastern end of the gap, which was from thirty to forty chains wide, but was gradually narrowed by the approach of the hills which, at the western end, reduced the width to from ten to fifteen chains. Passed out of this gully at 10.40. a.m. = five and a quarter miles; and, on bearing of 250°, entered a fairly large, grassy, well-bushed plain. Up to this period the country traversed consists of good, red, sandy soil, abundantly grassed, but not of such good quality as that lying between Oolperkinta, Titania Springs, and Opperana, the vegetation consisting principally of fair class wire grass, kangaroo and Mitchell grasses being conspicuous by their absence. Herbage, however, is plentiful and of good quality, roley poley (*Salsola kali*), wild vetch, and leguminosæ abounding. Mulga is sparsely scattered throughout, with occasional patches of prickly acacia, bastard box, and strips of dense broom and dwarf wattle. On traversing the plain above-mentioned, found it to be splendidly grassed with kangaroo, bunch, and good spear grasses, with abundant roley poley, wild vetch, leguminosæ, and cape gooseberry. At 11·45. p.m., on bearing of 256°, passed a low granite rise on the plain. Here the three natives who still accompanied us were very anxious I should bear off to the right (N.W.), exclaiming "Karpi poondoo" (abundant water), and pointing to another rise about three-quarter miles distant. The distance being so short, directed Mr. Murray to continue on same bearing with the party, whilst I rode over to the outcrop, which rose about 100ft. above the level of the plain. On reaching its base, left my camel, who is young and tricky, in charge of one of the natives, ascended the rise, and found a small rockhole full of water, its capacity being not more than 10galls. On the western side of the outcrop, noticed the granite was perfectly bare for an area of about three acres, and on examination, found the natives had assisted nature in forming a catchment area by collecting and piling the loose boulders and stone on the face of the sloping rock into heaps, so as to afford a clear run for the water, and to my further surprise, I found that at the foot of the bare rock, where the alluvium joins, they had formed three embankments of granitic gravel and earth, the whole on the inner sides being faced with larger stones; the largest and lower embankment being three and a half chains long; the second, or middle one, two chains long; and the third, or one nearest to the bare rock, one and a half chains long. Between these three embankments two channels were formed, meeting at a point opposite a deep depression in the alluvium at the foot of the outcrop, and here a channel had been cut which further led the water into an excavation construction in the lowest point of the depression. This excavation was 6ft. deep, of an irregular shape, the mean of which would be 5ft. by 5ft., and at the side, where the natives descended to obtain the water when at low level, it was cut into unequal steps, and faced with granite slabs to prevent the friable soil from breaking away; the result of their labor has furnished the natives with an excellent native well, quite sufficient to supply the wants of a large party for several months, as the slightest shower on so good a catchment will add to its contents; but to the traveller with camels or horses, it is of little value, as it is not more than ten miles from Opperana (the native name of this well is Purlanna). A large party of natives were camped close to this water, and my guides were anxious I should pay them a visit, but as I wished to rejoin the party, I declined, and they left to rejoin their tribesmen. Mr. Murray's notes, after I left the party until we camped, are as follows:—"Here bore 256° towards Day's Gully, through strips of dense mulga with open grassy patches. At 12·15, lunched; travelled four hours; estimated distance, ten miles. Resumed at 1·25 p.m., bearing 256°, through open mulga and good grass for three-quarters of a mile, when mulga gets dense and grass gets lighter and scantier." At 5 p.m., camped at small rocky outcrop, after passing through strips of dense mulga with moderately good grass and herbage; mulga, with open grassy patches, extending to Lungly Gully's group of hills. Distance for day, twelve and three-quarter miles.

Saturday, March 28th, 1896.—Camp No. 44. Resumed journey at 8·10 a.m. on bearing of 255°, and at once plunged into dense mulga; this only lasted quarter-mile, when mulga became more open, with good grass, herbage, and leguminosæ. At one mile entered patches of spinifex, alternating with good grass and herbage, the spinifex growing on sandridges running about east and west, the intervening flats being covered with limestone nodules; this class of country continued to three and three-quarter miles, when dense mulga was again encountered, good green bunch grass and roley poley *(Salsola kali)* forming the undergrowth. This only extended quarter-mile, when a low spinifex sandhill was crossed, and these alternated with good hard sandy flats, open mulga well grassed, and with good herbage for one mile and a quarter (the flats averaging about ten chains in with) when fairly open mulga on red sandy soil, good bunch grass, roley poley and sparsely scattered broom bush was met with. This continued quarter-mile, when spinifex covered low sandhills, with broken limestone at foot, were crossed; these continued with red grassy sand flats intervening for one mile, when the sandhills gave place to a sandy flat covered with spinifex, no grass or herbage, but large

large well-grown desert oak. This class of country continued until 12·25 p.m., when, at ten miles from last camp, stopped for lunch. Resumed at 1·30 p.m., continuing through same class of country described for one mile and a quarter, when a small strip of better country, carrying good grass and roley poley, intervened. Here noted four large grass tree *(Xanthorrhea)*. This patch where crossed was not more than twenty-five chains wide, but it extended fully two miles = four miles to north and south, and widened considerably. After crossing this strip again entered inferior country of desert oak and spinifex, which continued to four and three-quarter miles from lunch camp, when we came out on a good patch of mulga, roley poley, and grass; and as it had been steadily raining from 11·50 a.m., and we were all wet through, and there was danger of our flour being damaged, I decided to camp and cover up loading (although I had hoped to make a longer stage), there being every indication of a wet night, with a further probability of our entering spinifex shortly.

Sunday, March 29th, 1896.—Camp No. 44. Bar., 9 a.m., 27·72; attached ther, 64°; bar., 4 p.m., 27·75; attached ther., 69°. Rained all day, secured loading and equipment, and remained in camp.

Monday, March 30th, 1896.—Camp No. 45. Bar., 9 a.m., 27·66; attached ther., 64°. Resumed journey at 10·30 a.m., on bearing of 255°, continued on this course for twenty minutes, when we took up a bearing of 225°, as the oldest of the three natives who are still with us got quite excited and exclaimed, pointing in the direction we were going "Kweeah camelli pika" (eat 'em, tumble down), from which I gathered we should meet poison bush on a bearing of 255°. The native then pointed on a bearing of 225°, and said "Camelli indutu," meaning in that direction the camels would be allright. Continued on this bearing for four and a-half miles, and then altered to 265°. As Day's Gully was showing plainly on that bearing, at 1·15 p.m.—six miles—stopped for lunch. The country traversed this morning is most inferior, undulating sandy soil, with occasional jumbles of moderately-sized sandhills, clothed with spinifex, desert oak, dwarf mallee, and a few kurrajong *(Sterculia)*, with no grass or herbage of any description, except a few stunted cape gooseberry bushes, not in fruit, and a plant in every way resembling the hydrangea, with clusters of bright yellow flowers, but much smaller and less fine than those on the pot-plants of cultivation. At 2·15 p.m., resumed on bearing of 265°, and travelled through very poor mallee, desert oak, kurrajong, and a few blood-wood, spinifex being the sole undergrowth for four and a half miles, when we struck a smaller patch of good mulga, water-root mallee, good grass, roley poley *(Salsola kali)*, and water bush, and as it was evident we would soon be enveloped in heavy rain, which had been falling for half an hour a short distance to the south-west and west, we camped. Total distance to-day, ten and a quarter miles. To-day we passed a large nest of green ants, the first I have seen in latitudes so far south of the tropics, although they are common in the Northern Territory, where their bite is more dreaded than that of the bulldog ant. The three natives still accompanying us, during the morning halted and began to energetically dig at the roots of some young kurrajong trees, and when I inquired the reason, replied "Miie indutu" (food good). My curiosity being aroused, whilst the team travelled on, I remained to supervise operations. On reaching a depth of 2ft. in the loose friable sandy loam, they came upon their "miie," which proved to be the roots of the young kurrajong. Whilst one was digging, the others had borrowed matches and started a fire, they soon had 6ft. of roots, averaging 1in. in diameter roasting on the fire, which, when cooked to their satisfaction, they stripped off the outer bark and handed to me about 4in. of a perfectly white substance, with the remark "Indutu" (good). This, on being tasted, in flavor exactly resembled a cocoanut. It was certainly much more fibrous, but, then, Australian natives are not very epicurean in their tastes, and they seemed to enjoy munching it as they travelled along. It unquestionably would fill a vacuum, and remain there for some time.

Tuesday, March 31st, 1896.—Camp No. 46. Bar., 7 a.m., 27·72; attached ther., 69; bar., 6 p.m., 27·62; attached ther., 79. Resumed journey at 8·55 a.m. on bearing of 265°; traversed red sandy soil covered with mulga, spinifex, grass, roley poley *(Salsola kali)* and a few kurrajong. This, however, extended only a few chains from camp, when we again entered desert oak and spinifex. At four and a half miles entered quite a forest of straight, well-grown desert oak, amongst which the lighter green of the kurrajong could be seen occasionally; spinifex formed the sole undergrowth amongst these trees. From a pastoral point of view the country is worthless. At five and a half miles approached foothills to the Mann Ranges, when country began to improve, roley poley *(Salsola kali)* and parakylia *(Portulaca)* being sparsely scattered between the spinifex; there were also quite a quantity of edible bushes, notably quondong, dwarf acacia, and waterbush. Here altered bearing to 253°, Day's Gully sub. trig. pile being distinctly visible from the plain and bearing 261°. At five and three-quarter miles Mount Whinham bearing 293°. At seven and three-quarter miles entered a good patch of mulga, parakylia, bunch, spear, and Mitchell grasses, the latter being especially green and flourishing; lunched here at 12·15 p.m. A light shower fell at 12·30 p.m. Journey resumed at 1·25 p.m. on bearing of 262°; travelled through excellent grass for half-mile, then small patches of spinifex intruded, but the country was vastly superior to that traversed yesterday and this morning. At three-quarters of a mile from lunch camp, altered bearing to 219° to clear point of foothills; the gully for which we had been steering proving, on nearer approach, to be impassable to camels. Country as above described to twelve miles from last night's camp, when an exceedingly good flat, with excellent grass, herbage, and edible bushes was traversed. At twelve and three-quarter miles rounded point of hills and altered bearing to 258° for three-quarters of a mile; then bore 270° for quarter-mile; and then altered to 290°. At fifteen miles we bore 270° degrees for quarter-mile; then left good flat and again entered spinifex, with large belts of desert oak showing half-mile to south. At fifteen and a quarter miles left spinifex and again entered good low mulga, good bushes, excellent Mitchell grass and herbage, with small patches of spinifex at short intervals. At sixteen miles altered bearing to 292°, passing through mulga and splendid varied grasses, some of which are unknown to myself and all other members of the party; herbage of every description green and flourishing. At sixteen and three-quarter miles camped on flat opposite Day's Gully, on excellent camel feed; Day's Gully sub. trig. bearing 2°, about two miles distant. Hours of travel, six hours forty-five minutes.

Wednesday, April 1st, 1896.—Camp No. 46. Bar. 3 p.m., 27·72; attached ther., 82°. At 7·30 a.m. Mr. Murray and self left camp on foot to examine water in Day's Gully. Soon entered the gorge, which narrows rapidly, and is moderately rough, with rocks and boulders brought down by floods, and which have rolled down from the precipitous sides of the hills abutting on either side. Found Gosse's post, which, on the south side is marked STG. PT. CLAIM 344/74. On north side DAY'S GULLY. ↑ This bears 182° from Day's Gully sub. trig. pile. Five chains further N.W. struck the first water, which was contained in a shallow, sandy hole in the bed of the creek. The water was clear, pure, and fresh, and, being easy of access, will suffice not only to replenish our nearly exhausted casks, but to give the camels a good drink should they be so disposed. Followed the creek up, and at five chains came to running water. This

This extended for fifteen chains, when the gorge bifurcated, a little water coming in from the N.E. branch, whilst a strong stream was running down the one from N.W. At the meeting point a considerable body of water was collected in depressions of the here rocky bed, which, in some instances, were 3ft. deep. Followed up the N.W. branch, which is the smaller of the two, but contains the most water, to where it issues from the face of a precipitous sandstone hill 500ft. above base of the plain (ten chains above bifurcation of the gorge). Found the water was issuing from numerous fissures from 3in. to 6in. wide in flat, stratified, grey sandstone. Thus, the water in Day's Gully is now running strongly for a distance of half a mile, in which length it forms many from small to fair-sized waterholes, but it is open to great stock for only half that distance, the top end of the gorge being innaccessible to domesticated animals other than sheep or goats. The gorge presents a pleasing aspect, with the sparkling water trickling down its rocky bed, and in other places running over clear sand; but it is by no means clear to me that this water is permanent, as, with the exception of a few small ferns and an occasional tuft of small ordinary rushes, there is a marked absence of aqueous vegetation, and the present quantity of water is, to my mind, accounted for by the January rains, which we met at Owallina. These have evidently been much heavier here, and have been supplemented by the very heavy thunderstorms which have fallen in these ranges during the past three days. However, during ordinary seasons sufficient water may be relied upon to supply the wants of a large herd of passing cattle during winter months, and the gorge being narrow, with a steep gradient, an ordinary storm in summer will certainly leave a considerable supply in the lower holes, so that this water may be regarded as a valuable one to drovers, more especially as the soil of the extensive flat opening out from the gorge is superfine, and carries an abundance of excellent feed, kangaroo and spear grasses prevailing, whilst wild vetch, leguminosæ, and roley poley *(Salsola kali)* are plentiful and good, with occasional small patches of Mitchell grass; good open mulga, prickly acacia, and native cherry abound, and all are good fodder for cattle, upon which, when green and succulent, they rapidly improve in condition. After completing examination of Day's Gully climbed the range at lowest point, and descended into the next gully westwards, which appears to be much larger and more important than Day's Gully. After thirty-three minutes' climb, the top was gained, and from that elevation water could be seen meandering down the creek, which is about two miles S.W. from Day's Gully, sub. trig. Descended the range, entered the gully, and crossed to the creek, which we found to be densely wooded with dwarf fresh-water titree *(Melalucca)*, with a few bastard box, stunted scattered pines, and some good clumps of native cherry growing on the wide and deep alluvium, forming the flats adjacent to the creek. Ran this creek up into the range, and found as we advanced that the water was running more strongly than where we had first struck the creek, that the timber improved in size and vigor, and bastard box gave place to white gum; many good holes were met, which contained considerable bodies of water, and these culminated at the foot of a waterfall, 15ft. high, flowing over the face of a bare rock, completely blocking the whole gorge to further progress of all stock; we surmounted the difficulty by climbing the here precipitous sides of the range until the obstacle was passed, when we again descended, re-entered the gorge, and followed up the water, not to its point of issue from the hills, as it became almost impracticable, but sufficiently so to convince me a valuable water exists here, as there are some good rockholes in which the water was running more strongly even than where it falls over the rocks into the large hole to which we now returned. Here I stripped, plunged in, and swam across to the waterfall, enjoyed an excellent shower-bath, and then swam over and bottomed the hole in every direction, the result being that it was found to be 8ft. 6in. in the deepest places—in many places 7ft.—from whence it shallows gradually to zero. The water covers the whole width of the gorge, which here is 150 links wide, and the hole extends the same length down the gorge, from where it flows in a strong stream down the creek. Then followed the creek down to where it debouches upon the plain; passed the spot we first struck the creek, and found the water continued running to a point one and a half miles below the waterfall, when it disappeared in the sand, which, however, was wet and springy for five chains further down the creek. In this distance many fair holes are formed, one specially fine one being four chains long by one-third of a chain wide, with an average depth of 18in., with sandy bottom and sides, in which probably a good soakage will remain after surface water has disappeared. From the above it will be gathered that at the time of inspection a large volume of water is available for stock in this gully, but it must be remembered my inspection has been made under the most favorable circumstances the present season being an exceptionally good one, but in any case I opine water will always be found in the head of the gorge above the waterfall, the difficulty in dry seasons being to render it available for stock. A magnificent reservoir could be constructed in the gorge at a point some chains below the hole at the foot of the fall, where the gorge is narrowed by approach of the hills on either side, whereby an absolutely permanent supply would be ensured at, allowing for cost of cartage, a comparatively moderate cost, by erecting an embankment, the water thus conserved being conducted lower down the gorge by gravitation to a line of troughs to be built on a spot easily accessible to great cattle. A noticeable feature of the hills abutting upon this and Day's Gully is that instead of being clothed with worthless spinifex they carry excellent grasses, chiefly kangaroo grass, right to their summits, whilst on the alluvial flats intersecting the hills, and extending for a considerable distance into the mulga-clothed plain south of the range, superb feed obtained, when it is met by desert oak and spinifex with occasional patches of better country intervening, extending in one direction to Lungley's Gully, and in another to the Deering Hills. Then returned to camp, reaching there at 1·15 p.m. the inspection of the two waters having occupied us five hours twenty-five minutes, during which time we had walked six miles. The bush described as native cherry in no way resembles the native cherry growing in districts south of Adelaide, as the foliage consists of a sage green broad and elongated leaf; it rarely exceeds from 8ft. to 10ft. in height; the leaves are tender and succulent, and are greedily eaten by our camels, many of them coming to a dead stop on reaching a bush; the fruit when ripe is purple in color, is about the size of white heart cherry, the flesh being viscid with a pleasant semi-acid flavor. The small black ants which abound here are an appalling nuisance; all food has to be surrounded either by water or hot ashes to protect it from their enterprise, and until after sundown the camp-stool and table at which I was writing, to protect me from their attacks, were surrounded with hot cinders. Night calm, clear, cool, with 25 per cent. of cloud, light, high, and fleecy.

Thursday, April 2nd, 1896.—Camp No. 47. Bar. 9 a.m., 27·76; attached ther., 69°. Resumed journey at 8·50 a.m., on bearing of 250°, for half a mile, then crossed the creek issuing from the western gully. At two and a half miles, on bearing of 267°, crossed gum creek (not shown on Carruthers' plan) coming out of range, and, ten chains further west, another and smaller one issuing from the same gully. At three and a half miles passed some fair-sized claypans, containing pure clear water, four chains

to

to south of our course. They are not deep, and, being close to main water, did not stop to examine them. At five miles crossed a small polygnum flat, with a fair-sized clump of gums, half a mile to north, under the range, on west side of the gap. Here there is a good site for a well. Also noticed quite a quantity of blue-bell flowers. Did not examine the gums for same reason as the claypans. At six and a half miles mulga became slightly more dense, but was sufficiently open to afford good travelling; and under the trees, interspersed with good grasses, were masses of purple everlasting flowers. These grew so thickly and were in such bloom they covered the whole surface of the ground with a purple flush, and were evidently appreciated by my camel, who, when I stopped to make notes, ate them with gusto. As we advanced through this mulga it became more dense, fully 25 per cent. of it being dead. This retarded progress, Mr. Murray and self having to wait repeatedly for the team; therefore, in order to avoid the mulga, altered bearing to 285°, travelling immediately under foot of the range. At eight and three-quarter miles left the mulga and entered an open grassy flat, with a few clumps of bloodwood, mulga, and prickly acacia, where, at 12·30 p.m.—three hours forty minutes travelling—we stopped for lunch. With exception of a small patch of spinifex, a few chains wide, the whole of the country traversed this morning, including the dense mulga, was splendidly grassed, and, except in its densest portions, edible bushes of infinite variety were abundant, kangaroo grass being especially so, and more vigorous than I have seen it in any other locality; in specially favored spots it was most dense and fully 30in. high. The country extending south to the Deering Hills is apparently equally good. Resumed at 1·20 p.m., on bearing of 280°, and at 0·6 mile from lunch camp crossed a wide, shallow gum creek, with wide inundated flats on the east side, over which a heavy flood has recently passed, leaving a large quantity of drift in its track. Immediately after crossing this creek entered spinifex, which was crossed in ninety chains, when low mulga, good grass, parakylia *(Portulaca)*, and excellent bush were again met; this, with occasional small patches of spinifex, extended to five miles and a quarter, when larger patches of spinifex, amongst which were struggling for existence a few plants of grass, roley poley *(Salsola kali)*, and annual saltbush, low scattered bloodwoods, and some fairly foliaged prickly acacia. At seven miles the country improved, as spinifex occurred in only narrow strips; good mulga, acacia, other good fodder bushes, grass, roley poley, and parakylia predominated. At seven and three-quarter miles the country on our course was still good, but desert oak and spinifex could be plainly seen half a mile to south. From this point the country deteriorated, as wide patches of spinifex intruded on the better land, when, as night was falling, we turned off to a belt of mulga and bloodwood, a few chains off our course to N.W., half a mile distant, and camped for the night. Morning travel, three hours and three-quarters = eight and three-quarter miles. Afternoon, four hours five minutes = eight and three-quarter miles Total, seventeen and a half miles.

Friday, April 3rd, 1896.—Camp No. 48. Resumed journey at 8·20 a.m. on bearing of 280°. Immediately on leaving camp plunged into spinifex with a few mulga and corkwood affording inferior pasturage, amongst desert oak and spinifex, thirty chains to south and extending apparently right to the Deering Hills. This continued for three and a quarter miles, when open good mulga was entered, the undergrowth being good grass and excellent herbage, including parakylia, with occasional small patches of spinifex, desert oak and spinifex still showing to south, the good country extending to twenty chains north, when it meets southern slopes of the Mann Ranges, which here is not of great elevation, the sides of the hills being covered with kangaroo and wire grass, and a few scattered pine and corkwood. Trew's Gap sub. trig. here bore 307°; the good country proved to be only three-quarters of a mile wide, when we again entered poor spinifex on red sandy soil which carried no other vegetation for two miles, when a little parakylia and a few fodder bushes were noticed. This extended to six and a half miles, when a good belt of mulga, interspersed with bloodwood, corkwood, water bush and broom, the undergrowth being wire grass, excellent parakylia, purple everlastings and marguerite daisies was met and crossed in one-third of a mile, when spinifex again asserted itself (Trew's sub. trig. here bearing by Mr. Murray's compass 335°, by mine 336° 30′) with an occasional cherry tree and bunch of parakylia, neither of which appeared to be at ease amongst the uncongenial surroundings. This extended one and a quarter mile when good open mulga, wattle, wire grass, well-grown parakylia, roley poley, annual saltbush and other salsolæ came in. This improvement continued one mile, Trew's sub. bearing 347°, when a deep fairly wide gum creek, not shown on Carruthers' plan, bearing 205° south and 20° north, was crossed. It has recently been in flood, new drift being visible on flat country on both sides of the creek. There was no water where we crossed, but some would probably be found in the rocky gorge from which it issues for a considerable time after rain. Resumed on bearing of 285°, continuing through same good mulga, which, as we progressed, became still better, Mitchell grass being abundant. This continued three and three-quarter miles, when a fairly large gum creek, not shown on plan, was crossed bearing 35° north to hills and 250° south to plain, the channel being narrow, but deep, with fine sand in creek. This could be traced with field-glasses for several miles, but apparently does not extend to the Deering Hills; on the overflow ten chains to S.W. of our course there was quite a plantation of saplings from four to six years old; after crossing this creek again entered spinifex. This only lasted a half mile when good country was again reached, open mulga, grasses, and herbage as previously described, parakylia being especially good and abundant, and purple everlastings more numerous than elsewhere. Here altered bearing to 295°, having rounded that portion of the range jutting out west of Trew's Gap. At one and a half miles further took up bearing to what I suppose to be Mount Mann, 331° 30′ (doubtful), three-quarters of a mile on altered bearing to 305°; at eight and three-quarter miles from lunch camp reached western edge of the good country, and as spinifex and desert oak presented themselves dead ahead, and it was 5 p.m. we camped and headed camels back on to the good feed. Morning's travel, 4h. 15m. = nine and a quarter mile; afternoon, 3h. 40m. = eight and three miles = eighteen miles.

Saturday, April 4th, 1896.—Camp No. 49. Bar., 3 a.m., 27·37; attached ther., 81. Resumed on a bearing of 284°. At once entered spinifex on open plain; crossed it in one hour five minutes = two miles; it proved to be slightly superior to the spinifex passed through yesterday, as parakylia and other herbage with a few fodder bushes extends into it for half its width. On leaving this spinifex a good belt of mulga was entered, the undergrowth being Mitchell, bunch, and wire grasses, abundant parakylia, vetch, leguminosæ, and various salsolæ, but no true saltbush; this was crossed in twenty minutes = thirty chains; then passed through spinifex and desert oak with sparse parakylia; this extended two and three-quarter miles, when we came out on a magnificent strip of kangaroo grass, on rich dark loamy soil, subject to inundation. Where crossed it was not more than eight chains wide; to north it extends to hills distant one mile, and widens to forty chains; to south its limit is twenty chains, width about the same. Crossed this and entered mulga, corkwood, good fodder brushes, grass and roley poley, and stopped for lunch. Travelled two hours forty minutes

minutes = five and a quarter miles; the camels travelling slowly through the spinifex. Resumed at 1·35 p.m., the good country continuing. It, however, was not more than twenty chains, and extends to foot-hills, which we are now skirting. Here noticed quite a number of young and vigorous Sturt pea, not yet, but soon to be in bloom; in the lower north this plant rarely flowers until July or August. Continued through this country until 2·35 p.m. = two and a quarter miles, when, as heavy showers were falling to north, south, east, and west, within half a mile of our position, and a heavy thunderstorm was rapidly approaching, we hurriedly encamped in order to get all saddles and flour under cover. Just as this was completed the rain came down, and those without coats were drenched before the tent could be erected, and then just as all was snugly secured rain ceased, and the sun shone out hot and strong. Travelled three hours twenty-five minutes = seven and a quarter miles.

Sunday, April 5th, 1896.—Camp No. 50. Bar., 9 a.m., 27·60; attached ther. 63°. So much time having been lost on account of rain, determined to travel to-day, and resumed journey at 8·20 a.m., on bearing of 296°. Travelled over the good flat on which we were camped for one and a quarter miles, when a low saddle in spur of the range was crossed. Then ran up a narrow gully with small gum creek lying a few chains to north on N.W. and S.E. trend; pasturage of every description plentiful, vigorous, and green, with stunted pine and corkwood on slopes of the range, which also carries wire grass to its summit. This gully extends three-quarters of a mile, and at its head a small patch of true saltbush was found; then crossed another low saddle and entered spinifex with limestone rubble on surface; this only lasted a few chains, when open mulga and good pasturage was again entered, but grass and herbage was not so abundant as on the previous flat. The one we are now traversing is also very narrow as spinifex approaches to within ten chains of our course on the south side, whilst fifteen chains to north the hills rose abruptly from the plain, here carrying only a little rough wire grass and stunted spinifex. Here altered bearing to 346°, with a gum creek bearing 241°; as we advanced the good country widened, and well-grown saltbush flourished. At four and a half miles we were abreast of Lake Wilson, passing it on eastern side, distant one mile. Here crossed a strip five chains wide covered with a dense growth of ordinary rushes, green and vigorous; no water on surface, but would probably be obtained at a shallow depth, excellent pasturage still continuing. Crossed two small gum watercourses close together; shortly afterwards the gully narrowed and became rougher; mulga and pasturage still good, but not so abundant. At 11·30 a.m.—six and a half miles—left camels as the gorge became too rough to travel them further with safety. Directed Mahar to keep a sharp lookout and prepare lunch whilst Mr. Murray and self—well armed, as the natives were numerous and demonstrative on the adjoining hills—proceeded on foot to examine spring or soakage located in this gorge. Directly after leaving the camels the gorge divided, one branch running 320°, the other 280°. First examined the former, and, finding no water, crossed over to the latter. Examined this also to its head, and, finding only a small quantity of water in depressions in the rocks, collected from recent rains, ran the gorge back towards the camels, keeping in the main channel, which was densely wooded with dwarf titree, and 40yds. below where we had struck the branch came on the water, which proved to be only a slight soakage at the foot of black basaltic rock in the main channel of the creek, which here does not exceed twenty-five links in width, the mean contents of the hole containing water being 6ft. x 4ft.; the greatest depth of water above the sand is 6in.; greatest depth of sand, 6in.; after which solid rock is met, so that at no time is there more than 1ft. of water. The above is the top water. Seven chains lower down a slightly larger and deeper hole was met, which in a good season (which now obtains) might furnish sufficient water for twenty horses for two or three months, but as a watering place for a quantity of stock it is absolutely worthless. At 1·5 p.m. resumed journey by running back down the gorge to the plain, and again passed along east side of Lake Wilson, keeping clear of the lake, which, being salt, I did not examine. When crossing a narrow sandy watercourse running into the lake, in which native tracks were recent and numerous, found a strong soakage, which, however, I do not consider to be permanent. Here took up a bearing of 200°, travelling over good red sandy soil carrying fair grass and herbage. This was crossed in one and a quarter miles, when spinifex was entered, which, however, is intermixed with a fair quantity of parakylia. At one and three-quarter miles entered long low sand rises covered with dense spinifex, where, although parakylia does not cease entirely, it is much more sparsely scattered. These rises also carry fairly open mallee of a peculiar variety none of the party have seen elsewhere, the timber of which is stunted and crooked, in no case exceeds 3in. in diameter, and is very brittle. The leaf is light-green and very broad; is young, succulent, and tender; and, although the camels had been on good pasturage last night and it was yet early in the afternoon, they ate the leaves readily. I am, however, doubtful if they would be content with it for a whole night. At two and a half miles entered small clumps of kurrajong. Here all parakylia disappeared, the sole undergrowth being spinifex. At four and a half miles entered a small patch of mulga and roley poley *(Salsola kali)*, with some well-grown bunches of parakylia, and, there being no prospect of obtaining a better spot for the camels, camped for the night. We are now, owing to visiting spring (?) in the gorge, very little west of our last night's position. Travelled seven hours thirty minutes with camels; one hour forty-five minutes on foot seventeen and a half miles. From the above it will be seen the line traversed from Day's Gully to the spring (?) is unsuitable for a stock route, and as I had doubts of the latter being permanent as we travelled I carefully examined the country to southwards with field-glasses from every available elevation in order to obviate the necessity of striking back should my anticipations prove to be correct, as, although a considerable quantity of spinifex country will have to be crossed in a more direct line, in my opinion the line should run as direct as possible from Day's Gully to Teizi Spring, as from observations I am convinced there is a greater quantity of mulga and consequently better pasturage on that line, in addition to a saving of eight miles in distance.

Monday, April 6th, 1896.—Camp No. 51. Resumed journey at 8·25 a.m. on bearing of 250°, the hills of the Teizi group in the Tomkinson Range being plainly in view. Passed through the clump of mulga we had camped in in a few chains, and again entered spinifex, which continued for one and a half miles, interspersed with fair parakylia, roley-poley *(Salsola kali)*, and occasional small patches of Mitchell grass *(Astrabele trinitacoides)*, also a few wattle and native cherry, with belts of desert oak to south-east. At two miles passed through small clumps of very young kurrajong *(Sterculia)*, with spinifex *(Triodea)* forming the sole undergrowth. At three miles we were abreast of the Tomkinson Ranges, and were running up a wide gully leading into that range; spinifex still prevailing, but mulga, with good grass, fifteen chains to left. At four miles cleared the spinifex and entered fairly good mulga, fair class wire grass, roley poley, and well-grown parakylia *(Portulaca)*. A considerable portion of this mulga was old, lofty, and 20 per cent. dead, which, however, was being rapidly replaced by young trees. The gully we are traversing is about thirty-five chains wide from hills to hills, the slopes of the hills being covered with a dense growth of mulga, which

which is vigorous and reach to the summits of the hills. Here altered bearing to 210°, and as we progressed the gully became more narrow and very rough; mulga was more dense, purple everlastings more plentiful, and the surface of the ground strewn with broken sandstone and grits; this culminated in a deep, rough, narrow, rocky, mulga creek, surrounded by a jumble of low, rough, mulga-clothed hills. After crossing the creek selected the lowest and least rough hill; this being surmounted and descended, another creek, not so deep, but equally rough, presented itself; the low jumble of rough hills still continuing, but carrying kangaroo and bunch grasses, purple and yellow everlastings forming the remaining undergrowth. On crossing the next series of low hills, open country to the S.W. was visible, but still a number of low, rough hills lay before us. These were crossed, and level country reached at 11·30 a.m, our course for the last one and a half miles being necessarily very sinous. On the S.W. slopes of the hills we have just cleared were a few stunted pines and crooked corkwood. The plain we are now traversing stretches one and a half miles S.W., with a N.W. trend towards Teizi Hill. Continued journey through bunch grass, kangaroo and Mitchell grasses, roley poley, and leguminosæ, all being green and most luxuriant, to a fine clump of box and cork trees, and native currants; many of these clumps being scattered about at irregular intervals, imparting a pleasing and park-like appearance to the scene. Left the party here, directing Mahar to prepare lunch, whilst Mr. Murray and self rode over to and examined head of the gully, as we were doubtful if there was an outlet in that direction. Found our surmise was correct; therefore shall have to alter course and pass through a gap to the S.W. Then returned to party; lunched, and at 12·45 p.m. resumed journey on bearing of 156°, Teizi Hill bearing 278°. Crossed plain on which the same excellent vegetation continued, varied by occasional small patches of spinifex. Reached low foothills fringing gap in three-quarters of a mile, on ascending which dense mulga carrying good undergrowth, extend'ng well to the south, was observed. After crossing foothills entered a narrow gully, which led us into another plain similar to and equally as well grassed as the one we had just traversed. Here picked up large hill which we suppose to be Mount Davies, but we are too far off to be certain as to pile. Here altered bearing to 256°, and continued for four and a half miles; then turned northerly 360° to a large gum creek, where party was left, and Mr. Murray and self went on and examined water; found some good holes half a mile up the creek, and, as I wish to examine waters in this locality, returned to and brought up the party to the water, where there was excellent pasturage for the camels, and camped for the night. Distance, twelve and a half miles.

Tuesday, April 7th, 1896.—Camp No. 51. Although the evening and night were cool, calm, and clear, with not a cloud visible above the horizon, I was wakened at 1 a.m. by falling rain, and hurriedly roused the camp to cover up saddles and stores; this was soon effected, but it was far too dark and wet to stumble around and erect tents or flies, so we patiently laid down in the rain, which continued intermittingly until daylight, when it set in steadily and continued until 9·30 a.m. It then ceased, but the clouds remained very low, and were heavily charged with moisture. During this time we had erected tent, and I was employed in making up journal from field notes. After rain ceased Mr. Murray ascended range, and by a series of bearings to Mounts Hardy, Bryson, Davies, Gosse's Pile, and Teizi Hill, determined that Teizi Spring, as shown on Gosse's plan, is identical with the Crowther Springs of Sir John Forrest, at which we are now camped; as they are situated in the same creek about one mile apart, will in a good season or after a heavy rain, form a connecting stream of water. On Mr. Murray's return from the range he and I traversed both branches of the creek, and found that the main one, which bears 260°, contains the most water; it was running strongly for upwards of one mile above our camp, in which distance several good holes are formed in the sandy bed of the creek, all of which are accessible to stock, the only impediment being dense dwarf titree and rushes, through which they can easily break their way. After traversing the main creek examined the smaller branch running N.W., in which Teizi Spring is located; here also found a considerable body of water, but not so much as in the first creek. In this, as in the larger creek, fresh-water titree, rushes, and other aqueous plants grow in dense masses, and the white gums fringing the banks and growing on adjacent alluvial flats are lofty, of good girth and foliage; it is therefore reasonable to assume that a considerable body of water may be relied upon for nine months of the year in ordinarily fair seasons; and even in excessively dry seasons I am of the opinion that by excavations in the sandy bed of the creek sufficient water will be obtained to supply the wants of a fair-sized herd of cattle. I have also little doubt that should this resource fail a good well could be obtained either on the creek or on the alluvial plain a short distance out from the range. In regard to pasturage, fairly wide flats run from the plain into the range on both sides of both branches of the creek; these carry excellent feed of infinite variety, the hills abutting on these flats being covered with a mixture of spinifex, wire, and kangaroo grasses, the latter predominating. On completion of the above examination returned to camp, reaching there at 3·5 p.m. Marked a large white gum tree on east side of the main branch of the creek, well up in the gully, and twenty chains from the nearest water—

S.A. TO W.A.,
S.R.,
DAY'S GULLY,
56M.
E.

Distance travelled—camels, nil; Mr. Murray, eight miles; self, four miles = twelve miles.

Wednesday, April 8th, 1896.—Camp No. 52. Resumed journey at 9 a.m., on bearing of 80° for one-quarter of a mile, 125° for ten chains, 170° for half a mile, along the creek, when we had cleared range and were well out upon the plain. At one mile and three-quarters changed bearing to 278°, travelling over rich red sandy soil, forming a plain of considerable extent, densely covered with vegetation of every and the best description, but very little timber or bush, until at two miles and three-quarters a series of low stony hills was reached, when belts of mulga, wattle, and broom appeared. The plain then narrowed into a gully, from twenty to thirty chains wide, beautifully grassed; roley poley, other salsolæ, and herbage being also numerous, with occasional clumps of mulga, corkwood, prickly acacia, and native currant, and small patches of *Euphorbia Drummondii* (poison), the gully occasionally narrowing for a few chains and then again becoming wider, until at three miles its width was about forty-five chains. Here altered bearing to 285°. At four miles hills closed in again and mulga became more dense. Soil still composed of rich red sandy loam, with abundant grasses, wild vetch and roley poley, but no parakylia, although that valuable plant was abundant on country traversed yesterday. At four miles and three-quarters the gully again widens out to a plain, fully two miles wide, which is magnificently grassed, with clumps of mulga, corkwood, native currant, and cherry, dotted about at irregular intervals. Here altered bearing to 270°, and parakylia once more became abundant and of large size, dense mulga, and a few stunted pines on slopes of hills. At five and three-

three-quarter miles left plain and entered a narrow gorge with dense mulga. This immediately opened out into another good plain, with fairly open mulga, good grass, and excellent herbage, including well-grown parakylia and purple everlastings. At 12·25 p.m. crossed a small polygnum swamp, containing a deposit of wet mud, surrounding vegetation being plentiful and green. At 12·35 p.m. stopped for lunch, Gosse's pile bearing 201°, Mount Davies 233° 30′, high hill 314°, about three miles distant. At 1·30 p.m. resumed on same bearing, viz., 270°. At three-quarters of a mile good grasses and herbage gave place to poor quality wire grass, low scrubby mulga, and mallee, and spinifex. This continued to one mile, the soil still continuing to be sandy loam, but stiffer and less rich, mulga fairly dense, of poor foliage, with 30 per cent. dead or dying. This fortunately only extended to one and a quarter miles, when the soil and vegetation improved, and we were again passing over magnificent pasturage. At two and a quarter miles Mount Davies bore 200°. Here mulga is fairly dense, but grass is still good and plentiful. At three and three-quarters miles a change again occurred, mulga giving place to low broom. This extended a few chains, when spinifex was again met. This carried no grass or herbage, but better country obtains to north and continues on same line as our course. At four and three-quarter miles good mulga and grass was again the order of the day, with low broom, mallee, and wattle fifteen chains to south. This extended to seven and a half miles, when low scrubby hills covered with broom and wattle were encountered, the undergrowth being a little speargrass, annual saltbush, and purple everlastings, sparsely scattered through black spinifex. Here the surface of the ground was covered with ironstone nodules intermixed with broken limestone and flints. As we advanced through this the spinifex became more dense, until there was hardly a spot a camel could place his foot without stepping upon the sharp spines, and this sorely troubled the long-suffering animals. Fortunately this strip was narrow, as we crossed it in less than half a mile and again entered fair mulga grass and herbage, which soon developed into splendid pasturage, equally as good as the majority of that passed through between this point and Owallina. We are now running up a long leading gully, its average width being one-third of a mile, and being enclosed on either side with high sandstone and porphyritic hills. Camped in this gully on excellent camel feed at 5·55 p.m., Mount Davies bearing 126°, Gosse's Pile, 105°. Distance travelled, sixteen and three-quarter miles.

Thursday, April 9th, 1896.—Camp No. 53. Resumed journey at 8·15 a.m., on bearing of 270°, travelling up the long leading gully camped in last night. This carried from fair to good grass and herbage, and was intersected by a network of narrow shallow watercourses, in which grew rank, course, inferior vegetation. At one and a quarter miles this gradually opened out into a plain three miles wide, the soil of which, unlike the majority of the plains traversed since entering the Musgrave, Mann, and Tomkinson ranges, is composed principally of clay, with ironstone nodules sparsely scattered over the surface, the subsoil being limestone marl, as is shown when brought to the surface by rats and other burrowing animals. It is consequently less absorbent of moisture than the red sandy loams, and the vegetation, although abundant and good (bunch, Mitchell, and kangaroo grasses, and a grass resembling barley grass), is more patchy and less green although the heavy and general rains have evidently fallen over this plain. Of herbage there is little, parakylia and everlastings being the only representatives. From the mouth of the gully for a distance of two miles the plain is perfectly devoid of timber, except where a few clumps of mulga fringe it on the northern side abutting on the foothills of the range. At two miles open mulga extends right across the plain, which here is not more than two miles wide, although Carruthers' plan shows it to be eight miles wide at this spot. This continues for three quarters of a mile, when the soil changes to an inferior yellow loam covered with limestone nodules; mulga and good pasturage gave place to a few bushes of dwarf mallee and wattle; all grass and herbage ceased, and spinifex of the worst description lay before us. Half a mile further on, scrubby wattle and native currant became fairly dense and spinifex less so, and in another half a mile the soil changed to low red sandy undulations with fairly open lofty mulga and other well-grown acacias, with good grass and fair herbage, spinifex still continuing a few chains to north; shortly after mulga became more dense, spinifex ceased entirely, and vegetation generally improved. At one and a quarter miles altered bearings to 350° for a few chains to escape from the dense mulga which hampered our progress, and issued on to an open plain fifty chains wide to north, and extending to foot of the range, Here the soil much improved and carried excellent Mitchell grass *(Astrabele trinitacoides)* and parakylia with numerous small patches of kangaroo and abundant roley poley. The greater portion of this plain is perfectly level and destitute of timber, only a few currant bushes growing at wide intervals apart; as we advanced the plain increased in width until it was fully three miles in extent. At nine and a half miles we stopped in a small thicket of mulga for lunch, Mount Hinckley bearing 285° and about four miles distant. This will be the last lunch we shall eat on South Australian territory for some time unless we meet a West Australian Government party, as we are within a very short distance of the boundary of the two provinces, viz., longitude 129°. Resumed on bearing of 270°. At 1·15 p.m., continuing over similar grasses and herbage for half a mile, when the boundary was crossed, and we were in the province of West Australia. At three-quarters of a mile entered very open mulga, where the vegetation was equally good in quality, but much more patchy, bare ground covered with ironstone nodules being plentiful. These patches would be very boggy after rain, bore a general resemblance to the tablelands south and east of the Alberga, but was less stony, and intermixed with the ironstone nodules were a few water-worn pebbles. At three and a quarter miles the mulga became slightly more dense, and formed a fine belt extending across the plains from hills to hills; excellent pasturage of every description still abundant, but patchy. At five miles plain ceased; it is therefore ten miles long, extending east and west, with an average width of one and a half miles. Then entered a series of low hills S.E. from Mount Hinckley. At half a mile crossed a small box creek, and at fifteen chains another one, having to run down ten chains to obtain a crossing for the loaded camels; these hills are covered with a fair growth of bunch grass, annual saltbush, and a few leguminous plants. After crossing creeks resumed course over a good open flat ten chains wide. At three-quarters of a mile a rough jumble of stony hills was met, and we entered a long leading gully, in the centre of which was a titree creek. This being too rough for camels halted party, whilst Mr. Murray and self examined the gorge on foot; ran it up to within twenty chains of the range. Found no water or signs of spring or soakage and, as there was no possibility of a valuable water higher up, it being too rough to allow of ingress of stock, we returned to the party, and resumed journey by continuing on through the jumble of hills, the small grassy flats between them affording good travelling. At 5·25 p.m. camped on good camel feed, having travelled eight hours ten minutes = seventeen and a half miles.

Friday, April 10th, 1896.—Camp No. 54. Having slightly twisted my ankle when scrambling up the rough gullies yesterday, sent Mr. Murray to examine Harriet Springs, the gullies being too rough to admit the passage of camels. He left at daylight and returned at 8 a.m. The following is extracted from his field-book:—

field-book:—"Examined all gullies to S.W. of Hinckley, and found all dry; approximating to where Harriet Springs are shown a hole 2ft. 6in. deep in sand alongside a shelving rock, where the blacks obtained water after last rains." I also learnt from Mr. Murray that the natives had deserted their encampment close to these springs (?) for a considerable time. I am not very disappointed at the absence of water here, as when approaching the hills in which the spring is located I was not favorably impressed with the prospect of finding permanent water, and as a watering place is not required here, although if present it would, of course, be very useful. Resumed journey at 8·45 a.m. on bearing of 280°, continuing to skirt the range on south side, passing through from open to fairly dense mulga, fair grass and roley poley *(Salsola kali)*; the former green, the latter semi-dry, the soil being composed of stiff yellow clay, with sandstone and quartz rubble on surface. At one and a half miles caught first glimpse of Mount West bearing 255°. At one mile further altered bearing to 285°; soil and vegetation as above described. At one and a half miles soil improved, carrying good true saltbush, mulga, Mitchell and bunch grasses, roley poley, and purple everlastings, and a few clumps of mallee. At two miles mulga became less dense and Mitchell grass *(Astrabele trinitacoides)* increased in quantity and quality. At two and a quarter miles crossed a large box creek, which also carried a few well-grown vigorous white gum, with a general trend to south and S.W. It issues from the range N.E. from a high bluff hill, and appeared much more promising for water than any of the gullies examined yesterday and this morning. Therefore halted the party, as dense mulga and jumbled hills lay ahead, whilst Mr. Murray and self ran the creek up to its head (three miles from where we crossed). At one and a half miles north the creek bifurcates. Examined both branches most carefully, but found no water or indications of a soakage. Returned to party at 11·30 a.m.; lunched, and at 12·15 p.m. resumed on bearing of 283°, travelling through fair open mulga, Mitchell grass, roley poley, and leguminosæ, but all patchy, a large percentage of the ground being bare of vegetation and thickly strewn with sandstone and quartz rubble. At one and a quarter miles from lunch camp passed some small patches of good kangaroo grass, in depressions where water had been collected; here Mount West bore 200°. At two miles passed through scanty parakylia *(Portulaca)*; Mount Hinckley bearing 83°, Mount West 194°. At two and a half miles crossed an open flat carrying good Mitchell grass and a few scattered corkwood; this extended to two and three-quarter miles; then entered a small belt of dense mulga, with only fair undergrowth, and at three miles crossed another small flat with good Mitchell grass, leguminosæ, and well developed parakylia, open mulga a few chains to south. Mount Hinckley here bearing 88°, Mount West 177°; then headed for Mount Aloysius on bearing of 201°. At three and three-quarter miles the soil became firmer, less absorbent, and vegetation less luxuriant; mulga, corkwood, and acacia all being stunted, scrubby, and of poor foliage. At four miles good grass and herbage was again plentiful, with many good camel bushes on light red sandy loam. At six and three-quarter miles soil became poorer, grass deteriorated in quantity and nutritious qualities; but heavy rains had evidently fallen here, as purple everlastings were abundant. Here the mulga also became scrubby and more dense, and fully 50 per cent. was dead and lying on the ground, rendering travelling difficult and painful to the camels; soil was also covered with small limestone and quartz rubble, amongst which were many quartz crystals. At seven miles passed through good patches of roley poley. At seven and three-quarter miles the soil again improved, bunch grass predominating, with various fodder bushes, leguminosæ, and excellent green roley poley; mulga was less dense and of better quality. At eight and a half miles we were in country as above described; but a wide patch of spinifex was in evidence a few chains to south. At nine miles light-red sandy soil carrying abundant leguminosæ, purple everlastings, and other herbage; spinifex still in view, and continuing to south. At nine and a quarter miles good pasturage gave place to spinifex. At nine and a half miles crossed a high red sandridge densely covered with dwarf titree and spinifex; then across red sandy undulations on which the sole vegetation was spinifex; this extended to nine and three-quarter miles, when bearing was altered to 277°, and soil became firmer, with limestone outcropping on surface. This, however, was only a few chains wide, when another high red sandridge was crossed, from the top of which the prospect was by no means inviting, as apparently nothing but a jumble of red sandy rises clothed with dense spinifex lay before us, right to the foot of the Aloysius group of hills; and as there was a good patch of mulga, grass, and roley poley at foot of the ridge, camped for the night. Mount Hinckley bears from camp 102°, Mount West 141° 30′. Distance travelled by camels, thirteen and a half miles; Mr. Murray and self on foot when searching for water, twelve miles = twenty-five and a half miles.

Saturday, April 11th, 1896.—Camp No. 55. Resumed journey at 8 a.m., on bearing of 350° for twenty chains to avoid high sandridge, which was crossed at lowest point, when another and higher one rose a few chains off to N.W. Selecting the best place, crossed and awaited arrival of party, and when they came up continued, on bearing of 315°, travelling over red sandy undulations, on which the sole vegetation was dense spinifex; this extended one mile, when dense mulga, 50 per cent. of which was dead but still standing, was entered, the undergrowth being good quality wiregrass, a little speargrass, and abundant roley poley, with small patches of dwarf spinifex. This class of country continued to foot of Aloysius, which was reached at two and three-quarter miles from last night's camp, when we struck a fair-sized box and gum creek issuing from the hills. Leaving our camels at foot of the hills Mr. Murray and self ran this creek up on foot, selecting the main (northern) channel first; examined it to its source, but found no water, then crossed a ridge and entered the smaller (western) branch; soon came on traces where water, impregnated with magnesia, had been running some weeks previously; this was succeeded by wet sand, and a few chains further on we came upon a fair-sized hole in sand and rock, containing sufficient water to supply all our wants; but we shall have to carry it about ten chains to fill the casks, the approaches being too rough to admit a heavily-loaded camel returning down the gorge, although with a little trouble unloaded camels can be taken right to the water and obtain a good drink. Examined the western branch of the creek to its head; found the water to be running for a distance of half a mile above the hole where we first struck the water. In this length it forms several small holes, but with exception of one, in addition to the lower hole, they were all in rocky depressions, consequently there is no soakage; and the two holes which contain sand are not sufficiently deep to last for any length of time, therefore this water cannot be regarded as permanent, although it will be useful, as it will probably run for about three months after rain, after which time it would probably be difficult to obtain a drink for a few horses or camels. This is demonstrated to my satisfaction by the fact that we sank a hole in a spot where damp sand was showing at a spot accessible to loaded camels, and in a few inches water was struck; when the hole was sufficiently deep to dip, an ordinary bucket cleaned it out, and then the water flowed in on all sides at a rapid rate, but when we began filling the casks the supply gradually decreased, until one man was occupied two hours

hours and eight minutes, baling the water by a quart pot in the bucket to obtain sufficient to fill three 25gall. casks; it is therefore evident the reserve water in the sand is by no means great, and the rocks in the creek bed are not sufficiently pervious to admit of a quantity of water being stored. The nearest permanent water easterly from here is at Teizi Springs, distant forty-eight miles east by south; it will therefore be necessary to provide water in or about this locality, and, judging from the dip and nature of the rocks of which the hills are composed, it is probable a good well would be obtained at no great depth about three-quarters of a mile S.E. from the gorge; but so far as I have examined the country in the immediate vicinage there is no site for construction of reservoirs. Distance travelled—Mr. Murray on foot, six miles; self on foot, four miles; camels with party, two and three-quarter miles.

Sunday, April 12th, 1896.—Camp No. 55. Had camels brought in, attended to, and kept in camp until hottest part of the afternoon, then sent them to water; none drank more than 5galls., the majority less, at which I was not surprised, as last night they were on excellent parakylia, and a leguminous plant from 18in. to 2ft. high, which was very succulent and which they appear to prefer to even their much-loved parakylia. As this will be a useful water, although by no means permanent, I marked a large box tree growing four chains west of the branch of the creek in which the water is located which bears from the tree (the lower waterhole) 286° half a mile distant, the tree being marked

S.A. to W.A.
S. R.
TEIZI WATER,
48 M.,
E. by S.

Monday, April 13th, 1896.—Camp No. 56. Resumed journey at 8·55 a.m. on bearing of 200°. At three-quarters of a mile bore 177° until the point of the range was cleared. Then at one and a quarter miles altered to 202°, and travelled along a fairly-sized box creek issuing from near Mount Aloysius (on S.W. side). In addition to the box, mulga, and corkwood fringing the channel and growing in the alluvial wash, there were quite a number of black broad-leaved wattle, in a measure resembling the wattle obtaining around and south of Adelaide, but they are much larger, many of them attaining a height of from 25ft. to 30ft.; the bark on the younger trees is sage green and smooth, on the older ones it is black and rough, the leaf in both cases being light-green, and it is, I have no doubt, the black wattle referred to in Lindsay's journal; if so a good well should be obtainable in the vicinity. The undergrowth consists of good spear, bunch, and wire grasses, parakylia, leguminosæ, and roley poley *(Salsola kali)*, all abundant, green, and vigorous, on a rich red sandy loam. This extended for two miles, when bearing was altered to 255°. At two and a quarter miles another large box and gum creek was met coming out of the range in a south-westerly direction, and as it appeared to promise well for water, halted the party, left the camels, and then, on bearing of 25° for quarter of a mile examined creek. Here found a sandy soakage where a large party of aborigines had recently been encamped; this however was now perfectly dry, as we found many holes excavated by them in the sand reaching down to the bed rock, none of which contained water. This soakage is located in the mouth of the wide gully down which the creek meanders, the soil of the gully on either side of the creek being excellent, carrying abundant pasturage of every description. Ran the creek up one mile further, when the gully, bearing 320°, narrows into a gorge which speedily became so rough as to be inaccessible to the generality of stock. Followed this up, and soon came upon traces of where water had recently been running, and at one mile further on the same bearing arrived at the only water in the creek; this consisted of a small soakage in sand and rock, which at the outside will not last more than fourteen days without being replenished. It is therefore practically valueless to others than natives. Then returned to party. Resumed journey on bearing of 255°, and continued on through rich soil and vegetation as that previously traversed this morning. This continued for five miles, the mulga generally being open, but in places it became so dense, with such large quantities of dead timber lying on the ground, as to render our course devious. Stopped for lunch at 12·30. Resumed at 1·30 p.m. on bearing of 270°, and at a quarter of a mile entered open broom, 75 per cent. of which was dead and completely withered. It is therefore evident that this line of country has also been subjected to the disastrous drought which was ended by the January rains. In addition to the broom there were a few corkwood, dwarf mallee, and a good undergrowth of roley poley and speargrass. This extended a quarter of a mile, when good open mulga on rich red sandy loam, carrying excellent herbage in addition to the above-mentioned grasses, leguminosæ being especially plentiful, vigorous, and green. This continued to two and a quarter miles from lunch camp, when the soil became firmer. Here excellent wild vetch, roley poley, leguminosæ, and speargrass luxuriated under good open mulga. At two and three-quarter miles entered a spinifex flat. At three and three-quarter miles met sandhills running N.E. and S.W., covered with dwarf titree and spinifex. These hills alternated with sandy spinifex flats for five and a half miles, when dense mulga, extending one mile to north and skirting south slopes of the range, lay before us. At seven miles, finding that spinifex continued dead ahead on our direct course, and that mulga, in which good pasturage would probably be found, lay one mile off to S.W. under a high bluff hill, we proceeded there, and at 5.30 p.m. camped for the night on good camel bush, roley poley, and munyeroo, the latter being a species of portulaca. Whilst camels were being unloaded and camp formed, Mr. Murrry and self ascended hill, obtained a fair view and took bearings to prominent surrounding objects. A long stretch of mulga and spinifex undulations lay before us, extending apparently to the foot of the Cavenagh Ranges to westward, and to horizon to north and south. The country for ten miles apparently consists of open mulga, presumably carrying fair pasturage, as the prominent white patches, which on being reached invariably prove to be spinifex, were not visible. Distance travelled by party, thirteen miles; Mr. Murray and self, five miles = eighteen miles.

Tuesday, April 14th, 1896.—Camp No. 57. Resumed journey at 8.15 a.m. on a general bearing of 270°. Travelled over sandy undulations and poor spinifex for half a mile; then entered open mulga, a little grass, good leguminosæ, a small quantity of parakylia, and some gigantic black wattles. At one and a quarter miles crossed a small sandhill and entered mulga, dwarf wattle, and good vegetation, on hard red loam, with quartz rubble on surface. At two miles crossed another small sandhill, on which the only growth was dwarf mulga and spinifex. The mulga soon gave place to low, scrubby titree, which, however, only extended a few chains, and then was replaced by open mulga, native cherry, a few large black wattle, and other good camel bushes, but spinifex still formed the sole undergrowth. At two and a half miles traversed a hard red loamy flat, with fine ironstone on surface, with a little grass, roley poley, and parakylia amongst the spinifex, which still prevailed. We are now abreast of the Cavenagh Ranges, which lie from half a mile to one mile north of our course. At three and a quarter miles a little limestone rubble on surface. Here vegetation

vegetation improves, bunch and spear grasses, purple everlastings, prickly acacias, and other good bushes being plentiful. Here I noted a site where I believe a permanent supply of good water is obtainable at a moderate depth. At four and three-quarter miles crossed a good clayey flat, where water had been conserved for some time, but which had just gone dry. Here the vegetation was much greener, and of better growth; it consists of good open mulga, bunchgrass, and roley poley. Lunched, and at 12·30 p.m. resumed on general bearing of 270°, passing over soil and vegetation as described since leaving sand and spinifex. At three-quarters of a mile entered a small open flat, a quarter of a mile broad, half a mile long, very boggy after rain, on which was a dense growth of bunch and Mitchell grasses, roley poley, and other good herbage. Then again entered open mulga, with the usual excellent grasses and herbage. At two miles we were still travelling through open mulga, but good pasturage alternated with patches of spinifex. Here cut on to recent tracks of a small party of aboriginals, travelling in a N.W. direction and making into the range. Judging from the tracks they were about two hours ahead. At two and a half miles noted a promising gully running into the range. Left party under Mr. Murray to continue on course, and rode off on bearing of 335°, to examine it. On entering mouth of gully, struck a small box creek which had recently been in flood, but on running it to its sources, could find no water or soakage in the sand. Whilst in the range noted that the Cavenagh, unlike the Musgrave, Mann, and Tomkinson Ranges, are clothed to the summit with poor spinifex, and are almost destitute of timber. The height attained by the most lofty hills of the Cavenagh is also much less than the prominent hills of the above three ranges; it is, therefore, not probable that any large body of water will be met with in the Cavenagh; but, notwithstanding this opinion, I shall make it a point to examine every main gully within reasonable distance of my course. After leaving gully cut on to course, rejoined the party, and continued through alternate small patches of spinifex, dwarf mallee, good mulga, and grasses intermixed with abundant herbage. At three and three-quarter miles crossed a flat half a mile by half a mile of strong rich soil clothed with abundant Mitchell grass. Then continued on through good open mulga, fine grasses and herbage to four and a half miles, when the soil changes to poor class yellow loam covered with limestone rubble. Here the vegetation, although still good, is more patchy and less luxuriant, and mulga is more open and intermixed with scrubby corkwood, native currant, and dwarf wattle, good roley poley *(Salsola kali)* plentiful. At six miles the soil changed for the better, and vegetation once more became abundant and varied, consisting principally of speargrass, leguminosæ, and roley poley. At six and a half miles a belt of very large black wattle was passed. At seven and three-quarter miles caught first glimpse of Mount Scott, of Ernest Giles, passing through fairly dense mulga, 50 per cent. of which was dead and lying on the ground; undergrowth still remaining excellent, and was represented by Mitchell, bunch and wire grasses, roley poley, and munyeroo (a species of portulaca), the mulga being varied by occasional clumps of corkwood, water-bush and other edible bushes. At eight and a half miles, another promising gully presenting itself, again left the party and rode off on bearing of 305° for one mile; cut a small box creek; ran this quarter of mile into the range, and passed a small native encampment which had been deserted about a week. Five chains further up found a small sandy soakage, where they had obtained their supplies of water, but it is now perfectly dry. This was almost at head of the creek, therefore crossed a low stony ridge into the main gully, expecting to find a larger creek, but was disappoined, as the gully proved to be one and a quarter miles in width, in the centre of which was a wide, shallow watercourse containing no holes or sand in which water could be conserved. The soil in the wide gully is good, and carries mulga, box, corkwood, prickly acacia, kangaroo and bunch grasses, with bedrock out-cropping in many places. Then cut off party, rejoining them at eleven miles from lunch camp, travelling on through good open mulga, kangaroo and Mitchell grasses, and leguminosæ, with fair-sized patches of good green roley poley *(Salsola kali)*, the vegetation improving in quantity and quality. Half a mile from foot hills to the range camped at 5.30 p.m., when Mr. Murray ascended hill and obtained bearings to Mount Scott and other prominent points. Hours travelled by party, eight = nineteen miles; self, nine = five miles extra; Mr. Murray and self, two miles on foot = twenty-six miles for day. Being now well outside of Mr. Carruthers' triangulation, observed Alpha Leonis and Beta Argus, and found Camp No. 57 to be in latitude 26° 1′ 46″.

Wednesday, April 15th, 1896.—Camp No 58. Resumed at 9·25 a.m. on bearing of 247°, and continued over hard red loam, open mulga, fair bunch grass and good roley poley, but all patchy, a large percentage of the soil being bare. At one and a quarter miles the soil changed to yellow loam, when grass ceased and was replaced by good saltbush, a little mulga, prickly acacia and broom; small patches of blue-bush, bunchgrass, and roley poley, with dense mulga still continuing half a mlle to north and south. At half a mile noticed a very green patch thirty chains to south, left party to continue on course and rode across; found it to be a cane-grass swamp, now dry, but holding a considerable body of water after rain. It is here the natives, whose camp we saw, obtain their water. The site is not good for a reservoir, the catchment area being too limited, and the swamp boggy. Immediately surrounding the swamp was excellent cotton-bush, roley poley and Mitchell grass. A few chains to south low limestone rises formed a block to the swamp, and continue in a westerly direction. At three miles from camp left saltbush and entered excellent open mulga, prickly acacia, Mitchell and bunch grasses, and roley poley on hard red clayey loam, with limestone rubble sparsely scattered on surface; but as spinifex is showing close to north and south, I am afraid this line of good country will not continue far in a westerly direction, as Forrest and Giles both report poor spinifex country on their routes, which are a considerable distance south of our present position. As anticipated, at three and a half miles spinifex closed on our course, and perforce we had to plunge in. As we advanced the soil became harder and poorer, and the quantity of sharp limestone rubble on surface increased, but occasional small patches of better soil were crossed, on which were growing dwarf and black wattle, cherry trees, water and other good camel bushes, varied with a few mallee, cork and box woods, with a fair quantity of good roley poley. At five and three-quarter miles entered a belt of better soil, on which mulga, bunchgrass, and roley poley were abundant; red sandhills showing three-quarters of a mile to N.W. As we advance, the above good pasture was supplemented by leguminosæ and a variety of good camel bushes, with a small patch of good saltbush, but limestone rubble was still plentiful. Unfortunately this improvement extended for only a quarter of a mile, when we were again passing through spinifex, on very inferior soil, with hard, sharp, flinty limestone cropping to surface; the red sandhills previously noted closing in to within a few chains of our course. On these, roley poley *(Salsola kali)* had established itself; but the all-pervading spinifex was gradually forcing its way up. From here the soil gradually improves, until, at seven and a half miles, we were again travelling through fair mulga and pasturage with many purple everlastings. Luncheon at 12·40 p.m. Resumed at 1·30 p.m., and at a quarter of a mile again entered poor spinifex. At one mile obtained first sight of Remarkable

Remarkable Peak, near Fort Mueller, ten miles to south-west. At three and a half miles encountered high red sandhills, on which there was little except spinifex, worthless scrubs, and herbage which even the omnivorous and ever-hungry camel passed with disdain; the only edible bushes being a few dwarf wattle and stunted quondong. These sandhills run nearly N.N.E., extending towards the Cavenagh Hills, and S.S.W. to Fort Mueller, with undulating red sandy flats intervening, which carry box, broom, dwarf corkwood, and other scrubs of no value; the sole undergrowth being spinifex. At five and a half miles these sandhills were covered with a dense growth of dwarf titree. At seven and a half miles a little roley poley and a few kurrajong were struggling for existence. Here first sighted Giles' Lightning Rock from the summit of a high sandhill, from which a fair view around the horizon was obtained. The outlook in every direction was most unpromising, as nothing but a sea of spinifex and scrubby sandhills repaid our gaze. These extended from the foot of the Fort Mueller group of hills N.W. to the Lightning Rock, and northerly to a prominent hill about eight miles distant. Here altered bearing to 262° for the Rock, and travelled on through the same class of country until 6·30 p.m., when, at dusk, we camped on the worst camel feed we have met during the trip, not even excepting the drought-stricken region between Indulkana and Glen Ferdinand. Sir John Forrest describes this country near to and south of Barlee Spring as "most wretched." Had he exhausted the English language he could not have used an apter term. Hours travelled, eight = eighteen and three-quarter miles. Observed for latitude, B. Argus—Regulus = 26° 5′ 6″.

Thursday, April 16th, 1896.—Camp No. 59. Resumed journey at 8·40 a.m., for Lightning Rock, on bearing of 262°, travelling over inferior sandy soil covered with spinifex, to two and a half miles, when light-red sandy loam, carrying open mulga, dwarf wattle, a few corkwood, good roley poley and a little spinifex were met; this, with short intervals of pure sand and spinifex, extended to four and a half miles, when the improvement was confirmed by the soil becoming richer and carrying excellent mulga and good camel bushes, roley poley, Mitchell and bunch grasses, and a little parakylia; this continued to the Lightning Rock of E. Giles, which was reached at six and a half miles from Camp No. 58. Rode round to N.W. side of the outcrop and tied up camels, when Mr. Murray and self ascended the rocks, which are about 150ft. above base of the plain, and composed of rough bare granitic boulders, carrying no vegetation except the large hybiscus, from which the natives manufacture their spears. Examined the country with field glasses and took round of angles, Mount Scott bearing 76°, Mount Squire 238°, Mount Borrow 148°, Mount Blyth of Forrest 181°. Found the outlook ahead to be more promising than that of yesterday, for although a considerable extent of spinifex is visible, there is a deal more mulga in which from fair to good pasturage may be expected; then descended, and the team having arrived directed lunch to be prepared, whilst Mr. Murray and self walked off to find the water. Went direct to position as laid down by Giles, and found the rockhole at foot of the lower rise, thirty-five to forty chains south of the main outcrop. This rockhole is stated by D. Lindsay to be from 10ft. to 12ft. deep. We found it to be filled to within 3ft. of the surface with drift sand, the remainder being full of good pure rainwater; but it is impossible to estimate the quantity of water the hole would contain if cleaned out. Then examined Tietkins' Tank, and found it also to be nearly full of sand, with a little stagnant water on the surface. Did not fill casks or water camels, as we have sufficient to take us to Barlee Springs, and by not watering camels until at that point, they will be in a better position to negotiate the 170 miles to Alexander Springs. Should known rockholes of Forrest and Giles fail or we should discover no new waters, our course being considerably off their routes, but crossing and touching them in places such as Lightning Rock, Barlee, and Alexander Springs. Lunched and resumed at 1 p.m., on bearing of 287°, direct for Barlee Springs. Travelled over loose red sandy flats, through open mulga, good grasses, leguminosæ, and roley poley alternating with sandy rises, on which little but spinifex grew for two and a quarter miles, when good hard red soil, open mulga, excellent Mitchell grass *(Astrabele trinitacoides)* and luxuriant roley poley, with cherry and other good fodder bushes was encountered. This extends to four and a half miles, when red sandhills appeared to north and south, these rapidly closed in on our course, so that I anticipated another bad night for the camels; but in this was agreeably disappointed, for on surmounting the first sandhill, of no great height, similar county to that just traversed lay before us, with the addition of the large black wattle peculiar to Western Australia. Here we saw quite recent tracks of a native travelling in the same direction as ourselves. This good country continued to eight miles from Lightning Rock, when a large sandrise, extending from a granite outcrop, rose before us. On surmounting this a fair view to south and S.W. was obtained; to S.W., mulga, and presumably good feed obtained for six miles, when a wide stretch of spinifex, reaching almost to foot of the Barrow Range, which bounded the view in that direction, intervened; westerly (our course) mulga and small patches of spinifex lay before us for about four miles, and then apparently a wide stretch of spinifex had to be crossed. Here bearings were taken to Mount Burt, and course resumed on bearing of 273°, in order to pass to north of Mount Burt. Travelled through open spinifex, intermixed with a little grass and fair herbage for one mile, and then through from fairly open well grown to dense mulga, the soil being light-red sandy loam, harder in places, and sparsely covered with iron, limestone, and quartzite rubble. Here there was abundance of excellent roley poley, a little bunch and spear grasses, a few leguminosæ and a plant resembling the broad bean, with a blue flower, which I have not seen in other localities, and cannot class; this the camels eat readily. Continued through country as above until 5·20 p.m. when, as advanced guards of spinifex put in an appearance, and as the camels had been on such poor feed last night, camped in fair mulga and herbage. Kangaroo, emu, rats, and snakes' tracks numerous. Observed Ephsilon and Alpha Crusis S. and Alpha Leonis N., which place us in latitude 26° 2′ 29″.

Friday, April 17, 1896.—Camp No. 60. Resumed journey at 8·25 a.m., on bearing of 273°, continuing through open mulga and vegetation as described yesterday. This continued a quarter of a mile, when spinifex and dwarf mallee were met, amongst which was a limited quantity of good herbage. At half a mile all vegetation except spinifex ceased. This was crossed at one and a quarter miles, but open spinifex was still visible to south and to the horizon to north. Then entered open mulga, few currant bushes, and a little spinifex; the latter ceased entirely in a few chains, being replaced by good roley poley and speargrass on rich red sandy soil, with flat granite outcropping a few inches above the surface. At two and a quarter miles again entered spinifex, with a few dwarf wattle and corkwood, a little herbage, but no grass. At three and a quarter miles soil improves, the growth being mulga, corkwood, bunchgrass, purple everlastings, roley poley, leguminosæ, and dwarf wattle. At four miles reached the summit of a series of low granite rises, almost covered by blown red sand, on which grew dwarf acacia, roley poley, and spinifex. From here a view was obtained westerly to Mount Burt, the intervening country apparently being covered with dense mulga, in which I trust good feed will be found.

To

To S.W., as far as the foot hills to Barrow Range, about eight miles, the country is similar, but with wide strips of spinifex showing between. The view to north being limited, left the party to proceed on course and rode to a higher point. From the new position was able to see that dense mulga extended for four miles, with occasional strips of spinifex between. The outcrop from which I obtained this view is composed of gigantic round granite boulders piled upon each other in picturesque confusion, many of them being 20ft. and 30ft. high. In the interstices stunted pine grew, and in one place a perfect thicket of native fig trees *(Ficus platypoda)*, loaded with fruit, but unfortunately none were ripe. Here disturbed a large white owl. On rejoining the party, Mr. Murray reported he had found a rockhole containing 100galls. of water, which was situated on south side of the outcrop where I had left the party. At four and a half miles we were travelling over rich red sandy soil and passing through open mulga, excellent herbage, and a little spinifex. At four and a half miles crossed some rough limestone ridges carrying good pasturage. At five and a quarter miles entered very dense mulga, 50 per cent. of which was dead and lying on the ground, which considerably retarded our progress. At five and a half miles soil became harder and carries the same vegetation, but is more patchy, being intermixed with spinifex and bare ground. At five and three-quarter miles limestone rubble on surface, amongst which were some very large pieces of flint. At six and a half miles crossed some good patches of leguminosæ, a little saltbush, and parakylia. At six and three-quarter miles ascended rising ground to foot hills of Mount Burt. Here the soil became much harder, was less rich, and the vegetation, though abundant, was of inferior quality, whilst fully 75 per cent. of the mulga was dead; the surface of the ground being covered with iron and sandstone rubble. At seven and a half miles the dense mulga opened, with same class of undergrowth, and a little more parakylia. At eight miles passed a few boxwood and large black wattle. At eight and a quarter miles stopped for lunch on a good patch of leguminosæ, Mount Burt bearing 128° one mile distant, Mount Rawlinson 357°. Resumed at 1 p.m. through similar country to two miles, roley poley being more abundant but less green than on the more absorbent soil traversed during the morning. At two and three-quarter miles, what I consider to be an excellent site for a well, and where a strong supply of good water will be obtained was noted, the flat on which this site is located being three miles west of Mount Burt. Here the pasturage improves, grass, roley poley, and leguminosæ being abundant and green. At three miles left the mulga and entered a jumble of high red sandhills clothed with dwarf titree, wattle, spinifex, and a little roley poley. Had to deviate from our course to avoid these, the intervening flats being only a few chains wide. At three and a half miles cleared sandhills and entered fairly dense mulga on light-red sandy soil, the undergrowth being good green speargrass, bunchgrass and roley poley, and other herbage. Here there were a few slate-colored doves. At five and a half miles entered a very rough stony gap, in which there was dense mulga, 75 per cent. of which was dead, with good speargrass, parakylia, and everlastings. Passed through this in fifteen chains and entered a good flat carrying abundant, well-developed parakylia, roley poley, Mitchell and bunch grasses, leguminosæ, and black wattle. At six miles, on this flat, noted another good site for a well. The flat improved as we progressed, and at six and a half miles camel feed became so abundant and green that I determined to camp and allow our camels to enjoy its benefit. Travelled fourteen and three-quarter miles. Observed E. D. and B. Argus N.; E. and A. Leonis S. Latitude 26° 2′ 5″ S.

Saturday, April 18th, 1896.—Camp No. 61. Bar., 9 a.m., 28·39; attached ther., 83°. Resumed journey at 8·25 a.m. on bearing of 260°. Crossed a few chains of the good flat camped on last night, and entered low red sand rises carrying little else than spinifex. This, however, extended only a short distance, being an intrusion on the rich flat, which still extended to south, and which shortly trending westerly was again entered. Traversed it for a short distance, when sand rises and spinifex again presented themselves; but good mulga, roley poley, and parakylia were still in sight a short distance to south. This alternation of superior and inferior soil and vegetation obtained for five miles, but the ground was considerably harder, consequently grass and herbage was not so green or vigorous. This led us to the foot of a prominent isolated hill, which Mr. Murray and self ascended. From the summit, in a series of low continuous hills one and a half miles to north, we observed a fairly wide gully, in which Barlee Springs should be located. Signalled the party to follow us and rode direct to the gully, which we entered and followed for one mile, when, finding the travelling somewhat rough for camels, tied them down and continued on foot. At one mile further N.E. the creek bifurcates. I took the north-east branch, Mr. Murray the one trending N.W. Examined mine to its head, and finding no trace of water crossed over to Mr. Murray, who had also been unsuccessful. As we are quite certain that, unless the position as fixed both by Forrest and Lindsay is wrong, we are very adjacent to Barlee Springs, directed Mr. Murray to cross over to the next gully westerly, whilst I returned to our riding camels, from whom we had now been separated for some time. On reaching them, found the party had come up and were lunching. Just as I finished mine heard a shot, to which I replied. Mr. Murray came into camp a few minutes later, and reported he had found Forrest's pile and the springs, the latter being located in the next gully to the one we had examined in the morning, the two gullies in one place approaching to within ten chains of each other. Moved on to within thirty chains of the water, and then finding a suitable spot for camp, turned out at 3 p.m. Leaving Mr. Murray and men to arrange camp, I walked on to the water, passed it, and ran the creek to its sources, so as to satisfy myself there was no water beyond the point Mr. Murray had left the creek. Found he had been to all the water, and had scraped a hole in the sand fifteen chains above the top surface water. Examined the creek above this point to where the various runlets from the sides of the hills form the main channel, when, being absolutely convinced there was no possibility of water ahead, turned to and ascended the low hill upon which Forrest's pile is erected. On reaching the pile, found it to be 2ft. 6in. high, and not on the highest point of the hill, and is not visible either from the level country or the water, and as a guide to those in search of the water is valueless, although, possibly, were one certain as to its position, it might be picked up with powerful field glasses from the western side. The view from this hill is of considerable extent, more especially to the S.W., in which direction the summits of the Warburton Ranges shew up above the sea of mulga intervening with many low hills outcropping irregularly, occasional strips of spinifex being also visible, but these fortunately do not appear to be of great magnitude. Then returned to and examined the gorge in which the water is situated. The highest waterhole is situated one and a quarter miles from the south side of the low hills abutting upon the level country; its capacity at present is 20ft. by 10ft. by 18in. (mean). The water is stored in a rocky bed, containing a quantity of sand deposited by flood water, the high water mark being 2ft. above the present water level. The second hole is located one and a half chains lower down the gorge; its capacity is one and a half chains by one-third chain by 2ft. deep (mean), the bottom being very rocky and irregular. This hole contains very little sand; high water mark is 1ft. above present

present water level. A distance of one chain separates this from the next or third hole, the sand between the two being moist; but there is no depth of sand, as the rocks crop out in many places. This hole is small and shallow (20ft. by 4ft. by 1ft. mean), the high water mark being 6in. above the present water level; moist sand extends 20ft. below this hole. The fourth and last waterhole is three chains lower down the gorge; its capacity is one chain by one-third chain by 9in. deep (mean), with wet sand 2ft. above the present water level. This hole is the one which probably will conserve water longer than any of the other holes of the series, as the depth of the sand is greater, and extends one and a half chains below where water on the surface ceases; this is accentuated by the fact that fifteen chains lower down the gorge there is three chains of moist sand. Here the natives had excavated three small holes; these are now quite dry. In the higher one, on removing a few inches of sand, a little water was obtained; but on removing more sand, in 3in. solid rock was encountered, therefore no supply exists here; but after the creek has been in flood a fair sized waterhole can be relied upon. From the above it will be gathered that after rain a considerable body of water is stored in this gully; but, judging from the rocky nature of the gorge, the absence of sand in quantity, the present quantity of water, the flourishing condition of the vegetation in the immediate neighborhood, which points to the fact of a recent and heavy fall of rain, and the entire absence of aqueous growth in and adjacent to the water, I am confident that the Barlee are not springs, but simply a soakage, and further am convinced that the soakage is not a strong one. It will therefore be necessary to provide a permanent supply to enable stock to traverse the wide belt of waterless country between Teizi Springs and Barlee Springs, as, although the water at Mount Aloysius is a fair one, it cannot be regarded as permanent; and this I think can be obtained at either of the sites mentioned in yesterday's journal, viz., three miles west of Mount Burt, and at another point three and a quarter miles still further west; but as in ordinarily fair seasons the Barlee Springs will be of value, and as there is no guide to lead travellers into the water, which is difficult to find, I have determined to remain and build a pile which will be visible from the eastern approach and be of special service to travellers from South Australia. Party travelled, nine miles; self on camel, six miles; self on foot, six miles = twenty-one miles. Observed—Epsilon Argus, Delta Argus, Beta Argus, Iota Argus south; Epsilon Leonis, Alpha Leonis, Gamma Leonis, north; and found latitude of camp to be 26° 1′ 47″, and latitude of springs to be 26° 1′ 22″.

Sunday, April 19th, 1896.—Camp No. 61. Bar., 6 p.m., 28·27; attached ther., 90°. Mr. Murray built pile on hill during the morning; self cut down mulga tree, squared it to 5in., and cut on one side—

S.A. TO W.A., S. R. EXPN.

On next side— ALOYSIUS WATER 80 MILES E.

On third side— 20/4/96.

On fourth side— S. G. HUBBE.

During the afternoon Mr. Murray and Langman carried the pole up the hill and placed it in position on the pile, which to top of the pole is 8ft. high, and can be readily picked up by anyone coming from the east south, or south-west. It bears 165° from the water, from which it is distant one mile, *i.e.* the water is one mile from the pile, a trifle west of north. Forrest's pile not visible but forty chains beyond water on the same bearing. During the afternoon I marked a box tree on west side of the creek, and thirty chains south of lowest water—

S.A. TO W.A.
S.R.
ALOYSIUS WATER
80 M. E.

Monday, April 20th, 1896.—Camp No. 61. Having been fully occupied yesterday, remained to clean and adjust instruments and firearms. Had camels mustered and taken to water at 3 p.m., this being the seventh day they have been without water; none of them did more than wet their lips and play with the water. Put sufficient water in casks to enable us to reach Alexander Springs, which will probably occupy us fourteen days. Obtained mean time by observation of the sun, and found our watches to be forty-five minutes fast, and will alter them before resuming journey.

Tuesday, April 21st, 1896.—Camp No. 62. Set watches back forty-five minutes to mean time, and resumed journey at 8·10 a.m. on bearing of 265°, travelling through good open mulga, Mitchell and bunch grasses, roley poley, and parakylia, for one mile; then for a quarter of a mile spinifex and red sand; then entered dense mulga, 40 per cent. of which was dead. This continued a quarter of a mile, when open spinifex, a few stunted mulga, and dwarf wattle was met; this extended another quarter of a mile, when sandy rises carrying spinifex, no grass or herbage, were crossed. At one and a half miles from starting point entered hard inferior soil covered with limestone rubble, lofty mulga, and mallee, quondong, currant, wattle bushes, and broom, the undergrowth being represented by a little poor wiregrass, roley poley, and abundant spinifex; this, with occasional small patches of light-red sandy soil in depressions, on which roley poley *(Salsola kali)* was green and abundant, extended to three and a quarter miles. This only lasted a few chains, when hard red soil, dense mulga, with a little wire and bunch grasses was entered. At four miles soil improved, green grasses being abundant, with a little native geranium; but this unfortunately only lasted a few chains, when hard inferior soil covered with quartz and ironstone rubble was entered. At four and a half miles entered poor dwarf mallee and spinifex, which extended to 6·2 miles, when low red sandstone hills to north closed in to within twenty chains of our course, and good red soil carrying good mulga, wiregrass, purple everlastings, parakylia, and abundant roley poley was entered, with open mulga, dwarf wattle, and large black wattle to north. This was extremely fortunate, as camel "Eringa" here went dead lame in off hind leg, and as I did not care to abandon the poor animal, although his load could have been transferred, we camped at 11 a.m., having only travelled six miles.

Wednesday, April 22nd, 1896.—Camp No. 63. Bar., 6 a.m., 28·31; attached ther., 75°. All camels mustered at 6·45 a.m. "Eringa" still lame, but has evidently improved by the rest. My impression is he has contracted rheumatism, the past three nights having been excessively cold. Shall rest him until lunch time and then, if possible, resume. Resumed journey at 12·10 p.m. on bearing of 256°, travelling through inferior spinifex and mulga, a little poor wiregrass and herbage, with limestone, quartz, and ironstone rubble thickly strewn on the surface, with large quartz blows and reefs to south of and crossing our course. At one mile country slightly improved, being composed of firm red soil carrying fair bunchgrass, roley poley and everlastings, good open mulga, prickly acacia, native currant, and black wattle. At two miles the soil becomes hard and inferior, the sole undergrowth being spinifex. At two and a half miles entered a jumble of low red sandhills covered with poor mulga, spinifex, and a limited quantity of roley poley, limestone outcropping at intervals. At two and three-quarter miles struck and ran a mulga creek, in which grew good pasturage,

pasturage, principally of a leguminous nature. At three and a quarter miles crossed limestone rises, dwarf mallee and spinifex. At three and a half miles soil slightly improves, with fair grass, roley poley, and mulga; little limestone rubble on surface. At four and a half miles entered a good flat of firm red soil, carrying abundant green grasses and roley poley. At four and three-quarter miles soil is poorer, and is thickly strewn with nodular ironstone and quartz rubble, with small veins of slate and basalt cropping out at intervals, the vegetation consisting of poor open mulga, native currant, fair roley poley, purple everlastings, and bunch grass. At five and a half miles a few corkwoods in blossom. At six and three-quarter miles a good flat of firm red soil, with large box and corkwood trees, open fair mulga, excellent roley poley and parakylia. At seven and a half miles quartz rubble and spinifex, with a low range of rough hills fifteen chains to south. This only continued a few chains, when it changed to open fair mulga, good herbage, and a little grass; but this was again, at fifteen chains, succeeded by inferior soil and vegetation, the larger growths consisting of dwarf mallee and stunted quondong. At eight and a quarter miles passed through a small gap in the low hills we had been running all the afternoon, inferior country continuing until gap was cleared, when at eight and a half miles soil improved, carrying good roley poley, parakylia, and leguminosæ; kangaroo and emu tracks being plentiful. This improvement continued to eleven miles, when, at 4.55 p.m., we camped on excellent camel feed. Our westing to-day is two miles short of this distance, the course being rendered sinuous by the rough hills we had to skirt. Saw the only black jays noted since leaving the Alberga. Observed for latitude—Alpha Leonis, Beta Crucis, Iota Crucis; which gave us latitude 26° 5′ 3″.

Thursday, April 23rd, 1896.—Camp No. 64. "Eringa" still lame, but much improved. Resumed journey at 7·35 a.m. on bearing of 240°, travelling through dense mulga, a little wiregrass, and fair herbage, for a quarter of a mile; then poor spinifex to half a mile, when a little grass and roley poley, on loose sandy soil, to three-quarters of a mile; then spinifex, mallee, and poor mulga, to one mile, when mulga improved in size and quality, but 50 per cent. was dead; undergrowth fair bunch and wire grasses, roley poley, and purple everlastings, with occasional patches of Mitchell grass; quartz rubble on surface. At two miles excellent Mitchell and bunch grasses, purple everlastings abundant; mulga much more dense, with occasional patches of giant mallee. At two and a half miles good open mulga and dwarf wattle. Here the soil deteriorates and spinifex prevails; low hills one mile to south. Similar soil and vegetation obtained to two and a half miles, when a few large black wattle were observed. At three and a quarter miles, broken quartz rubble on surface, open mulga, purple everlastings, speargrass, roley poley, and salsolæ, with a little well-grown parakylia. Here crossed a large quartz reef, the strike of which was N.N.W. At five miles we were travelling over firm red soil, open mulga, good green Mitchell, wire, and bunch grasses, roley poley, and a little herbage, but all very patchy, there being a large percentage of bare ground covered with quartz rubble. At five and a quarter miles low red sand ridges, trending N.E. and S.W., carrying scrubby wattle, spinifex, and a little roley poley. At five and a half miles flat of firm red soil, open mulga, poor bunch grass and stunted roley poley; quartz and ironstone rubble on surface. This continued to seven and a half miles, when sandstone boulders were intermixed with the quartzitic rubble. Here the soil improves slightly, bunch and Mitchell grasses being plentiful, but still much of the soil was devoid of vegetation, and timber was only represented by dwarf scrubby wattle. At eight miles dense mulga, 50 per cent. of which was dead and lying on the ground, fair wire and Mitchell grasses; no herbage; a little spinifex; ironstone and quartz rubble plentiful. At nine and a quarter miles fairly open mulga, wire and bunch grass on firm red soil, Stopped here for lunch at 12·30 p.m.; resumed at 1·25 p.m. on same bearing, and continued through similar country to one and a half miles, when the vegetation was diversified by a little parakylia and saltbush, with bunchgrass more plentiful. At two and a half miles soil improves, vegetation is more dense, and good Mitchell grass is plentiful, with occasional strips of *Euphorbia Drummondii* (poison). At three and a half miles passed a large dry claypan surrounded by large boxtrees; here there was an old encampment of natives, who utilise this water during the winter. Here the vegetation deteriorated, being principally spinifex and stunted roley poley. At three and a quarter miles purple everlastings were very plentiful, fair grass, and only a little spinifex; mulga and dwarf wattle fairly dense. At four miles sharp limestone rubble replaced quartz and ironstone, causing our riding camels to limp and trip badly; similar vegetation, with a little parakylia added. At four and a quarter miles crossed a burnt patch carrying a little spinifex and good roley poley. At four and a half miles a few large boxwood and spinifex. At five and a half miles open mulga, bunch and wire grasses, purple everlastings, roley poley and parakylia; all very patchy, on firm red soil, much bare ground being visible. This continued to eight and a quarter miles, when a low rough range half a mile distant on our course presented itself; and as there is little probability of obtaining a good camp there, I camped on the good feed. Distance travelled to-day, seventeen and a half miles. The view to-day has been limited, as we were traversing country at a low level; it was therefore not until we began to ascend the low range that a high bluff hill was observed some miles to the south of our course. I shall examine it with field glasses in the morning from top of the range, when, should there be any probability of a good water existing in the neighborhood, will go to and examine it. Observed for latitude—Beta, Iota, Kappa —Argus; Epsilon, Alpha—Leonis = latitude 26° 11′ 27″.

Saturday, April 25th, 1896.—Camp No. 65. Instructed Mahar to continue journey on a course not more than 5° south of west, and to keep on that course until Mr. Murray and self rejoined the party. We then left camp at 7·30 a.m. to examine the high bluff hill seen last night, which I estimated to be from six to eight miles distant; a little south of east. We travelled six miles and then the hill appeared to be no nearer than when we were at camp, the deception being caused by the clearness of the atmosphere and a wide low-lying valley we had been unable to see last night. At six and a half miles struck a wide shallow watercourse fringed with box and stunted white gum. Here grass, leguminosæ, parakylia, and roley poley were abundant and luxuriant; but away from the flooded lands abutting on the channel soil was inferior and vegetation poor. The greater portion of the mulga was dead, evidencing the frequency of prolonged and recurring drought. As this creek evidently ran through the gap at the foot of the bluff hill, our hope of finding a good water increased, more especially as we progressed the channel became deeper and was more defined, with a considerable body and depth of sand, giving promise of some excellent soakages. The timber was also larger, greener, and more vigorous. Ran the creek to foot of the bluff, which was reached at twelve miles. At half a mile north of the bluff, in the creek, amongst dense titree, found a native well in deep sand, which had been recently visited by two aboriginals. The supply of water is evidently strong, as it rises to within 3in. of the surface, and the sand is moist and springy for yards around the well; but to our intense disappointment the water proved to be hardly drinkable, being very brackish and strongly impregnated with magnesia. Then ran the creek three miles further through the gap, and in that distance passed several

several fair-sized holes, the lower portion of which contained wet sand, but no surface water was visible. The whole of the channels, there being five, were covered with an efflorescence of salt, soda, and magnesia; therefore, although the creek was traceable for several miles further to the S.E., did not traverse it further, there being no possibility of finding good water, as at end of a dry summer, should any remain, it would be far too salt for stock; therefore altered bearing to 300°, to cut off the tracks of the party. Rode until dark, when, as we had not crossed the tracks, camped for the night, having travelled thirty-four miles. The general character of the country traversed to-day is most inferior, with occasional small and, at times, wider patches of good parakylia and saltbush.

Saturday, April 25th, 1896.—Camp No. 66. Rejoined party and resumed on bearing of 300° at 9·55 a.m., and continued through rough stony undulations, with inferior soil, to two miles, when a slight improvement was noted; open mulga, a little prickly acacia, better grasses, saltbush, and a little roley poley were met with, but all dry and without succulence. At three miles stony tablelands came in from the south to within thirty chains of our course; here the only growth was spinifex. This extended to six miles, when we stopped for lunch at 12·30 p.m. Resumed at 1·20 p.m.; travelled one mile through similar inferior country, except that there was a little superior mulga, 90 per cent. of which was dead; then struck a large gum creek, trending N.W., and, as driftwood in many places was from 4ft. to 5ft. high, it is evident a large volume of water rolls down this channel in times of flood, although a considerable period has elapsed since such has been the case, all drift being very old and dry. I here left the party to continue on its course, under Mr. Murray, and ran the creek back one mile. In that distance found two fair-sized dry waterholes, the sand being washed out to the limestone bottom; there was no soakage. At another place, by scratching in the sand, a little moisture was obtained, but rocky bottom was reached without obtaining any quantity of water; then turned and ran the creek for five miles when it trended to the south, and, not wishing to spend another night away from the party without food, I left it. In that distance three large waterholes, all dry, were passed; these were located under high shelving banks in bends of the creek; two native wells were also found, one completely dry, the other containing a small quantity of moist sand, but no water. Here there were tracks of a small party of aboriginals, about one week old, also innumerable dingo, kangaroo, and emu tracks. After this creek has been in flood a considerable number of fair waterholes will be found, and we are unfortunate in meeting it at a time when the rains, although good, have not been sufficiently heavy to flood so large a creek, issuing from such comparatively low hills as compose the Warburton Ranges. On leaving the creek bore 320°, to cut off the party, which was overtaken at four miles. Continued with it to camp, which was formed at 5·15 p.m., in a small quantity of mulga, no other feed being available. The country traversed since crossing the gum creek consists of high red sandhills, carrying little else than dead dwarf titree and spinifex, with occasional small patches of stunted withered mulga on the flats, and at wide intervals a rare bunch of parakylia, with a few other green but worthless bushes; also saw one red mulga (the *minareachie* of Queensland). We are now six miles into this truly wretched country, and as no change is observable, after a most careful scrutiny, for a distance of fully forty miles to north and south, no better result can be expected should the course be altered, shall therefore continue to strike for Alexander Springs. Distances travelled—Mr. Murray and self to overtake party, seven miles; party on course, fifteen miles; self, when examining creek, seven miles = twenty-nine miles. Observed for latitude, Beta Argus, Alpha, Iota, and Epsilon Leonis, which places Camp No. 66 in latitude 26° 6′ 10″.

Sunday, April 26th, 1896.—Camp No. 67. Resumed journey at 10·20 a.m., on bearing of 270°, through inferior spinifex country. At one and three-quarter miles passed some large kurrajong. At two and a quarter miles entered dense mulga, 95 per cent. of which was dead The late rains here must have been light, there being very little green parakylia. At two and a half miles the mulga became so dense, with such quantities of dead wood lying on the ground, there were continual stoppages to readjust loads and tie up broken nose nips, ties, &c. At three miles left mulga and entered open sandy undulations, on which the sole growth was dwarf titree and spinifex, with rare clumps of stunted mallee at wide intervals apart. At five and a half miles entered a jumble of sandhills, but vegetation did not improve. At eight and a half miles left this jumble and again entered sandy undulations. At nine and a half miles passed a clump of large black wattle, and from here the soil became firmer, with ironstone rubble on the surface; but the only vegetation was mallee and spinifex. This continued until 3 p.m., when a strip of mulga appeared one mile N.W. of our course, and as I intend tieing down the camels to-night, bore over to it and camped; let the camels go at once, but as the mulga was dry they did not care to feed, but lay down and chewed their cud. Half a hour before sundown they arose in a body, cast a comprehensive gaze around and then unanimously made off eastwards, and many were their remonstrances on being brought back and tied down. Distance by party, eleven and a half miles. Observed Beta, Argus, and Regulus = latitude 26° 6′ 5″.

Monday, April 27th, 1896.—Camp No. 68. Resumed journey on bearing of 270° at 6·30 a.m., travelling through the same inferior sand and spinifex country, varied by occasional low sandridges. At three and a half miles a fair belt of mulga was passed through, and here a very few tufts of bunch grass, hydrangia, and a few other green but non-edible bushes were noted, showing that the rains had extended this far, of which, since we entered the inferior country, I had been doubtful. At five and a half miles entered a jumble of high red sandhills, carrying large boxtrees and a few quondong, but the only undergrowth was spinifex; here ironstone rubble ceased entirely. At six and a half miles passed some large kurrajong, and a few patches of hard clayey soil cropping out through the sand. At seven and a half miles cleared sandhills and again entered sandy undulations, covered with very fine ironstone gravel, which gradually became larger until it was again rubble. At seven and three-quarter miles crossed into and through another jumble of high sandhills, and then again into sandy undulations, the sole growth being spinifex. At nine and three-quarter miles another series of sandhills. Entered and passed over these, and at thirteen and a half miles noted amongst the spinifex a few well developed plants of parakylia. At fourteen miles soil became firmer and vegetation slightly improved, for although the ground was still covered with a dense growth of spinifex, there was quite a thicket of native cherry, other edible bushes, and a fair quantity of parakylia, upon which the camels can fill themselves before sundown. Traversed this to its western extremity, when, finding there was nothing but spinifex and sand ahead, camped at 1·15 p.m. Distance by party, fifteen miles. Observed Beta Argus and Regulus; latitude of camp, 26° 6′ 54″.

Tuesday, April 28th, 1896.—Camp No. 69. Resumed journey at 6·45 p.m., on bearing of 270°. Continued through spinifex and sandy undulations to one and three-quarter miles, when hard inferior soil, covered with ironstone rubble, was entered. Here, in addition to spinifex, which was the prevailing growth, were a few clumps of dwarf wattle and mallee, with a little bunch grass, and, at wide intervals apart,

clumps

clumps of inferior mulga. At two and a quarter miles soil slightly improved, grass, although not abundant, was more plentiful and much greener; there was also a little herbage; an improvement on the last four days, but still by no means good country, as spinifex still reigned supreme. At two and a half miles entered a thicket of dense mulga, with a fair quantity of good bunchgrass, spinifex still being plentiful. At three miles passed close to a considerable rise, composed of ferruginous clay. This I ascended to obtain what view was possible, and was delighted to find that, for a time at least, we were clear of sand ahead; but to south, north, and west, the interminable spinifex, alternating with patches of mulga, mallee, and other scrubs, extended to the horizon. Here I noticed two crows flying down a watercourse, and it being unusual to see such birds in inferior country far from water, followed them, and at one mile came upon a very small hole where water had recently been lying, the bottom being composed of wet clay. There being no probability of discovering a useful water, rode across to and rejoined the party, which had continued on the course. At five and a half miles we were travelling over hard light-red soil, covered with nodular ironstone, low black spinifex, a few stunted corkwood, mallee, and black wattle; no grass or herbage; with, as before, an occasional thicket of inferior mulga, to north and south of our course. At eight miles passed through a little green grass, sparsely scattered amongst the spinifex, nodular ironstone still thick on surface. The belt of country we are now traversing being uncommonly similar to the poor class country in the Port Lincoln district, with the exception that there is no heath *(Epacris)*. At eleven and a quarter miles entered a fair belt of open mulga, wattle, and bunch grass; but even here spinifex asserted its superiority over all other vegetation. At eleven and a half miles noted a few bunches of the valuable parakylia. At twelve and three-quarter miles entered dense mulga, with sharp broken sandstone on surface. Here the soil was most inferior, there being absolutely no undergrowth. At thirteen and a quarter miles still in dense mulga, with slight improvement in soil, which was free of stone and carried a little good saltbush; but mulga then gave place to dwarf mallee, a little grass, and abundant spinifex. At thirteen and a half miles a long stretch of open spinifex, with a few scrubby bushes, lay before us. At fourteen and three-quarter miles passed a few large black wattle, a little geranium, and bunchgrass. Here nodular ironstone replaced the ironstone sand; soil still very inferior. At sixteen and a quarter miles open mulga, mallee, black wattle, spinifex; no grass or herbage. This class of country, with small patches of bunch and wire grasses at wide intervals apart continued to nineteen miles, when we camped at 3 p.m., in a fair clump of mulga, black and dwarf wattle, a little green grass and herbage. Distance travelled by party, nineteen miles; self, extra, three miles = twenty-two. Observed Beta Argus, Alpha and Gamma Leonis = latitude, 26° 9′ 0″.

Wednesday, April 29th, 1896.—Camp No. 70. Resumed journey at 6·40 a.m., on bearing of 260°, travelling over inferior soil, through spinifex, a limited quantity of dry bunchgrass and withered herbage to one and three-quarter miles, when a dense thicket of mulga, whose sole undergrowth was spinifex was skirted to the north. Here a line of low blue hills to north and west first became visible. These I anticipate will prove to be the Sandstone Cliffs extending to east and west from Forrest's Camp No. 65, when passing through this line in 1874. At two and a quarter miles entered open mulga, low wattle, a little herbage, bnnch and wire grasses, with fine ironstone rubble on surface; soil slightly better, but spinifex still in the ascendent. At four a quarter miles Forrest's Remarkable Peake bore 294°, about twelve miles distant; soil as above described, but less grass and herbage, with more spinifex. At four and a half miles passed some patches of *Euphorbia Drummondii* (poison), native geranium, and a few milk bushes. At five and a quarter miles grass and herbage slightly improves, mulga and corkwoods being in blossom, shewing that rain had fallen recently. At six and a quarter miles soil becomes lighter and more sandy, with fine ironstone gravel on surface. Here there were a few large black wattle, spinifex forming the sole undergrowth. A few chains on crossed a red sandstone ridge, dwarf titree, spinifex and wiregrass being fairly abundant. At six and a half miles soil again hardened, with ironstone gravel thickly strewn over the surface. Here there was a little green herbage amongst the abundant spinifex; this continued to nine miles, when a thicket of red mulga, very short and scrubby, was entered. Here the soil is very inferior, 90 per cent. of the low scrub being dead, and the worst kind of spinifex formed the sole undergrowth. At nine and a quarter miles entered a belt of open mulga, a small quantity of bunch and wire grass and the inevitable spinifex *(Triocea irritans)*; soil hard and clayey. At ten miles entered open spinifex, with scattered mulga on both sides of the course, a little green bunch grass and coarse wire grass amongst the spinifex; also a few stunted wild cherry; these our camels attacked with vigor. At ten and a quarter miles passed some very young kurrajong *(Sterculio)*, and at eleven miles a perfect thicket of the same tree. At twelve and a quarter miles soil was very hard, of a light-red color, upon which there was nothing but very poor spinifex and fine ironstone rubble. At thirteen miles a few parakylia plants were struggling for existence, being almost choked by spinifex, lofty poor-foliaged mulga ten chains to right of our course. At thirteen and a half miles am confident the low hills seen this morning are Forrest's Sandstone Cliffs; here the ground was strewn with sharp broken sandstone, which rendered travelling difficult and painful to the camels. At fifteen miles saw a smoke S.W. by S. about twelve miles distant. Ran the Sandstone Cliffs to seventeen miles, travelling through low scrub, spinifex, a little bunch grass and herbage; then descended into a valley from one and a half to three miles wide, between two lines of red sandstone cliffs; here bunch grass became abundant and herbage fairly so, and mulga improved in growth and foliage, the soil being much superior to any yet met with during the past four days; but still it is by no means first class. At seventeen and a half miles passed close under and north of a prominent high point in the southern group of cliffs, which had a bold escarpment to the north. We are now in close proximity to Forrest's 200gall. rockhole, but I am doubtful if we shall find it, as the copy we possess of his plan is twenty-four miles to the inch and very badly photographed, so that it may be anywhere within two or three miles of the position assigned to it on the map, and apparently there are no natural features to guide one to it. Travelled on down the valley to eighteen miles, and camped on an open patch of fair bunchgrass and green herbage, surrounded on all sides by dense mulga. Liberated camels at once; they are beginning to want water, the weather having been unusually hot for the time of the year, therefore shall again have to tie them down to prevent rambling. After lunch Mr. Murray proceeded on foot in search of Forrest's rockhole and to take bearings to prominent objects. He returned at 5·35 p.m., and reported that after walking five miles he had failed to find the rockhole, but had met with many old aboriginal encampments and tracks. Distance travelled by party, eighteen miles; Mr. Murray, extra on foot, five miles = twenty-three miles. Latitude of camp, by Beta Argus and Regulus, 26° 3′ 41″.

Thursday,

Thursday, April 30th, 1896.—Camp No. 71. Resumed at 6·55 a.m. on bearing of 270°. Continued over rough broken country of sand and ironstone, intersected by numerous shallow watercourses; good bunch grass, various herbs and parakylia (but all dying off through lack of moisture), mulga, wattle, and other acacia to one mile, where 50 per cent. of the soil was devoid of vegetation, but that upon which any grew was fairly good. Here spinifex, sparse mulga, and dwarf wattle was entered; grass and herbage continued for a few chains, but at two miles we were passing through spinifex pure and unadulterated, with an occasional huge black wattle and native currant bush. This extended to three and three-quarter miles, when sandstone cliffs were again met, and we descended into a valley lying between two lines of cliffs, similar to the valley we camped on last night. Here grass and herbage was slightly greener, but less plentiful, and the percentage of bare ground was greater. Here we passed a peculiar pillar of sandstone, situated mid-way between the two lines of cliffs, which at one time was evidently portion of the connecting strata between the two lines. It is fast disintegrating, and will shortly disappear; its height is now about 40ft. above base, diameter, 10ft. (irregular). At four and a half miles passed through a little parakylia. At six and three-quarter miles crossed Blyth Creek (of Forrest) and left the valley, travelling over similar soil and through the same class of vegetation. At seven and a half miles crossed a shallow watercourse with sandstone bottom, on the flats adjoining which were some large patches of well-grown kangaroo grass, the first seen since leaving Barlee Springs. At ten miles we were travelling through inferior spinifex, but a little bunchgrass, green herbage, and large wattle redeemed the country from utter mediocrity; here there was a slight sprinkling of ironstone rubble on the surface. At ten and a quarter miles entered open mulga and a little dry bunchgrass, with 90 per cent. of bare ground. At eleven miles soil improved, and we passed through a good patch of Mitchell grass, with wire and bunch grasses fairly plentiful; soil more porous, and less rubble on surface, but percentage of bare ground was in excess of that carrying vegetation. The mulga here was of the black variety, an inferior class, with poor foliage. The above continued only a few chains, when most inferior soil and spinifex prevailed. At twelve miles met a fair patch of parakylia and other green herbage. Here a few flint boulders were lying on the surface. At fourteen and a half miles soil was harder, but still inferior, the mulga being half dead, with scanty withered foliage; no spinifex, the only undergrowth being sparse and withered bunchgrass. At fifteen and a half miles entered light red sandy soil, no rubble, with a quantity of low green bushy mulga, wattle, and a few native cherry bushes, spinifex, wire, and bunch grasses. Here noticed some recent native and kangaroo tracks; a few slate-colored doves were also seen in the mulga. At seventeen miles soil again became hard and inferior, with broken sharp sandstone thickly covering the surface, causing our riding camels to limp and trip badly; bush was scanty with less foliage; no spinifex, and very little grass or herbage. For the last five miles have noticed a considerable number of native orange trees, which, however, are exceedingly stunted and poor, as compared with their congeners of the MacDonnell Ranges. At eighteen miles reached a small rough creek, on which there was excellent pasturage, parakylia, munyeroo, and roley poley being abundant; therefore camped and liberated camels at once, as judging from the verdure and abundance of vegetation there was a probability of finding water. Then on foot ran the creek down for half a mile, when it spreads out and disappears. Discovered three holes, which would last from three to six weeks when full, but all were just dry, the largest one containing a little wet mud; here there were quite a number of diamond sparrows, shell parrots, and doves. Returned to camp, lunched, and then on foot ran the creek to its source in a low range of hills two and a half miles south from our camp. Followed the main channel and found many from small to fairly sized holes, some with indurated clay, others with sandstone, and again others with sandy sides and bottoms, but all were dry. Many of the larger ones after a flood would last from six to eight weeks, and the creek having a fair catchment area runs readily, therefore anyone travelling this way after rain would do well to examine it carefully. Returned to camp after a heavy rough walk of seven miles. Distance travelled by party, eighteen miles; self, on foot, examining creek, seven miles=twenty-five miles. Observed Alpha and Kappa Argus, and Gamma Leonis, and fixed our camp in latitude 26° 7′ 33″.

Friday, May 1st, 1896.—Camp No. 71. Bar., 3 p.m., 28·50; attached ther., 90°. Resumed at 6·50 a.m., on bearing of 270°. Crossed creek and continued on through fair feed, and in a few chains entered good saltbush, the first we have seen in quantity since entering the long stretch of spinifex passed over; this extended three-quarters of a mile, when a shout from Mr. Murray called me to the front. On joining Mr. Murray found him gazing into a hole seven chains long by 5ft. deep, containing 18in. of pure limpid fresh rain-water, with the added advantage of excellent parakylia and good camel bushes on the banks of the creek in which the hole is situated and the adjoining inundated flats. Tasted the water, and at once liberated camels. Mr. Murray then started on foot to run down the creek, whilst I also on foot traced it to its source in a line of low red sandstone hills, two and a half miles south, a little west of our position; these hills having a bold cliff-like frontage to the north; but the cliffs are formed of such friable sandstone they are fast disintegrating, huge masses which have fallen now lying at foot of the cliffs. Followed main channel of the creek to hills and found five good waterholes, all containing beautifully clear fresh water, some with rocky, others with deep sandy bottoms. In addition to these there were two others, which contained no water, but on removing a few inches of the deep sand, a strong soakage was obtained. The order and description of the holes, beginning with the one first found by Mr. Murray, on which we are camped, is as follows:—

	Long.	Wide.	Deep.	Present Water.
No. 1 Waterhole, at Camp	7 chains	12ft.	5ft.	12in.
" 2 " 5 chains above Camp	20ft.	6ft.	4ft.	12in.
" 3 " 10 " south of No. 2 ..	1 chain	10ft.	6ft.	12in.
" 4 " 10 " " " 3 ..	4 chains	12ft.	6ft.	None on surface; good soakage
" 5 " 4 " " " 4 ..	3 chains	12ft.	6ft.	2in.
" 6 " 12 " " " 5 ..	4 chains	10ft.	3ft.	5in.
" 7 " 8 " " " 6 ..	20ft.	8ft.	4ft.	12in.
" 8 " 5 " " " 5 ..	2½ chains	9ft.	3ft.	No surface water; good soakage

Beyond waterhole No. 8 the creek continues for one and three-quarter miles, but the channel is too shallow and rocky to hold water for a lengthened period. On running creek to its head, returned by shortest route to camp, when I found Mr. Murray had also arrived; he reported he had followed the creek to where it spreads out on the plain. The following is an extract from his field-book:—"Examined creek for further water. Followed course for one mile, when two small pools of water; creek generally narrow, steep sides, rocky bottom. At one and three-quarter miles creek branches into several channels; followed centre for one mile. Creek here spreads out and floods adjacent country; fine growth of grass, roley poley, parakylia, and usual herbage; tracks of dogs, emu, and kangaroo, all run up the creek from here, and being more numerous

than

than above, I think all the water at present time is further up the creek. Saw no place where water is likely to remain more than a few weeks." With this latter remark I do not agree, as from the dry state of the grass, parakylia, and munyeroo (another variety of portulaca), on the adjacent banks and flats, the height of the nardoo on places where water has been lying and dried off, the clearness and purity of the water, and the growth of aqueous plants below the water level, I am convinced the bulk of water conserved in this creek is the result of the January rains, four months ago; and I am also of the opinion that the deeper holes will last for fully one month from date without being further replenished, so that when this creek has been in general flood, surface water may be expected for fully five months, and after that period soakages more or less strong will be found in the sand. In addition to the growths mentioned by Mr. Murray, I would add that the growth of kangaroo grass on the flooded flats is exceptionally fine, and that the banks of the creek are lined in many places with the native orange tree, upon several of which the fruit is just forming. As Mr. Murray was the first to discover this creek, I have named it in his honor.

Saturday, May 2nd, 1896.—Camp No. 72. Bar., 3 p.m., 28·66; attached ther., 90°. Resumed at 6·45 a.m.; crossed creek, and took up bearing of 270°. Travelled over rough, stony country through good roley poley, parakylia, bunch, wire, and a little Mitchell grasses, and good low, scrubby mulga to one and a quarter miles, when a small open saltbush flat, which also carried good grass and roley poley, was entered. Here there was also a broad, shallow watercourse, trending in a northerly direction, coming from the same sandstone range in which Murray Creek takes its rise. After crossing this watercourse, entered upon mulga, with undergrowth as above. Sandstone cliffs in course of disintegration thirty chains to south, terminating in a bluff point one and a half miles to S.W. To north a similar line of sandstone cliffs, but less distinctive in character, our course being down centre of an alluvial depression about two miles wide, located between above two lines of cliffs. At two and a half miles Mitchell grass was abundant and very green, showing that a recent shower of rain had fallen. At three and a half miles spinifex and a little Mitchell grass; here the cliffs were lower and fully two miles S.W. of our course. At four miles there was a little broken sandstone on surface; bunch grass, roley poley, purple everlastings were abundant and green, but patchy, whilst spinifex was strongly represented; here mulga was less dense and not so well foliaged. At four and a half miles crossed a good kangaroo grass flat, where munyeroo and parakylia were also plentiful; then entered open spinifex, with a few clumps of large black wattle; and at four and three-quarter miles were passing through a fine belt of these trees fully one and a half miles wide, the majority of the trees being young and vigorous. The undergrowth was formed of spinifex, wiregrass, and a little herbage on light sandy soil; no rubble or stone. At five and a quarter miles a few clumps of mallee encroached on the black wattle. At five and a half miles black wattle ceased entirely, being replaced by good open mulga and numerous clumps of mallee, the undergrowth being spinifex, wire and bunch grasses, and herbage. At five and three-quarter miles we were again passing through black wattle, on firm red sandy soil covered with fine ironstone gravel. At six miles passed a low sandstone rise, twenty chains to south, and saw a large smoke, bearing 315°, about ten miles distant; probably aborigines burning spinifex. At six and three-quarter miles soil became inferior, with sharp, broken sandstone on surface, the vegetation consisting of poor mallee, titree, and spinifex, with a few gnarled and twisted very large black wattle, and a little inferior wiregrass and herbage. At seven and a half miles soil and vegetation improved, and spinifex became less plentiful. At seven and three-quarter miles crossed a wide shallow watercourse, where kangaroo grass was green and abundant; then crossed a rough sandstone rise, carrying a few waterworn quartz pebbles on the surface, intermixed with ironstone and sharp broken sandstone. Here soil and vegetation were inferior, and continued to be so until nine miles were traversed, when they improved, bunch and wire grass, roley poley, other herbage and dwarf wattle being abundant but dry; mulga and mallee, which was plentiful, was green and vigorous. Here there were also a few patches of spinifex and small clumps of young kurrajong trees. At ten miles crossed a flat carrying good grass and herbage; here there were some very old brush yards which had been erected by natives for the purpose of trapping kangaroo rats, the tracks of that animal being also plentiful. At ten and three-quarter miles crossed another sandstone ridge, the vegetation being fair, with some better and greener patches intermixed. At eleven and a quarter miles the soil changes to firm red loam, with small nodular ironstone on the surface, the vegetation consisting of open mulga and a little mallee, with good bunch and wire grasses, leguminosæ, and very green spinifex. At eleven and a half miles as above, but no rubble, less mulga and more mallee. At twelve and a quarter miles passed a belt of vigorous well grown young black wattle, the undergrowth being scanty; wiregrass, poor herbage, and abundant spinifex; a small red sandstone ridge twenty chains to north. At twelve and a half miles we were passing over red sandy soil, open spinifex, a few dwarf wattle, no grass, and a little herbage; high red sandhills dead ahead, two miles distant. At fourteen and a half miles soil is inferior, spinifex abundant, with no grass or herbage, the timber being represented by dwarf wattle, stunted mallee and crooked corkwood. At fifteen and a half miles crossed red sandridge clothed with dwarf titree and spinifex; then across ten chains of red sandy flat and open spinifex, and entered dense lofty mulga, where, in addition to spinifex, were a little wire and spear grasses; here there were more old brush yards for trapping kangaroo rats. At fifteen and three-quarter miles encountered a series of sandhills which extended to seventeen miles, and had to be crossed at right angles, the intervening country being narrow sandy flats, on which the only growth was spinifex. At seventeen and a quarter miles entered firm red sandy soil, carrying lofty mulga, dwarf wattle, spinifex, wire grass, and a little parakylia. From top of the last sandhill obtained a glimpse of the Sutherland Ranges, veering then from the S.W. The name of range seems to be a misnomer, as not a single prominent point is visible, and from our position they appear to be simply a high tableland. At eighteen miles camped on fair mulga, waterbush, dwarf wattle, and good herbage. Distance travelled, eighteen miles. Observed Beta and Theta Argus, Alpha and Epsilon Leonis, by which the latitude of this camp was found to be 26° 7′ 5″.

Sunday, May 3rd, 1896.—Camp No. 73. Resumed at 6·45 a.m. on bearing of 270°, continuing through good bushy mulga, dwarf wattle, Mitchell, wire, and bunch grasses, and good herbage to one and three-quarter miles; then mulga and herbage continued, but grass became very sparse, being replaced by spinifex; soil of rich red sandy loam, fairly firm, no rubble on surface; line of low red sandhills thirty chains to south, trending east and west. At two miles grass was slightly more plentiful, with a few quondong and kurrajong trees amongst the mulga. At two and a quarter miles another chain of sandhills five chains to north, those to south still continuing. At four and a half miles struck a large samphire swamp bearing 30°, from ten to twenty chains wide, with gypseous banks and a saline efflorescence on a surface of light-yellow loam; in the centre of the swamp this saline deposit was more pronounced. On the N.W. side of the swamp were many small gypseous mounds similar to those at Lindsay's extinct mound spring, but not exceeding 3ft. in height. In

In shape the swamp is most irregular; it is about three miles long by about fifteen chains in width, in many places being much wider and in others more narrow. After crossing swamp resumed bearing of 270° through a small quantity of good saltbush and abundant coarse inferior wiregrass. Here kangaroo rats were numerous. This continued till six miles, when sharp limestone rubble on firm brown soil was met; here wire and bunch grasses were abundant, underneath fair open mulga. At six and a half miles crossed a low ridge of red sandhills and entered very inferior low sandy undulations covered with kurrajong and spinifex, a few stunted quondong, corkwood, and broombush; no grasses or herbage. This continued to eleven and a half miles, with occasional very small patches of open mulga on low red sandhills from fifteen to thirty chains on either side of the course. Then reached foot of a low sandstone table range, and entered good hard light-red soil covered with ironstone, limestone, and a little quartz rubble. Here there were open mulga, native currant, dwarf wattle, bunch and wire grasses. Travelled through this to a small creek, on reaching and crossing which Mounts Allott and Worsnop, discovered and named by John Forrest in 1874, lay before us; and as close in to those historic hills the country appeared to be rough, uninviting, and with little vegetation, and there being good feed on the small creek just crossed, including the prized leguminosæ, camped at twelve miles; turned camels on to feed at once, lunched, and leaving men to arrange camp, Mr. Murray and self started on foot to look for Alexander Spring and Forrest's pile on the summit of Mount Allot. Having failed to pick up the pile, although we have narrowly examined the hill with powerful glasses—it has probably fallen—Mr. Murray followed up the creek whilst I climbed the hill. On reaching the summit, which is about 100ft. above level of the plain, with a diameter of six chains, crossed over to the extreme southern face of the hill, and there found Forrest's pile which, as surmised, had fallen, it not being more than 18in. high. At once set to work and rebuilt the pile and replanted the old pole of mulga, it being still sound after a lapse of twenty-two years. The pile and pole are now 8ft. high above summit of the hill, and can readily be seen fully three miles from the east side when bushes and scrub are cut away, which will be done to-morrow. Rebuilding the pile occupied me two hours; then started to descend the S.W. side of the hill, in order to cross over to and examine a line of gums fringing a creek forty chains distant, when I observed Mr. Murray coming down the creek; rejoined him, when he reported he had examined the creek we are camped on to its source on top of the tableland we crossed this morning, and had found no signs of water, permanent or otherwise. He then crossed over to the one we are now on, and ran it down to where we met. On this creek he found what may prove to be a soakage, but which is now perfectly dry. Here there were numerous native encampments (old), dingo, emu, and kangaroo tracks, but not a drop of surface water; and he assumes that if there is any it will be found lower down the creek and nearer to Forrest's pile, upon which he saw me employed, and therefore made over towards me. Personally I am of the opinion that Alexander Spring is located at the dry soakage seen by Mr. Murray higher up the creek; and if so the outlook for permanent water is not encouraging. I have therefore decided to move camp on to this creek to-morrow, leave the party in camp and thoroughly examine the creek; when, should we be unsuccessful, shall fall back on Murray Creek, water camels, fill all casks, and from there strike direct to L. A. Wells' permanent soakage on the Erlistoun Creek, near and east of Lake Darlôt. Mr. Murray and self then returned to camp, reaching there at 5 p.m. Distance travelled by party, twelve miles; Mr. Murray, on foot, five miles; self, on foot, three miles = twenty miles.

Monday, May 4th, 1896.—Camp No. 73. Bar., 6 p.m., 28·65; attached ther., 80°. Loaded up at 7.25 a.m., and moved camp to the large creek, to a spot bearing 172° from Forrest's pile, from which it is distant fifteen chains. Established new camp and turned out camels on fair roley poley, excellent leguminosæ, other good herbage and water-bush, the herbage including abundance of parakylia and munyeroo. Then sent Mabar, who is a good bushman and most reliable, to examine lower end of the creek; Langman with axe and saw to clear off scrub from around pile rebuilt yesterday; left Vines to guard camp and repair saddles, whilst Mr. Murray and self, taking our riding camels and spades, started to thoroughly examine top end of both creeks. Left new camp at 8·10 a.m. Followed creek up, which for a short distance trends N.W. and then angles to N.E. At this bend, thirty chains from our new camp, found a large box tree marked W.W.M. 67 in 6in. letters. This must be Mr. W. Whitfield Mill's tree, who passed here in 1889, and who, I gather from Mr. Lindsay's journal, had a hard struggle for life in consequence of finding Alexander Spring dry. Continued up the creek, and ran it to its source on top of the low sandstone tableland crossed yesterday, and of which, at no very distant date, Mount Allott and Mount Worsnop formed an integral portion. Were unsuccessful in finding water, but a mile and a half above our camp passed some deep sand, this being the spot noted yesterday by Mr. Murray, and where he supposes a soakage may be found. After thoroughly examining the creek returned to this spot, and with our spades sank in this sand. At 3ft. struck fresh water, which was followed to a depth of 5ft. from the surface, when either a rocky bottom or boulders were met, and the supply of water not being strong did not risk throwing any out in order to definitely settle the point, as I am satisfied that with care sufficient will be obtained to water our fourteen camels and refill our casks. Am satisfied this is the site of Alexander Spring, native old encampments being numerous in the vicinage; and it has evidently been used by the natives for a long period, as, when clearing out the sand, we came across much *debris*, including rotten bush used by the natives to prevent sand from running, and a large quantity of quondong stones. I also picked up an ancient spear head. On returning to camp Mahar reported that he had followed the creek to its debouchure on the plain, carefully examining all channels and depressions the whole distance, including some large gums I had specially directed his attention to, but had found no water or any deep deposit of sand. It is therefore evident that the soakage where we obtained the water is Alexander Spring. Langman had cleared scrub around the pile for a radius of 150ft., which now shows up distinctly, and can easily be picked up from every direction. Mr. Murray then proceeded to sketch surroundings of camp, pile, and spring (?), whilst I proceeded to and marked Mill's tree on west side:—

S.A. TO W.A.
S. R.
BARLEE
160 M
E
S.G.H. 4/5/1896.

The tree bears from Forrest's pile 285°, distant about thirty chains; and to reach the soakage (spring?) the main channel of the creek should be followed above this tree for a distance of a mile and a quarter. Observed for latitude, and found it to be 26° 7′ 13″. This will be checked to-morrow night if weather permits.

Tuesday, May 5th, 1896.—Camp No. 73. Bar., 6 p.m., 28·65; attached ther., 65°. Took casks and tarpaulin to soakage, the latter to form into a trough. Enlarged and deepened our yesterday's hole to 6ft. Put

Put twenty buckets into the tarpaulin, and then sent Vines for the camels. Watered half the camels and filled all casks during the morning. Then returned to camp, liberated the watered camels, lunched, and watered the remaining ones; and in order to do so had to deepen our excavation to 10ft. Mr. Murray and self then made an exhaustive examination of the creek and surroundings, and both failed to find any further trace of water. Under no circumstances can the soakage from which we obtained our supply be regarded as permanent—and this spot is undoubtedly Alexander Spring—it being only fourteen weeks since the heavy rains of January, which unquestionably extended as far west as here, as is shown by the abundance of grass and herbage in places where the soil is sufficiently good to produce them; and I am satisfied there is no water within many miles of Mounts Allott and Worsnop which will last through one dry summer, even if unstocked. But when returning to camp I noticed a few chains east of our marked tree a hole which had been formed during the day by a small burrowing animal, the sand which had been removed being specially moist. This is entirely apart from any of the creek channels, being located on an inundated flat adjoining the main creek, and I am inclined to the belief that a fair soakage well can be obtained at a shallow depth, and I am also of the opinion, from the character of the surrounding rocks *in situ*, permanent stock water could be obtained at a reasonable outlay. Remainder of the day occupied in repairing equipment, strengthening ration boxes, and writing up journal. Again observed for latitude, the stars taken being—B. Argus, O. Argus, L. Leonis, E. Leonis, G. Leonis, I. Leonis, which places latitude of camp in 26° 7′ 13″; pile, 26° 7′ 3″; soakage, 26° 6′ 0″; the position of the water being approximate.

Wednesday, May 6th, 1896.—Camp No. 74. Bar., 9 a.m., 28·70; attached ther., 74°; bar., 6 p.m., 28·65; attached ther., 81°. Resumed at 7·45 a.m. on bearing of 240°, our objective being a bluff point observed from the summit of Mount Worsnop on bearing of 236°, about sixteen miles distant. Crossed creek and travelled over a flat subject to inundation, carrying good kangaroo grass, for a quarter mile; then entered dense, well-topped, low scrubby mulga, green and vigorous, with an undergrowth of stunted herbage, wiregrass, and leguminosæ. At half a mile noted a small patch of Mitchell grass, and then entered a little herbage and much spinifex on firm red sandy soil, with large black wattle plentiful. At two miles left dense mulga and passed a chain of low red sandhills five chains to south, entering open spinifex and a few large black wattle, dwarf wattle, and quondong; no grass or herbage. At two and a half miles ascended a high sandhill a few chains to left of our course; took a round of bearings and examined country ahead, which apparently consists of low red sandhills and sandy undulations, clothed with spinifex and low scrub. This class of most inferior country continues to five and a quarter miles, being varied with an occasional clump of stunted crooked corkwood, dwarf wattle, mulga, and young kurrajong. At five and three-quarter miles soil improves, carrying fair bunchgrass, water-bush, dwarf wattle, and fair mulga, with a line of low red sandhills two miles to north. At six and three-quarter miles entered fairly dense mulga, bunch and wire grass abundant but dry, with a fair amount of herbage; spinifex still in evidence, but not predominating, with low red sandridges from fifteen to twenty chains to N.W., trending east and west. At seven and a half miles crossed a high red sand range, carrying wiregrass, dwarf wattle, and spinifex, the latter with dwarf titree being the prevailing growth. At eight and a quarter miles struck what appeared to be a small gypseous swamp, the banks carrying bunchgrass and samphire amongst the ever-flourishing spinifex; a slight saline deposit showing on surface of swamp. Ran the south bank of this swamp for one and a quarter miles, when its trend altered to north and south, and, it being too boggy to cross with camels, we were compelled to deviate from our course, as the swamp, which had now assumed the dimensions of an inland lake, was here at its apparently most narrow point fully two miles across; continued skirting S.E. shore of the lake, endeavoring to find a crossing. Attempted to cross camels in three different places, and on the last occasion attained to within five chains of the desired goal, and then was compelled to return, as our riding camels who were led and had no weight to carry sank to their knees and were extricated with difficulty; therefore had we succeeded in crossing them it would have been impossible to cross the heavily-loaded pack camels. Then rode to top of an adjacent high sandhill, and finding we should have to travel a long way east of south to turn the end of the lake, decided to try the N.W. end, which we had not yet examined; and altering course to 215°, traversed shore of the lake until 3·25 p.m., when our bearing was 280°, being considerably west of our true course. Here camped in fair wild vetch, roley poley, salsolæ, and some camel bushes, but limited in quantity, the prevailing growth being spinifex. After camels were liberated Mr. Murray went on and sketched in shores of lake. From his report I find we shall have to retrace our steps for a considerable distance before being able to resume our course, as there is a wide stretch of the lake dead ahead, extending beyond the horizon in that direction. Distance travelled by the party, fifteen and a half miles; but only nine miles on course.

Thursday, May 7th, 1896.—Camp No. 75. Bar., 3 p.m., 28·66; attached ther., 94°. Leaving Mr. Murray to walk across lake on foot, in order if possible to find a crossing, and sketch unexamined portions, led the party along the long arm mentioned yesterday. Resumed at 6·55 a.m. on bearing of 35° for one and a half miles over high spinifex, mallee, dwarf wattle, a few quondong. No grass or herbage on high red sandhills. Then altered to 329° for one and a half miles, then to 220° for one and a half miles, then to 270° for one-quarter mile, then to 225° for one-half mile, then to 240° for one-half mile=five and three-quarter miles—and rejoined Mr. Murray, who had signalled us to make in to where he was. On arriving, found he was waiting at a salt creek running into the lake, where he thought, with a little trouble, we should be able to cross. In this I agreed, the creek being only six chains wide, with fifty links of soft slippery ground to deal with. Over this we prepared a wide track with spades and shovels,and then crossed, riding and lightly-loaded camels, without difficulty. Then got two of the heavily loaded water camels over. They slipped about a great deal, but did not fall. The third and last one, however, came to grief by falling heavily, burst his saddle girths, broke the saddle, and threw his load, 500lbs. of water. Fortunately little damage was done, and no water lost. Repaired damages, and with some trouble induced the frightened animal to resume. Finally, after a loss of about forty-five minutes, resumed our course of 240° for Bluff Point. At one mile after crossing the salt creek, which in two places contained a considerable body of intensely salt water, we were travelling through fairly dense mulga, dwarf wattle, bunch and wire grasses, on firm red sandy soil; up to this point the country traversed this morning being most inferior. Open kurrajong and spinifex twenty chains to south. At eight and a quarter miles soil again inferior, the vegetation consisting solely of mallee, a few young kurrajong, and spinifex. At thirteen miles reached the bluff point seen from Mount Allott, which proved to be of friable red sandstone, the summit being covered with red drift sand. Ascended this, examined country, and took a round of angles to prominent objects. Then took up a course of 221° 30′ for a small peaked hill, distant about twenty-five miles. Up to this point there was no improvement in the country. At

At thirteen and a half miles crossed two lines of high red sandhills, then entered open flat sandy soil, on which the sole growth was spinifex. At fourteen miles passed a small belt of wattle, very dry, and many of them dead. At fifteen miles entered open mulga, other acacia, and a few dwarf wattle; and as this appeared to be the only feed we are likely to obtain to-night, camped at 1·45 p.m. Distance of party fifteen miles, but nine on direct course. Named the lake after the present Commissioner of Crown Lands in South Australia, the Honorable P. P. Gillen, M.P. for Stanley; the Bluff, after Mr. L. O'Loughlin, M.P. for Frome, and Government Whip; and the peaked hill after Mr. E. M. Smith, Deputy Surveyor-General of South Australia; they being shown on my plan as Lake Gillen, Mount O'Loughlin, and Mount Smith, respectively. Observed B. Argus, E. Leonis, latitude 26° 18′.

Friday, May 8th, 1896.—Camp No. 76. Bar., 9 a.m., 28·76; attached ther., 84°; bar., 3 p.m., 28·61; attached ther. 96°. Resumed at 6·50 a.m. on bearing of 221° 30′, and continued through open scrubby mulga and spinifex, no grass or herbage, to half a mile, when mulga became more dense, soil slightly better, with abundant poor wiregrass and a little inferior herbage. At one mile observed a large gum flat one mile to N.W. of our course; therefore left Mr. Murray to continue with party, and rode over to and examined flat; found the soil to improve slightly and carrying bunchgrass and fairly green herbage, which, however, was dying off rapidly. On entering the timber found it to consist of well-grown vigorous white gum, the flat where crossed being one and a half miles wide from east to west, but the length could not be determined, there being no adjacent height from which to obtain a view. In the centre of a thicket of young green gums found a large claypan, which after rain contains a considerable body of water; it, however, has been dry for many months. Ten chains east of the claypan was quite an extensive old native encampment, some of the wurlies being unusually large; they have been long deserted, and have evidently been constructed to serve during the winter months. Tracks of men, women, and children made during wet weather were numerous, but not recent. Examined all promising places and depressions and found several other from large to small claypans, but all dry; then cut off party and rejoined them in three miles. When doing so rode over about 400 acres of good quality saltbush, but all dry and withered. This in conjunction with the absence of water, the dry and withered state of grass and herbage, leads me to infer that, although rain has evidently fallen west and south of Alexander Spring within the past three or four months, it has not been so heavy or general as the one we were favored with in the Musgrave and Mann ranges. Should this continue, our camels will fare badly during the next four weeks, by which time, unless unforeseen difficulties arise, we should reach settlements. After rejoining the party continued on course to six miles, passing through very inferior spinifex country, consisisting of red sandy soil, thickly covered with broken sharp limestone rubble, open dwarf mallee, native poplar, and no stock pasture of any description; then entered open mulga, 50 per cent. of which was dead and lying on the ground. Here spinifex gave place to bunch or wire grass, roley poley *(Salsola kali)*, quondong, and a few camel bushes; but this lasted only a quarter mile, when inferior soil, spinifex, and limestone was again met; low and irregular sandhills to right and left, a few chains off our course; under these the mulga and vegetation was slightly better. At seven and three-quarter miles passed through a little wiregrass and fair but dry roley poley, open dwarf mallee, spinifex, and a little broom, the two latter being nearly all dead; limestone rubble being smaller and less sharp. At nine miles crossed a gypseous swamp thirty chains wide by one and a half miles long, its trend being north and south. After crossing swamp entered light-yellow loam with gypseous earth outcropping, carrying saltbush, wire grass, samphire, and a few stunted but well-topped quondong. At eleven miles passed a small isolated sandhill three chains left of course; here quondong became more plentiful, but grass less so, being replaced by spinifex. Since passing the swamp there is a decided improvement in soil and vegetation, but neither can be classed as good. At eleven and a half miles a little bunchgrass and dwarf titree, and more spinifex. Low ridge of red sandhills half a mile to N.W. of course. At twelve and a half miles open mulga, mallee, dwarf wattle, a little wiregrass, no herbage. At thirteen and a half miles crossed a low ridge of red sandhills covered with quondong, dwarf wattle, and titree. At thirteen and three-quarter miles a low ridge of red sandhills, one quarter mile N.W. of course, clothed to the summit with an open growth of young native poplar. At fourteen miles crossed a narrow arm of a gypseous swamp trending N.W., then crossed a low red sandhill, and entered a gypseous flat on which bunch and wire grasses were abundant, with a little saltbush and a few purple everlastings; the larger growths consisting of titree and dwarf wattle. At fifteen and a half miles soil was firmer, covered with limestone rubble on surface, and carrying lofty mulga, native currant, poplar, wattle, and abundant bunch and wire grasses, the latter being of inferior quality and dry. This continued to sixteen miles, when a fine belt of young very green native poplar was entered. At eighteen miles reached a high red sandhill, on which was a fair amount of good succulent herbage; and the outlook beyond not being so promising, camped, and at once liberated camels to give them the benefit of it. Distance travelled by party on course, eighteen miles; self, three miles extra when examining gum flat = twenty-one miles. Observed Alpha and Gamma Leonis, and Ceta and Beta Argus; latitude, 26° 29′ 54″.

Saturday, May 9th, 1896.—Camp No. 77. Resumed at 7.20 a.m. on bearing of 230°, continuing through open mulga and spinifex, a large percentage of both being dead. At one quarter mile crossed a red sandy saddle and entered open spinifex on loose red sand, with sparsely scattered quondong and poplar. At one mile were in open mulga, nearly all dead, low spinifex and poor wiregrass, with a little withered herbage; a few large black wattle were also struggling for an existence. To right and left and ahead sandhills. At one and a half miles we were again travelling through open spinifex, a few quondong and poplar. At two and a quarter miles soil still sandy but firmer, and carrying a few large black wattle and poor wire grass. Here reached the high red sandhills seen this morning and deviated slightly to south to avoid them; crossed at a low ridge and continued through loose red sandy soil, with limestone outcropping in places; a long stretch of mallee and spinifex apparently now lay before us, with sandhills closing in on left and right. At three miles entered this mallee and spinifex, limestone still cropping through the sand, with a few tussocks of bunch grass between the spinifex. At three and a half miles soil is lighter in color and firmer, with limestone rubble thickly strewn on the surface; the vegetation consisting of poor mulga, mallee, spinifex, and wiregrass. Here saw the only Lowan hen (native pheasant) seen on the trip, although we saw several of their nests and obtained eggs between the Musgrave and Everard Ranges. At four miles entered a jumble of high red sandhills, crossed one of these at right angles, and resumed course up a leading sandy gully, between two lines of high sandhills, the only growth being mallee, spinifex, and a few black wattle, quondong, a very small quantity of poor herbage. At four and three-quarter miles crossed another sandridge, from the summit of which an extended view to S.W. and west lay before us. About twelve miles distant, on bearing of 283°, lay a table-topped range, with high bluff hill about sixteen miles still further N.W. on the same bearing; the intervening country being low

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and undulating, with dense mallee or mulga. At four and three-quarter miles large black wattle, better class mulga, and some well-grown quondong on firmer soil, covered with ironstone rubble, a few orange trees, corkwood, and abundant very dry wire grass; this only continued to five miles, when loose red sand and spinifex was again encountered. At five and a quarter miles crossed a large red sandhill, and disturbed three white cockatoos; they flew off slowly to the south; therefore, leaving the party to continue on its course, I followed them for one and a half miles through an irregular jumble of high sandhills out on to a limestone flat; here comparatively recent showers had fallen, the vegetation being much greener, and the mulga in blossom; bunch and wire grasses, roley poley and purple everlastings were abundant and refreshingly green; diamond sparrows, quails, hawks, and a variety of other small birds numerous; but, although I searched most carefully, no water was found. Saw three places where it had been lying, but none where a body of water could be conserved for any length of time. Crossed this flat, and again entered high sandhills, when finding the limits of the shower had been reached, the vegetation being once more dry and withered, turned to cut off party; rejoined them at eight miles, when they were travelling over hard red clayey soil with flat limestone outcropping and limestone rubble on surface; fair dry bunch grass, spinifex, corkwood, mallee, and dwarf wattle, with a little inferior mallee. At eight and a half miles soil and vegetation similar, with addition of a few black oak *(Casuarina glaucus)*, large black wattle, and larger corkwood. At ten miles limestone was replaced by ironstone rubble and the soil slightly improved, with a corresponding advance in vegetation; but all trees, grass, and herbage were very dry, and contained little nourishment. At ten and a quarter miles high red sandhills a few chains to N.W., low scrub, spinifex, and poor wiregrass, rubble of flinty limestone. Here crossed a native's track, quite recently made; he was accompanied by a dog, and travelling in a southerly direction. A few chains on crossed another track going north, but this was several days old. Country as above described to thirteen miles, when a slight improvement occurs. Here passed a small sandstone rise, and entered fairly dense, low scrubby mulga, with an undergrowth of poor-class wire grassand spinifex; surface covered with large sandstone boulders. At thirteen and a quarter miles passed through a belt of red mulga. At fourteen and a half miles loose sand continued, the only vegetation being spinifex and dwarf titree. At fifteen and three-quarter miles crossed a line of high red sandhills, and then on over a sandy flat to sixteen miles, clothed with spinifex, low scrubby mulga, mallee, stunted pine, and dwarf titree on hills. After traversing flat, crossed another line of sandhills, and finding fair mulga, wattle and quondong half a mile off our course, turned westerly until they were reached, and then camped; our bearings and distances for the day being as follows:—230° for three-quarters of a mile, 237° for three and three-quarter miles, 240° for four and three-quarter miles, 231° for five miles, 270° for two and a quarter miles = sixteen and a half miles by party; self three miles extra = nineteen and a half miles. Distance on course, sixteen miles. From here a prominent hill is visible in a range running north and south, about thirty miles distant, and bearing from here 313°. Observed Beta Argus, Alpha and Gamma Leonis, which places us in latitude 26° 39′ 12″. Named bluff hill and table range seen this morning after Mr. E. P. Laurie and his daughter, viz., Mount Laurie and Ida Range, Mr. Laurie being chief draughtsman of the South Australian Survey Department.

Sunday, May 10th, 1896.—Camp No. 78. Bar., 6 p.m., 28·48; attached ther., 78°. Resumed at 6·38 a.m. on bearing of 262° to clear low bluff sandstone point about two miles distant; crossed high ridge of red sandhills and traversed rough inferior red sandridges with narrow intervening sandy flats, on which grew mulga, mallee, pine, dwarf wattle, and a very few fodder bushes, abundant spinifex, a small quantity of poor wiregrass, both in a very dry state, with the timber mostly dead or dying; no tracks of game or reptiles, the country being absolutely deserted. Reached the bluff point at two miles, then altered bearing to 240°, and crossed high ridge of sandhills, entered sandy flat and then across low sandy ridge into an irregular jumble of sandhills. Here the only vegetation was mallee, dwarf titree, and spinifex. At three and a half miles entered dense dead mulga and spinifex on hard yellow soil, on which was a limited quantity of wiregrass, very sharp rough gritty sandstone cropping out in places. Continued to four miles, where soil slightly improved, with small ironstone rubble on surface, mulga less dense and with better foliage, less spinifex and more wiregrass, but all were in a dry withered condition. At four and a half miles crossed another high sandridge; titree, stunted pine, and spinifex on hills and flats. Then entered a long narrow sandy gully, separating two lines of high sandhills running parallel to each other, about forty chains apart. Here the growth consists of malle, desert gum, and a few clumps of mulga, with occasional quondongs and scrubby corkwoods, the sole undergrowth being spinifex. This extended to six and three-quarter miles, when a wide belt of mulga, large black wattle, on firm light-colored soil, was entered, undergrowth spinifex and wiregrass—the latter predominating—with high lines of red sandhills about twenty-five chains to N.W. and S.W., about twenty-five chains distant. At seven and a quarter miles had to cross one of these, as it was forcing us from our course; then across a small sandy flat to another high sandy ridge. Ran this down on south side to eight and a quarter miles, when the flat widened, but vegetation remained as before. Here there was a little fine ironstone rubble on surface. This continued to eleven and a quarter miles, with occasional belts of dense mulga, dwarf and large black wattle, desert gum, and a few quondong. Soil soon became looser, and we were again passing over pure red sand carrying lofty open mulga and high spinifex; high ridges of sandhills closing in on both sides of the course. Crossed the one to N.W. and continued along another long spinifex gully, with low dwarf mallee and a few desert gum. At twelve miles we were on harder soil, with fine ironstone rubble on surface; no change in vegetation. At twelve and a quarter miles we were again passing through loose red sand, desert gum, mallee, and high spinifex. At thirteen and a quarter miles crossed another high sandridge and entered another leading sandy gully containing spinifex, a few large black wattle, and low scrubby half-dead mulga, a few quondong, and a little herbage, on which we camped. Bearings and distances travelled to-day: 262° for two miles, 235° for two and three-quarter miles, 230° for three and three-quarter miles, 223° for four and three-quarter miles, 230° for six and a half miles, which was continued to camp at nineteen and three-quarter miles. Latitude not obtained, it being too cloudy to observe stars.

Monday, May 11th, 1896.—Camp No. 79. Bar., 9 a.m., 28·64; attached ther., 58°. Resumed at 6.40 a.m. on bearing of 240°; continuing through spinifex flat with low sandridge a few chains to right for one-third of a mile, then entered a small patch of open mulga, passed through this and ascended a small sandhill, from the summit of which the Ernest Giles Range of tabletopped hills were descried, and further to the north Mount Peterswald; this range and hill being fixed and named by Mr. L. A. Wells in 1892, when on his flying trip from the Murchison. Sir John Forrest's position of Alexander Spring, Mr. Wells' Ernest Giles Range, and my traverse therefore agree very closely, the three positions being within a mile or two;

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a very satisfactory result, when the difficulty of obtaining correct longitudes in the interior is considered. Continued to one mile to the top of another series of sandhills; from here observed two tabletopped hills eight miles S.W. by south, with apparently dense mulga to their summit; the soil crossed to this point is light-red sandy loam with a little ironstone rubble on the surface, carrying open mulga, mallee, large black wattle and spinifex, which, at two miles, became fairly dense, 25 per cent. of the timber being dead. Here the soil was hard; the undergrowth, consisting of bunch and wire grasses and yellow everlastings, all old and very dry. At two and three-quarter miles entered open mallee, large black wattle, high spinifex, and a little green herbage. At three and a quarter miles open mulga and bunchgrass. At four and a half miles mulga became very dense, with no undergrowth. At four and three-quarter miles soil slightly improved; and here we met a little parakylia, but it was so short and stunted our hungry camels passed without attempting a bite; there was also a small quantity of fair bunchgrass, and a few native orange trees, the surface of the ground being covered with fine ironstone rubble. At six and three-quarter miles our eyes were gladdened by an intensly green spot, and I joyfully anticipated obtaining at least one good meal, and perhaps a drink for our patient companions; but alas, this beauty spot consisted of not more than three acres, formed by a depression in which water had lodged. At eight and a half miles we were abreast of the northern end of the Ernest Giles Range, and travelling through good saltbush and bunchgrass, iron and sandstone rubble on surface, timber being represented by fair mulga, and other varieties of acacia. At nine miles saltbush ceased, soil became inferior and covered with rough sandstone pebbles, which in some instances were almost boulders. Here the mulga also deteriorated, and bunch grass in limited quantity formed the sole undergrowth. At nine and a half miles an improvement was noted, soil being stronger, with good saltbush and bunch grass. At ten and a half miles soil still good, mulga and wattle was entered, the latter being in bloom, other fodder bushes and bunchgrass fairly plentiful and good. This strip may be classed as medium pastoral country. At fourteen and a half miles left mulga and grass country, and entered very inferior red sand rises and undulations. Here there was nothing but high mallee and dense spinifex; therefore ascended a sandstone rise about ten chains north of our course to obtain a view, and found that similar country extended on our course as far as the eye could reach, with no improvement to north and south. Camped on the first open spot, and sent camels back to feed on the mulga, wattle, and herbage, half a mile to east. After camping, Mr. Murray and self ascended hill and examined surroundings. Found a rockhole and old native encampment. The hole was quite dry, its capacity being only 60galls. Near the camp the aborigines, or more probably their children, had arranged the loose sandstone boulders in long parallelograms, circles, squares and diamonds. Took bearings to hill half a mile north of camp, 79°; Mount Peterswald, 354°; north end of Ernest Giles Range, 69°; Holyroyd Bluff (?), 260°. Too cloudy to observe for latitude.

Tuesday, May 12th, 1896.—Camp No. 80. Resumed at 6·40 a.m. on bearing of 230°, continuing through high spinifex, open mallee, a few large black wattle, and a little mulga, to quarter-mile. Then entered dense mulga, spinifex, wiregrass, and a little herbage, on red sandy soil slightly firmer than that on which the mallee was growing. This extended to one and three-quarter miles, then sandy ridges and undulations. Here the vegetation consists of scrubby mulga, mallee, and spinifex in about equal quantities, dwarf titree, with an occasional quondong, poplar, black wattle, and corkwood, and a few bunches of grass at long intervals apart. At four miles passed through a belt of *Myoporum desertii* (native myrtle), a strong camel poison, the first seen on the trip, although we had kept a very careful watch for it. At five and a half miles crossed a hard sandy flat, with ironstone rubble on surface, carrying good mulga, bunchgrass, and herbage. This was only of limited area, and was surrounded on all sides by sandhills, whose sole production was spinifex and dwarf titree. At six and a half miles we were passing over firm red soil, covered with large ironstone pebbles, the vegetation comprising open mulga, wire and bunch grasses, purple everlastings, dwarf wattle, native currant bushes, and a little spinifex. At six and three-quarter miles we were again in loose red sand, spinifex, titree, low irregular sandhills, and clumps of desert gum. At seven miles soil was hard yellow loam, vegetation as above, with iron and limestone rubble on surface. Here we passed a very ancient brush yard, formerly used by the aborigines for catching kangaroo rats and other small game. At seven and a quarter miles entered large desert gum, a few dwarf wattle, high spinifex, with no grass or other vegetation; practically absolute desert. Travelled on through this to sixteen miles, when, striking a fair belt of quondong and acacia, and there being no prospect of obtaining better or equally good pasturage, camped and liberated the camels at once.

Wednesday, May 13th, 1896.—Camp No. 81. Bar., 6 p.m., 28·78; attached ther., 60° Resumed at 7·40 a.m. on bearing of 250°, continuing through large desert gum, dwarf wattle, spinifex, and a few quondong to two miles, when large black wattle, good mulga, and a limited quantity of wiregrass were met. At two and a quarter miles dense mulga, wiregrass, and no spinifex. At two and a half miles desert gum, large black wattle, high spinifex, wire and bunch grasses, and a little dry herbage; sandhills two chains to left of course. Here we entered a jumble of high irregular sandhills, from the summits of which portion of Lake Wells was visible. At three and a quarter miles dense dwarf titree, dwarf mallee, desert gum and spinifex on loose red sand. At four miles high sparse spinifex, wiregrass, and green herbage; sandhills ten chains to south. At four and a half miles altered bearing to 200° to clear the most southern visible point of Lake Wells, continuing through dense mulga, abundant wiregrass, and considerable green herbage. This extended to seven miles, when bearing was altered to 160°, the lake being a quarter of a mile to west. Here we were traversing irregular sandhills, open mallee, high spinifex, a little herbage, and dry saltbush. This continued to shore of the lake, which was then skirted. At seven and a half miles bore 115° to eight miles, when we turned due south (180°) to clear end of lake. At nine miles bore 130° through dense mulga, other acacia, abundant wiregrass, a little roley poley, and other green herbage, saltbush, samphire, and other salsolæ. Travelled along south (?) bank of the lake, the shore being formed of gypseous earth, with high sandhills from twenty to thirty chains to south. On these black oak *(Casuarina Glauca)*, mulga, and a variety of other good acacia were plentiful. At nine and a half miles bore 35° along a narrow arm of the lake; at ten miles 100°. At ten and a quarter miles, having rounded the arm, bore 180°. At ten and three-quarter miles passed a low stony hill to east of course, with two narrow lake arms coming from N.E. Then bore 210° along edge of lake, and at fourteen and a half miles camped on fair saltbush, green salsolæ; other herbage, good mulga and wattle. After establishing camp, Mr. Murray and self walked across the lake to L. A. Wells' southern table-topped bluff, which bore 275° from camp, distant three and a half miles, leaving him there to take a round of angles. I walked on to another point one mile S.W., in order to examine country ahead; was disappointed with the outlook, and am afraid we shall make little headway on our course to-morrow, as the lake, or a considerable arm, extends east and south beyond the range of vision, which is limited

limited to three miles, by sandhills forming peninsulas and jutting into the lake. Noted a narrow neck, which I trust we shall be able to cross; otherwise we shall have to travel a long way out of our course. After making this examination rejoined Mr. Murray, and we returned to camp, reaching there at sundown, thoroughly tired out with the exceptionally heavy walk over and through the lake-bed. Distance by party, fourteen and a half miles (only nine miles of which was on course); Mr. Murray and self extra on foot nine miles = twenty-three and a half miles for day. Observed Alpha and Theta Argus and Gamma Leonis, by which it was determined that latitude of camp No. 81 was 27° 6′ 15″.

Thursday, May 14th, 1896.—Camp No. 82. Bar., 3 p.m., 28·69; attached ther., 72°. Bitterly cold during night; ice on water at daylight. Resumed at 6·30 a.m. on bearing of 225°, continuing along east shore of Lake Wells, through soil and vegetation as described, with small sandridges and gypseous patches to east, to half a mile, when the narrow neck examined yesterday was reached. This proved to be too soft and boggy to risk loaded camels on; therefore altered bearing to 150°, and continued for ten chains. Then had to alter bearing to 70° for seventy chains; then to 30° for seventy chains; then to 80° for seventy chains; then followed arm for thirty chains, and altered bearing to 140° for one mile; then bore 105° for ten chains; then 130° for seventy chains; then 170° for 100 chains; then 180° for one mile; then 210° for thirty chains; then 90° for three-quarters of a mile; then 135° for two miles, and ascended a high sandhill. From here Wells' Southern Bluff bore 308°, and we now, being clear of the lake, bore 235° for a distant hill, and ran this course to fifteen miles, when, entering a patch of good mulga, wattle, and green herbage, camped. Distance on course, *nil*, as we are still east of our last night's position. This delay is exasperating, but unavoidable, as we made repeated attempts to cross the narrow arm, on the last occasion nearly succeeding; but when within a few chains of the desired goal our strongest, heaviest, and best camel, who is carrying full casks of water, became hoplessly bogged, we having to relieve him, and carry the load back on to firm ground, and no persuasion would induce him to go forward. The country traversed this day comprises some of the best pastoral land travelled over since leaving Alexander Spring, the larger growths being represented by black oak, good mulga, and other acacias and pine. The undergrowth is wire, bunch, and spear grasses, good saltbush, other salsolæ, and one large flat of excellent cotton-bush, with rare patches of desert gum, mallee, and spinifex. Passed one very old native encampment. Two recent natives' tracks, two emus, and one wild dog, the first sign of man, bird, or beast seen for many days. Latitude by Alpha and Theta Argus and Gamma Leonis, 27° 13′ 5″.

Friday, May 15th, 1896.—Camp No. 83. Resumed at 7·20 a.m. on bearing of 235°, continuing through desert gum, open mulga, spinifex, and wiregrass, young desert gum forming quite a forest on low rises of red sand. At one mile entered firm red loam, carrying good lofty well-developed mulga, abundant bunch grass, half-dry herbage, and broom, the majority of the latter being dead; also noted a few stunted poor-foliaged water-bush. At three miles crossed about thirty acres of open salt and cotton bush, samphire, wire and bunch grasses; at its western end was a dry claypan. Here were quite a number of natives' tracks—very old—of men, women, and children. These were deeply indented in the soil, the surface having been boggy when they crossed. After leaving this flat, soil and vegetation as before, except that wire replaced bunch grass. At four miles entered an open grassy and samphire flat forty chains by ten chains, with a sandstone rise immediately to right. This carried mulga, black oak, and saltbush. At four and three-quarter miles we were travelling through good open mulga, salt and cotton bush, dwarf wattle, and bunchgrass, on firm red loam. At five and a half miles in similar good pastoral country, and crossed an extensive shallow dry claypan, covered with dry nardoo. At seven and a quarter miles mulga became dense, and saltbush was replaced by wire and bunch grass, both of which were abundant and intermixed with a limited quantity of herbage. At eight miles we were passing through good green herbage, wire and bunch grass, with dwarf wattle more plentiful. At eight and a half miles an open saltbush flat. At eight and three-quarter miles a gypseous rise and samphire flat, both small, with good green roley poley *(Salsola kali)*, other herbage, and leguminous plants; then crossed another gypseous rise, carrying black oak, mulga, hakea, broom, saltbush, and bunchgrass. This was succeeded by a second swamp, and that by another rise and swamp, causing us to deviate slightly from our course, the swamp being too soft to allow the crossing of loaded camels. Around the large swamp the vegetation was not so luxuriant, diversified, or green, the greater part being worthless samphire and inferior silver grass. On leaving this swamp crossed a narrow neck of gypseous earth, and then struck another swamp, not so broad as the last one, but longer—eighty by fifteen chains. On the banks of this there were open mulga, wire and bunch grasses, saltbush, roley poley, other salsolæ and herbage, all green and abundant. At thirteen and a half miles left good pastoral country, and entered inferior red sandy soil, carrying desert gum, a few sparsely-scattered mulga, and clumps of mallee and broom, the undergrowth being spinifex and worthless herbage. At fourteen and a half miles entered dense mulga, a little wiregrass, and much spinifex, with widely-separated patches of fair herbage. Here crossed two natives' tracks, both men, quite recent, and one extremely large. Continued through this, the vegetation gradually becoming poorer, when at fifteen and a half miles, desert gum and spinifex being the only products visible ahead, camped. Distance on course, fifteen and a half miles. Latitude by Alpha and Gamma Leonis and Alpha and Gamma Crucis, 27° 18′ 58″.

Friday, May 29th, 1896.—Camp No. 84. Bar., 6 a.m., 28·67; attached ther., 68°. Resumed at 6·30 a.m., on bearing of 225°. Passed through strip of mulga; camped in and entered desert gum, spinifex, mallee, and a little wiregrass. This extended one and a half miles, when dense mulga, a large percentage of which was dead, was met. Here the undergrowth was spinifex and wiregrass. As the scrub was penetrated this improved, and on some recently burnt patches of considerable area vegetation became abundant, Mitchell and bunch grasses, parakylia, and other good herbage being luxuriant. At three and a quarter miles altered bearing to 261°. Entered sandhills and rough sandstone rises. Here the vegetation continued good and abundant. At four and a half miles firm red sandy soil, open mallee, and spinifex. Here aboriginal tracks were numerous, but old. At six and a quarter miles still in open mallee, spinifex, and wiregrass. At six and three-quarter miles less mallee, no spinifex, and more grass, but soil still inferior, grass being short, sparse, and containing little nutriment, whilst parakylia was so stunted the camels could not obtain a mouthful. Here seven slate and pink gulares (cockatoo) flew slowly overhead, going in a south-westerly direction. At seven and a quarter miles passed a few native orange trees and some old native camps. Here the soil became very hard, light-colored, and inferior, the vegetation consisting of stunted mulga with poor foliage, native currant, and silvergrass; quartz and ironstone rubble on surface. At nine miles struck a small shallow watercourse coming from between two hills. We were steering for the higher of the two, being the one we took the bearing of 235° when on the high sandhill east of Lake Wells; these

these two hills form portion of a comparatively high range trending S.E. to N.W. Just prior to reaching the watercourse passed some old sleeping-places of the natives, where the children had amused themselves by arranging quartz and ironstone pebbles in long parallelograms, crescents, squares, circles, and diamonds. A solitary crow here flew towards us with caws of welcome; therefore Mr. Murray and self, who were a quarter of a mile in advance of the party, kept a sharp lookout for indications of water. On striking channel of the watercourse a slight depression, half a chain to left of our course, was noted, which on examination proved to contain deep sand, in which at 15in. we struck fresh water, the sand being collected at base of a large conglomerated sandstone flat rock. On striking water obtained a spade, and sent it down to eye of the handle = 3ft., without finding bottom; therefore concluded we should obtain sufficient water for the camels, which the young ones now badly require. Moved on ten chains to timber and camped. At once laid tarpaulin trough, opened out the sand, and followed it down through a rocky fissure, baling the water as we proceeded into the tarpaulin, in this manner obtaining 40galls. The supply was then exhausted, and the well 12ft. deep on an angle of 45°. The cause of this short supply was the narrowness of the fissure, which, as it went down, was only sufficiently wide to admit of removal of the sand with a quart pot. It was fortunate the flood which deposited the water had also carried in the sand; otherwise the water would have evaporated long before our arrival. Gave the young camels 5galls. each = 25galls., the remaining 15galls. being divided amongst the older ones. I now anticipate little difficulty in reaching the permanent soakage on the Erlistoun, even should the country prove to be as poor as that traversed since leaving Alexander Spring. Completed watering the camels at 3 p.m.; then put them on best feed available, when Mr. Murray and self went off, he to examine lower end of the watercourse whilst I traced it to its source. Neither of us were successful in finding more water, and that obtained is evidently the only water in this course which lasts for any time after rain. After examining the creek ascended the range, and obtained a fair view of the country. Ahead, on our course, a range extends from S.E. to N.W., distant about thirty miles, the intervening country being composed of alternate belts of desert gum and dense mulga. In the latter I trust we shall obtain better pasturage; otherwise our camels will be in a sorry plight. To south and S.E. the country slopes rapidly for many miles, when the outline of a high tableland, above which rose many flat-topped hills, was discernible, about twenty miles distant. To north a line of swamps extends north and easterly, and appears to end about five miles north of the highest hill in this range. This hill bears 280° from the water, about a mile and a quarter distant. Then returned to camp, where I met Mr. Murray, who reported he had found no further water either in creek or range. He had ascended the highest hill, from where he obtained bearings to salient points, which will be shown on plan. He built a trig. pile on this hill 6ft. 6in. high. The hill I have named "Mount Strawbridge," in honor of my chief, Mr. William Strawbridge, the Surveyor-General of South Australia; and the range of which it is the highest and most prominent point the "Ulrich," after my late father, Ulrich Hübbe, LL.D. As feed is not plentiful or good here had the camels brought in at nightfall and tied down. Marked a mulga tree S.E. of, and close to, the water $\frac{\text{S.G.H.}}{16/5/96.}$ Distance travelled on course, nine miles, Mr. Murray and self, seven miles extra on foot = sixteen miles. Did not observe for latitude, the distance from our last camp being so short.

Sunday, May 17th, 1896.—Camp No. 85. Bar., 3 p.m., 28·67; attached ther., 82°. Resumed at 6·50 a.m. after visiting the water, from which we obtained ten more gallons which had drained in during the night, this being given to those who had the least yesterday; then on bearing of 270° continued through open low mulga and other scrubs on hard red sandy soil, a few stunted corkwoods, a little silver grass and parakylia, sharp sandstone and quartz rubble on surface. At one and three-quarters miles open mallee, large black wattle, a little mulga and old dead bunch grass, and unlimited spinifex on light-red sandy soil, sloping rapidly to the south, with high tableland and flat-topped hills as seen from range yesterday, which this morning, owing to strong refraction and mirage, appear to be twice their natural size and height. At two and a half miles similar soil and vegetation, excellent dwarf wattle, and a few quondong with well-developed green fruit. At two and three-quarters miles more spinifex and less grass, but still good wattle and quondong, with a few large kurrajong, native poplar, and a little herbage. At three miles open mulga; no other change. At three and a half miles crossed three recent tracks (two men and one woman), and saw a crow. At four and a half miles soil is firmer; ironstone, sand, and quartzitic rubble on surface, wiregrass, spinifex, open mulga, no wattle or other bushes. At five and a quarter miles a little more wire and bunch grass, less spinifex. At six and three-quarter miles entered a salt and cotton bush flat, twenty chains wide, one mile to south and half a mile to north in length; then crossed a gypseous samphire swamp, with black oak on banks—quarter of a mile wide where crossed, and extending south three-quarters of a mile, northerly as far as could be seen. This is evidently an arm of the various swamps seen yesterday, and which, presumably, are connected with Lake Wells. After crossing swamp, soil and vegetation slightly improved, but many of the large black oak were dead; the undergrowth was composed of bunch and wire grass, dwarf wattle, and patches of saltbush. At seven and a quarter miles hard red sandy soil, dwarf mallee and spinifex, with no other growth. As we progressed this became an absolute desert of large desert gum and spinifex. This continued to thirteen and a half miles, when dense mulga was entered. Here the undergrowth was represented by wire, spear, and bunch grasses, leguminous plants, other green herbage including parakylia and excellent native geranium. As the mulga was penetrated it became less dense, and herbage so green and good that at fourteen and a half miles I camped to give the camels the benefit of it. They certainly will enjoy themselves to-night, the pasturage being the most succulent they have had for the past six weeks. Distance on course, fourteen and a half miles. Observed Alpha and Gamma Leonis and Alpha and Gamma Argus, which places us in latitude 27° 22′ 26″.

Monday, May 18th, 1896.—Camp No. 85. Resumed at 7·30 a.m., on bearing of 270°, through dense mulga, low spear grass, native geraniums, and other good herbage to one quarter of a mile, when, finding the mulga to be too dense to allow a passage for even our riding camels when led, turned north, and at half a mile, by skirting the scrub, was enabled to resume our westerly course, travelling through open dwarf mallee, corkwood, spinifex, and wiregrass on loose red sandy soil; granite and red sandstone range half a mile to north. This class of country continued to one and three-quarter miles, when mulga of similar character to that we had skirted, but less dense, was entered. Here the predominant growths were wiregrass and spinifex; soil still red sand, but firmer. At two and a quarter miles mulga ceased, and a wide shallow watercourse, with flats subject to inundation, lay before us. Here, noticing a depression eight chains north of our line, rode over and found a small waterhole, containing a limited quantity of pure clear water; and then, further observing a much deeper and more defined channel, I requested Mr. Murray to halt the party

party on its arrival and select a good camping ground should he hear a shot. Then rode off to examine the creek, and in ten chains found two good waterholes containing ample water for the camels and to refill our casks. Gave appointed signal, returned and assisted in liberating camels, and then we had a satisfying wash, the first of any description for thirteen days. Then, leaving Mr. Murray and men to arrange camp, I followed main channel of the creek into the granitic and sandstone range, a distance of two miles, and found nineteen different waterholes, some containing only a small quantity of surface water, but with good soakages in deep sand, others being several chains long, from 20ft. to 30ft. wide, and when full from 5ft. to 6ft. deep; three of these contained a depth of 3ft. of excellent clear pure water. Then, as the country abutting on both sides of the creek was clothed with dense mulga, and I had crossed some recent native tracks, and being alone, I deemed it prudent to return to camp, as I intend resting the camels here for some days, the pasturage on the flats subject to inundation being excellent. The time we are camped here will be devoted to thoroughly examining and sketching this creek and surroundings. Distance travelled by party, two and a half miles; self, extra, on foot, six miles, equal to eight and a half miles. Have numbered this camp same as last, having made so little westing. Observed Alpha and Gamma Leonis, which determined our latitude at 27° 21″ 38′.

Tuesday, May 19th, 1896.—Camp No. 85. Bar., 9 a.m., 28·69; attached ther., 55°. Mr. Murray and self proceeded on foot to examine creek and range. Ran the creek to its source and found it takes its rise on a level table-topped plateau, closely resembling the country in which Alexander Spring is located, with the difference that whilst we found that creek to be absolutely devoid of surface water, in this one a very considerable body of water is conserved, as in addition to the nineteen waterholes examined yesterday we discovered four more, one being fully seven chains long by 15ft. wide, with an average depth of 6ft. 6in. when full; in several places this hole contained from 18in. to 30in. of pure fresh water in an irregular rocky bottom, and, judging from the withered appearance of grass and herbage on the adjacent tableland, which had not been inundated by flood water, I am satisfied rain in appreciable quantity has not fallen here since last January, and as the present supply of water will, if unstocked, last fully three months longer, without replenishing, it may be assumed that under ordinary circumstances water can be relied on for seven months in the year, more especially as the catchment area is extensive and hard, so that even with a light rain water will readily be collected in the many tributary runlets which from both sides of the plateau join the main channel. This in addition to the large sandy holes contain many rockholes which fill quickly, thus enhancing the probability of conserving water sufficient to supply the wants of a large party during the hottest months of the year. The vegetation of the tableland consists of poor class low scrubby mulga and silver grass of little value, but after the creek debouches from the range, which on its southern slope is rugged and broken, the creek, although forming a well-defined and moderately deep channel in time of flood, overflows and inundates a strip averaging a quarter of a mile wide by five miles long, which is practically devoid of timber, the exception being a few corkwood; the undergrowth on this inundated strip comprises excellent well-developed kangaroo grass, various leguminosæ, native geranium, and bunchgrass, upon which our camels are simply revelling. On completing examination and sketch of creek, we crossed over S.W by west to a conspicuous white spot in the range which we supposed to be quartz. This on inspection proved to be granulite, in which was imbedded masses of quartz crystals, the surrounding rocks being friable mudstone with occasional outcrops of granite.

Wednesday, May 20th, 1896.—Camp No. 85. Bar., 9 a.m., 28·72; attached ther., 50°. Self and Langman proceeded to a spot fifteen chains N.E. of our camp, where yesterday I had noted what might prove to be a good soakage in rich black soil on inundated country clear of and distinct from the main channel and 90yds. distant. Here we sank a hole through alluvium, alternate bands of light clay and sand, to a depth of 46in, when water gushed in rapidly, bringing in a quantity of fine floury drift sand, the principal supply of water coming in from the side furthest from the creek bed; the water on being tested was perfectly fresh. Had time and my instructions permitted, should have deepened and timbered this hole to test the supply, but as I am instructed to sink no permanent wells in Western Australian territory unless water is required for the party, which here is not the case, and a shaft would require close timber to get down even a few feet in such movable country, work was discontinued. From present development I am satisfied that unless the lower strata changes rapidly, a permanent supply of excellent water is obtainable, as salt is not noticeable either in the water or on the surface, where a limited quantity of very fine white deposit, which I cannot identify, on rich black loam, is the only chemical in the neighborhood. I have named the range in which this creek rises the De la Poër, after the late Donald John De la Poër Beresford, clerk to the South Australian Parliament; and the creek, the Moxon, after Mr. William Moxon Cook, sporting editor of *The Australasian*, Melbourne, Victoria.

Thursday, May 21st, 1896.—Camp No. 85. Bar. 9 a.m., 28·70; attached ther., 50°. Remained at Moxon Creek, recruiting camels.

Friday, May 22nd, 1896.—Camp No. 86. As we no longer require water for camels or party, and by avoiding Lake Darlôt and the Erlistoun Creek we save from fifty to sixty miles, and shall traverse totally unexplored country, determined to alter bearing and strike for N.W. end of Lake Carey, distant about 120 miles, and proceed from thence to Menzies and Coolgardie. Resumed at 7·50 a.m., on bearing of 215°, with full camels and water casks, travelling through open spinifex and a few scrubby bushes to one and three-quarter miles; then entered dwarf wattle and a few mallee, undergrowth, spinifex, Mount Strawbridge and the Ulrich Range showing up well behind us. Low tableland ten miles to south. At two and a half miles we entered dense mulga, the loose sandy soil becomes firmer, but spinifex is still the only undergrowth. At two and three-quarter miles bunchgrass was abundant but very dry, a large percentage of both mulga and grass being dead. This continued to three and three-quarter miles, when mulga was more open and grass was replaced by spinifex. At four miles soil was harder, no spinifex, a little bunch and wire grasses, quartz and ironstone rubble and pebbles on surface. At four and three-quarter miles we were skirting south side of the De la Poër Range, and crossing inferior soil thickly studded with sharp, broken sandstone. On rounding end of this range observed a bold range, which had been previously hidden, on a bearing of 5°, distant about sixteen miles, in the centre of which is a high hill standing out prominently. This, being so far off our course, was not visited, but being a well-defined landmark, I have named it Mount Gerard, in honor of Sir Gerard Smith, the Governor of Western Australia. At five and a quarter miles we were in dense mulga on hard red soil, carrying abundant bunch, wire, and kangaroo grasses. Here the De la Poër Range was half a mile to right, and trending N.W. At five and a half miles still dense mulga, with mallee intermixed, no rubble on surface, undergrowth poor wiregrass and spinifex. At five and three-quarter miles dwarf mallee, a little mulga, and dense spinifex. This continues to nine and a quarter miles, when a long low ridge of red sandhills was

was crossed. Here desert gum replaced dwarf mallee, but for undergrowth spinifex still reigned supreme. At nine and a half miles dwarf mallee, open spinifex, a few large grass trees *(Xanthorrohœa Tateii)*, on a loose red sandy flat. Here saw two pied magpies, the first seen since leaving the Alberga, South Australia. This continued to thirteen miles, when dwarf titree in blossom presented itself. At fourteen miles there were a few quondong and dwarf wattle. At fourteen and a quarter miles thickets of native poplar. At fourteen and a half miles some well developed kurrajong *(Sterculio)*. This desert country continued to seventeen miles, when a small patch of dwarf wattle and green herbage amongst an irregular jumble of low sandhills was met, and there being no prospect of better pasturage, camped for the night. Distance on course, seventeen miles. Too cloudy to observe for latitude.

Saturday, May 23rd, 1896.—Camp No. 87. Bar., 9 a.m., 28·47; attached ther., 56°. Resumed at 7·54 a.m. on bearing of 215°, continuing through desert gum, spinifex, grasstree, and a few fodder bushes, quondong, and a little herbage on loose red sand to half a mile, then all vegetation other than desert gum and spinifex disappeared, with the same wretched country extending to the horizon to S.E. and N.W. At three miles passed a strip where the desert gum had been torn up by the roots and twisted off their boles by a cyclone, many of such trees being from 12in. to 18in. in diameter. At three and a half miles the sole growth was dwarf mallee and spinifex. At four and a half miles entered a forest of desert gum, amongst which were noticed a few corkwood, quondong, dwarf wattle, broom, and kurrajong. Up to this point we had been traversing sandy plains with low sandhills at irregular intervals to right, left, and in front of our course, which by slight deviations we were enabled to avoid; but at five and three-quarter miles a continuous line of high sandhills barred the way, and perforce had to be surmounted. These run N.W. and S.E., and from their summit observed that the same class of country as traversed this morning obtains to the horizon, which was shut out a short distance ahead by high ground. At seven miles a high table range, with two noticeable hills, 252° and 260° respectively. These are hills in the Neckersgat Range not shown or named on plan of the Elder Exploration Expedition. They are distant fifteen miles from our traverse, on bearings as given above. At nine and three-quarter miles passed through a few chains of dense mulga, then entered open lofty mallee, dwarf wattle, quondong, and spinifex; no grass or herbage. At ten and a quarter miles a limited quantity of green herbage and wiregrass on burnt patch. At eleven miles entered fairly dense mulga, bunch, wire grasses and herbage, including parakylia, on firm red soil, quartz and fine ironstone rubble on surface; there were also a few water-bushes. At twelve miles soil and vegetation as above, but less spinifex; here crossed an old well-defined horsepad, heading N.W. from direction of Point Pater, and making for Lake Darlôt, probably a prospecting party last winter, as tracks were made during wet weather. At thirteen and a half miles we were crossing a low, rough, broken sandstone range, running to N.E., from the top of which a high bluff hill, about thirty miles distant, and bearing 215°, was visible. Here the mulga was very dense, with an undergrowth of fair bunch and wire grasses. At fourteen and a half miles struck a small mulga creek, running through rough stony rises and hollows. Here crossed a comparatively recent bullock track, not more than three to four days old; grass plentiful, but inferior quality, purple everlastings abundant, slate, iron, and quartz rubble thick on surface. This is very sharp, and, if it continues, will make sad havoc amongst the camels' feet, who are now limping and tripping badly. This creek is very sinuous, but runs fairly in direction of our course, which on sighting the bluff was altered to 215°, and as sharp rubble is less plentiful close to the creek banks, we travelled down this creek to fifteen and a half miles, when meeting a good cotton and saltbush flat, with well-grown and succulent parakylia and good mulga, camped. Collected some specimens from a ferruginous quartz reef 4ft. wide, and outcropping above the flat in places for upwards of half a mile. Distance on course, fifteen and a half miles. Too cloudy to obtain observations for latitude.

Sunday, May 24th, 1896.—Camp No. 88. Bar., 9 a.m., 28·45; attached ther., 62°. Resumed journey at 8·10 a.m., on bearing of 217°. Continuing along creek through rough stony rises and undulations, thickly covered with quartz and ironstone rubble and broken slate, dense low scrubby mulga and other good acacia, and a fair amount of herbage, including green roley poley *(Salsola kali)* and parakylia *(Portulaca)*, with salt and cotton bush in patches, to two miles. Same class of country apparently extends to N.W. and S.E., but our view, owing to broken nature of the country, was limited. Here crossed a small watercourse which has recently been in flood, where grass and herbage were green and abundunt, but there was no alteration in soil or vegetation. At two and a half miles crossed another watercourse, which had also been running a few weeks ago. At three miles crossed a well-beaten horsepad heading westerly, and at three and a half miles a dray track going in the same direction; these tracks are fully six months old. At five miles met another mulga creek, much larger than the two former ones crossed this morning, trending S.W. and N.E. Saw two shallow waterholes which had just gone dry. Leaving the party to continue on its course, ran the creek S.W. for two miles, and in that distance saw seven more waterholes several chains long by from 20ft. to 30ft. wide, but all shallow, and with the exception of one, which contained a few inches of stagnant water, dry, and none of them were more than 18in. deep; diamond sparrows and other small birds numerous. Then cut off and rejoined party at seven and a half miles. After crossing this creek soil improves and is less stony, although ironstone rubble is still plentiful, grass slightly better. Just after rejoining crossed an old express buggy track. At nine miles lunched, and continued through dense mulga on hard red soil and ironstone rubble, poor wire grass being the only undergrowth. At eleven and a quarter miles crossed an old cart track. At eleven and a half miles on an open patch in the densely surrounding mulga, was surprised to see one very large myall tree, the first seen in Western Australia. Here there were also a few quondong. At eleven and three-quarter miles crossed another dry creek. At thirteen and a half miles crossed track of a pony in hopples, about four days old, heading west. At fourteen and a half miles dense mulga was more open, with good bunchgrass, salt and cottonbush forming the undergrowth. Here saw several old hoppled horse tracks, and passed a white man's old lunch camp. At fourteen and three-quarter miles a small quantity of kangaroo grass, good green roley poley, and other herbage, including Sturt pea, one plant being in blossom. At fifteen miles entered a large cottonbush flat; here the pasturage was excellent and varied, water having lain on the surface for a lengthened period, and here, for first time on the trip, noticed fresh water pigface *(Mesembryanthemum)*. Traversed this flat to fifteen and a half miles, when finding vegetation was becoming less succulent, camped for the night. Distance on course, fifteen and a half miles. The greater part of to-day traverse has been through exceedingly dense mulga, which retarded our progress and inflicted a painful injury to one of our strongest pack camels, "Cheedee," who received a severe stake in the left eye, which will cause the poor animal intense pain for some time, even should he not eventually lose the sight of the eye. Too cloudy to obtain latitude until early morning, when south stars only could be observed, and latitude approximately fixed at 27° 57′ 13″.

Monday,

Monday, May 25th, 1896.—Camp No. 89. Resumed journey at 8·5 a.m., on bearing of 215°, through open mulga, good bunch grass, salt and cotton bush, roley poley, parakylia, other herbage, and a few quondong on light yellow loam covered with a little quartzitic rubble to three-quarters of a mile, when a gum creek was crossed, running S.W. for a considerable distance. It then bears off to the south. Five chains south of where we crossed saw water, and on running the creek S.W. found a waterhole eight chains long by 30ft. wide by 6ft. deep when full, the water at present being from 3ft. to 4ft. deep, on which there were four teal. Here, finding Mr. Murray's tracks, who was ahead on foot for the purpose of obtaining bearings from high points on the range we were rapidly approaching, I left examination of the creek to him, rejoining and leading the party on course. At one mile crossed a small creek, being an affluent of the larger one. Here there was a puddle of water heavily impregnated with clay, and at one and a half miles another one. Soil and vegetation as described continued to foot of the range, which was reached at five and a half miles. Here the vegetation consisted of salt and cotton bush, bunch and silver grass, the timber being represented by low scrubby mulga and other acacia, all vigorous and healthy. The range, which presents a bold front to the S.E., is precipitous. The rocks are sandstone, ferruginous, and slate, and are intersected by numerous quartz reefs, many of these being of great extent, and, judging from the number of old horse and camel tracks and marks on the reefs where stones, &c., have been broken off, have been thoroughly prospected during the past winter. Here we were rejoined by Mr. Murray, who had been successful in obtaining a bearing to Mount Flora (one of Sir John Forrest's hills), distant about forty miles on bearing of 225°, and as this will probably take us clear of Lake Carey and its numerous arms, altered bearing from 215° and struck for the mount. From the range Mr. Murray has taken bearings to other salient points and sketched in the creek. He reports the creek to contain a large supply of water, and when surface water has disappeared there is every reason to assume that permanent soakages will be found in the sand deposits, which in places are extensive and deep. He also saw many ducks, and found heaps of fresh water turtle shells at various old native encampments. On resuming, after Mr. Murray's arrival, crossed low point in range to south of a conical peak, on which a small pile had been erected, probably by prospectors, as surveyors would have selected one of the two higher points immediately adjacent, and took up new bearing of 225° for Mount Flora. At six and three-quarter miles we were travelling over firm red sandy soil, wire and bunch grass, salt and cotton bush, and good open mulga, with a little quartz rubble on surface. At seven and a half miles crossed some flat sandstone outcrops; here the soil was harder, quartz rubble thicker and larger, and bunch and wire grass of poor quality abundant; salt and cotton bush less plentiful. At seven and three-quarter miles saltbush was again good and abundant and plentifully intermixed with roley poley and parakylia, with a few myall amongst the fairly dense mulga. At eight miles sandstone outcrops were replaced by granite ones, and salt and cotton bush ceased entirely. At nine miles we were passing through good open mulga, bunch, wire, and spear grasses and excellent parakylia on firm red sandy soil. This continued to eleven and a half miles, when spinifex and a little wiregrass formed the sole undergrowth. At twelve miles entered dense mulga, fair grass and herbage; here crossed an old wagon track heading N.W. At thirteen and a half miles entered dense spinifex with burnt patches, on which was excellent green herbage. At fifteen miles passed out of spinifex and entered dense mulga, wiregrass, saltbush, a little parakylia, and native geranium. At fifteen and a half miles we were again travelling over open spinifex burnt in patches, on which there was good green herbage. At sixteen and a half miles entered fairly dense mulga and other good acacia; here bunch and wiregrass was dry but abundant. Continued to seventeen miles, and camped. On arrival of the team Mahar reported his riding camel "Melos" had run into a mulga and staked his right eye so badly that the sight was completely destroyed, and after examination I am afraid such is the case. Distance travelled on course, seventeen miles. Too cloudy to observe for latitude.

Tuesday, May 26th, 1896.—Camp No. 89. Vines and Langman for camels at daylight, and returned with thirteen at 8·25 a.m., when Vines reported two of them were poisoned. He had with difficulty managed to get one of them, "Indulkana," into camp; the other one, "Sam," he had to leave quarter mile back, as he lay down and could not be induced to rise. At once took a bucket of water and supply of epsom salts and returned to where this camel was lying, evidently in great pain; warmed water, and administered 12oz. of salts; then leaving Vines to bring "Sam" into camp, returned and treated "Indulkana" similarly. This camel had become much worse during my absence; both are in great pain and unable to travel, I shall therefore be compelled to remain here for the day, if not longer; fortunately we have full casks, and should more be required a supply is available in the creek crossed yesterday (which after reaching settlements I was informed is known to prospectors as Mistake Creek, and is shown as such on plan of my traverse). Shall shepherd camels all day and tie them down for the night, as after sick camels had been doctored it was found that the native myrtle poison bush *(Myoporum desertii)* was plentiful half a mile to south of our camp. Fortunately the two poisoned camels, who are wide rangers, were the only two who had extended their investigations into the flora of this district thus far, and I now have strong hopes of saving them both, as two hours after salts were administered they had both decidedly improved, although still shaky on their legs. Had camels brought in and tied down at sundown. "Indulkana" is out of danger, but "Sam" is in great pain and frothing at the mouth; am afraid he will be unable to travel to-morrow. At 9 p.m. administered another strong dose of salts; at midnight as he was no better, gave him three large bottles of castor oil, and, as I could do no more, cast the poor brute loose for remainder of the night. Distance by party, nil.

Wednesday, May 27th, 1896.—Camp No. 90. Bar., 9 a.m., 28·70; attached ther., 60°. At daylight found "Sam" had recovered his cud, and if relieved of his load would probably be able to travel. "Indulkana" had recovered his usual cheekiness; therefore decided to continue, and called men. Resumed at 7·25 a.m. on bearing of 225°, travelling through dense mulga, speargrass for a few chains, when mulga ceased, and grass was replaced by spinifex. This class of country extended one and a half miles, when dwarf mallee, kurrajong, *Myoporum desertii* (poison bush), and high open spinifex was met. At three and a half miles, open mulga, broom, and spinifex. At four and a half miles dense mulga, mallee, spinifex, and a little bunch grass; here noted places where natives had dug out nests of honey ants. At four and three-quarter miles more grass, less spinifex, and a little saltbush. At five miles grass and saltbush abundant, but dry. At five and a half miles an unusual mixture of spinifex, bunchgrass, saltbush, and samphire in fairly dense mulga. At six and three-quarter miles crossed a salt swamp, apparently an arm of a lake. At seven miles crossed another one extending N.W. and S.E. to the horizon and entered good saltbush, mulga, and pine on gypseous rises. Small swamps numerous to right and left of course. We are now evidently on the outskirts of a large lake which extends many miles in a south-westerly direction, as since striking the first arm we have crossed four similar ones, all trending in the same direction, the soil being in the main gypseous, and vegetation

vegetation of salsolaceous order. No rain has fallen here for a lengthened period, the lake arms being perfectly dry, as is all the vegetation. This class of country continued to ten miles, when a larger arm of the lake was crossed. At twelve miles surmounted a high red sandhill, a series of which forms the western shore of a large salt lake, which from here bears 295°, and extends as far as visible to N.W. These sandhills are clothed with lofty mallee and spinifex. At twelve and three-quarter miles we were travelling over firm red sandy soil, good salt and cotton bush and speargrass. At thirteen miles gypseous rises, mallee, pine, salt and blue bush. At thirteen and a half miles crossed a low red sand ridge, a hard red sandy flat. At thirteen and three-quarter miles, good salt and cotton bush flat, silver grass, quondong, dwarf wattle, large fresh water titree *(Melaluca)*, and lofty well-topped mulga. At fourteen and a half miles open mulga, mallee, acacia, and spinifex. At sixteen and a half miles as above, but no mallee. At seventeen we were in fair mulga, other acacia, and fair herbage, and camped. Distance travelled on course, seventeen miles. Poisoned camels much better than was expected, and both are now apparently out of danger. Too cloudy to observe for latitude.

Thursday, May 28th, 1896.—Camp No. 91. Bar., 9 a.m., 28·44.; attached ther., 58°. Resumed at 8 a.m. on bearing of 225°, continuing through from open to dense mulga, spinifex, wiregrass, and a little herbage to half-mile, when spinifex ceased, mulga opened, and wire and good bunch grasses, parakylia, and geranium on firm red soil; a few native myrtle *(Myoporum desertii)*—poison, and some waterbush. At two miles passed a well-defined old horsepad, trending N.W. by W. Here the surface of the earth was covered with quartz rubble and sandstone pebbles. At two and a quarter miles soil became inferior, and quality of vegetation deteriorates, whilst 50 per cent. of the mulga was dead. At two and a half miles saw six gulares (slate and pink cockatoo) flying towards the S.E. We are now rapidly closing on the high range we have been approaching for the past three days. Here soil, mulga, and grass slightly improve. At three and a quarter miles, in the foothills to the range, a little salt and cotton bush was met, soil being covered with sharp quartzitic rubble and broken sandstone, causing our tender-footed camels to limp and trip badly. At three and a half miles noticed a green patch of herbage fifteen chains to right of our course, where quite a number of diamond sparrows were congregated. On examination this proved to be a small watercourse. Running parallel to our course where first struck there was a waterhole, just dry, three chains long by 8ft. wide by 3ft. deep. Ran this creek three-quarters of a mile, when, finding it was too small to carry or conserve any considerable body of water, and that it was trending away from our course, left it and rejoined the party. At four and a half miles crossed a small open salt and cotton bush flat. Here quartz and sandstone rubble were intermixed with basalt and ironstone. After crossing flat salt and cotton bush continued, intermixed with bunch and spear grasses and open mulga. At four and three-quarter miles crossed the small creek I had examined, which here trends to the south, and found fresh emu tracks to be plentiful. At five and a half miles inferior soil, mulga, acacia, and mallee, all dead or in a dying condition, the sole undergrowth being a limited quantity of very inferior wiregrass. We are now passing through the range, with rough stony hills on both sides of the course and ahead. At six and a half miles Mr. Murray left the party on foot to ascend one of the highest hills in order to obtain bearings; self continuing with the party and crossed a small open saltbush flat, to the left of which was a very large quartz blow, which, on examination, proved to be most thoroughly prospected. At seven and three-quarter miles reached summit of range, and obtained a bearing to a high hill about fifteen miles distant 210°, and altered to that course. Here the soil was hard and inferior, with lofty but poor mulga, with a very small quantity of poor wiregrass; the greater portion of the soil being perfectly destitute of vegetation. At ten miles stopped for lunch, to enable Mr. Murray to overtake us. He rejoined at 1·35 p.m., when the journey was resumed. At ten and a quarter miles entered exceedingly dense mulga and acacia, absolutely devoid of undergrowth. At eleven miles mulga opened, with spinifex and wiregrass on hard red sandy soil At eleven and a quarter miles mallee was intermixed with the mulga, and a little saltbush was added to the undergrowth. At eleven and a half miles silver grass replaced mallee and spinifex. At thirteen and a quarter miles passed some low, flat, granite outcrops, also a small watercourse, in which were some shallow dry waterholes. Here soil and vegetation improved. At thirteen and a half miles passed into open mulga, mallee, and spinifex, on hard red sandy soil; no rubble on surface. At fourteen and a quarter miles entered good low scrubby mulga, bunch and silver grasses. At fifteen miles crossed a quite recent native's track. At fifteen and a half miles we were passing through dwarf mallee, wattle, and stunted cookwood, low broom and spinifex. At sixteen and a half miles crossed some low granite rises; and at seventeen miles camped in dense mulga, with good green herbage, a shower having recently fallen in the neighborhood. Distance on course, seventeen miles. Observed Alpha Crucis, Beta Centauri, Theta Bootis, and Arcturus, by which it was determined we are now in latitude 28° 30′ 41″.

Friday, May 29th, 1896.—Camp No. 92. Bar., 6 a.m., 28·44; attached ther., 57°. Resumed at 7·40 a.m. on bearing of 205° through dense mulga, sharp stones, spinifex, a little wiregrass and herbage, to one and a half miles, when a stony watercourse was crossed; this ran fairly in direction of our course, and the ground adjacent to its banks being less stony, in order to save the camels' feet, we ran it. Here there has been comparatively recent rain, parakylia and other herbage being green and plentiful, with a few kurrajong showing new growth, but no water was found. At three and a half miles crossed another small stony watercourse containing many shallow granitic basins just dry. Here the mulga was open and inferior, the undergrowth consisting of poor silver-grass and short stunted geranium, intermixed with poor parakylia. At four and a half miles passed through some very rough broken sandstone rises, open mulga, kurrajong, dwarf wattle, and silver-grass. At four and three-quarter miles a fairly high and continuous range showed up six miles distant, on bearing of 153°. At five and three-quarter miles we entered upon open to dense dwarf mallee, with a few small wattles intermixed, the sole undergrowth being dense spinifex on loose red sand. At seven and a quarter miles passed out of mallee and entered dense mulga, spinifex, a poor variety of saltbush (annual), and wiregrass on hard red soil, a large percentage being entirely devoid of vegetation; a few chains on surface was covered with nodular ironstone and sharp broken sandstone. The range to S.E. here trends westerly, and was reached at seven and a half miles, when a small watercourse was met; here green silver-grass, short parakylia, and everlastings were in profusion. At seven and three-quarter miles struck a small rocky creek running through a rough gap in the range. Followed this up a quarter of a mile and then struck a well defined road with quite fresh horse and wheel tracks trending north-west. As the range is very rough, although not particularly high, followed the road in order to find if it passed through or over the range, as should it do so the camels' feet will be spared some pain, many of the poor animals now limping badly. In a few chains along the road struck a general camping ground on a tributary creek. Examined this for water, and in a short distance discovered a sand soakage, no water on surface,

surface, but on scratching with my hand reached it in a few inches; therefore, as it was 11·30 a.m., decided to stop, lunch, and open out soakage, and if sufficient water is obtained, give the camels a drink, as they have now been eight days without water, and the past three days on dry mulga and dwarf wattle. Whilst we were at lunch saw two men, with seven horses, crossing the track, twenty chains north of our position. Fired a shot to attract their attention, and then joined one of the men, who awaited my arrival. He proved to be a prospector, Mr. Bolland, on his way to a new alluvial rush fifteen miles south-west of our position. In conversation with him learned that there is a new township named Niagara sixty-six miles south of here, where there is a telegraph line; that the road we are now on goes there direct, and from thence to Menzies, and then on to the Ninety-mile (Roaring Gimlet). As these towns are on the line as laid down in my instructions, and the road will save the camels' feet, decided to follow it, go in to Niagara, and from thence wire Adelaide Mr. Bolland also showed me a large waterhole a few chains off, where the camels obtained a satisfying drink. Then resumed journey at 1·45 p.m., travelling along road, and in half a mile arrived at McKenzie's well (Government), containing a good supply of fresh water 40ft. below the surface. On leaving this well track runs on a bearing of 205°, through a long leading gully carrying silver and bunch grasses, parakylia, waterbush, large mulga, corkwoods, salt and cotton bush. For two miles it then bears east of south, winding through rough stony ranges for half a mile, and then trends 180° (S.) direct for Mount Malcolm, forty miles south of which hill is situated the town of Niagara. Followed the road for fourteen miles through country carrying fair pasturage. Passed several mining camps and many travellers with horses, vehicles, and camels, also diggers on foot making out to Wilson's rush; and camped on Bummers Creek, near a fair-sized waterhole.

On the following and succeeding days the journey was continued to Niagara, when, finding the telegraph had not been carried to that point, the expedition proceeded to Menzies, which was reached on June 3rd, 1896, and wires dispatched to the Surveyor-General, giving *resume* of the trip across the continent. Instructions were then received to proceed to Coolgardie, and on arrival there further instructions to traverse and report upon a stock route to which, by the medium of the press, Mr. J. C. Thompson had directed public attention. Full detail of each day's proceedings between Bummers Creek, Niagara, Menzies, and Coolgardie, with a description of country passed through, has been kept, and will be forwarded if required; but as this country has been mapped by the Western Australian Government it is not considered necessary to include such here. This journal is, therefore, resumed after leaving Coolgardie on the return trip eastwards, and, for convenience of reference, the camps are again numbered from 0 onwards.

Thursday, August 27th, 1896.—Camp No. 0. Rejoined camp near Lady Loch mine, two miles south-east of Coolgardie; loaded camels, and then, on bearing of 180°, started to pick up telegraph line south of Londonderry and connecting with the town of Widgemooltha, but soon found that the country was far too rough and scrub too dense to allow of passage of loaded camels; therefore altered course to 270°, and in two miles cut the road between Coolgardie and Londonderry. Camels all being in season travelled badly and were continually shifting loads and breaking nose nips; therefore on striking a fair patch of saltbush and herbage in open Morrell forest, camped at nine miles. Liberated camels and shepherded until dark when they were tied down for the night, there being many other bulls in season in the vicinity. Distance on course, nine miles.

Friday, August 28th, 1896.—Camp No. 1. Resumed at 7·55 a.m. Travelled to Londonderry; watered camels; they drank 40galls. at 4d. per gallon. Then in half mile cut telegraph line to Widgemooltha, and, the scrub being exceedingly dense, ran it fourteen miles and camped on a small patch of saltbush, a few dwarf wattle, and stunted quondong. All country passed through yesterday and to-day densely wooded with large Morrell trees (Blackbutt *Eucalyptus)*, large red mallee, gimlet woods (fluted mallee), and desert broom; the whole forming very inferior pastoral country. Distance on course, fourteen miles.

Saturday, August 28th, 1896.—Camp No. 2. Resumed at 7·35 a.m. Running telegraph line on bearing of 136°. Travelled twenty miles and camped on a small patch of fair camel feed, principally acacia and quondong. The whole of the country traversed to-day is densely wooded with Morrell, red mallee, and gimlet wood on ironstone and quartzitic soil, with occasional belts of white sand on which there is desert broom; no undergrowth except patches of dry bunchgrass and inferior herbage, black grass, and saltbush. Distance on course, twenty miles.

Sunday, August 30th, 1896.—Camp No. 3. Resumed at 9·45 a.m. At two miles passed out of inferior and entered good salt and blue bush country with a considerable quantity of herbage and speargrass, large Morrell and red mallee forest still continuing. At five and a half miles telegraph line alters to 90° to avoid a high heavily-timbered range and continues on that bearing for four miles until the southern shore of Lake Lefroy is reached, when a bearing of 136° is resumed. Arrived at Widgemooltha at fourteen miles = forty-eight miles direct from Coolgardie, the distance by road being fifty-five miles. Passed through the town and camped quarter of a mile east, on fair salt and blue bush. Distance on course, fourteen miles.

Monday, August 31st, 1896.—Camp No. 4. Examined Widgemooltha soakage in a small creek, quarter of a mile from the township, and found it to be perfectly dry; under no circumstances can this be regarded as a permanent water, as heavy rains have fallen in this locality during the present month. Resumed journey at 8 a.m. for Binyarinyinna, on bearing of 110°. At two miles arrived at bifurcation of roads at Lake Lefroy crossing; crossed lake arm, and at five miles skirted southern shore of Lake Lefroy, which bore 40°, and extends in that direction for about ten miles, when the view is closed by high round-topped hills to the N.E. High white sandhills approach on southern side to within a chain of the lake. These are covered with titree, mallee, stunted pines, desert broom and heath *(Epacris)*, but no good pasturage. At six and a half-miles track leaves the lake shore on a bearing of 107°. At seven and a half miles it bore 97°, passing through light open mallee, stunted pine and spinifex, vigorous blackgrass and broom, but no succulent vegetation. At eight miles the track trends southerly on a bearing of 131° to avoid a deep and wide arm of Lake Lefroy. At eight and a half miles mallee, spinifex, and blackgrass is replaced by blue and saltbush, the former predominating, with occasional belts of well grown and foliaged quondong, the soil being still sandy but more compact. At nine miles, having rounded lake arm, the track again trends easterly on a bearing of 100°; pasturage and soil as described, with a small quantity of herbage. At nine and a quarter miles track runs north-easterly on a bearing of 55° in order to cross at narrowest point a long arm running into the lake, here soil is replaced by loose white sand, covered with samphire, spinifex, dwarf-broom, black grass, and light open mallee. At nine and a half miles this arm is crossed and track resumes an easterly course of bearing of 103°. At ten miles it trends still further to the south, on bearing of 110°; here the soil is still inferior, but a little green herbage, blue and salt bush was noticed, and then soil rapidly improves, timber being larger and more open;

open; the undergrowth, consisting of dense blue and saltbush, good green herbage, and oatgrass; this class of country and vegetation, with the track running on the same bearing, continues to fifteen miles, when the soil and vegetation is the same, but track trends southerly on a bearing of 120°; this continues to seventeen and a half miles, when, striking a good patch of young saltbush and green herbage, camped.

Thursday, September 1st, 1896.—Camp No. 5. Resumed journey at 8 a.m. on bearing of 135°. At one mile struck a small native well, which has been recently enlarged by Europeans; it is now 6ft. x 6ft. x 5ft. deep, and contains water to within a few inches of the surface. All camels drank well. Continued journey over similar soil and vegetation as passed through yesterday afternoon to eight and a half miles, when a belt of inferior kurrajong country, one and three-quarter miles wide was crossed, good pastoral country as before was then entered and continued to Binyarinyinna, which was reached at fifteen miles. As I have to examine this extensive outcrop thoroughly, shall remain over to-morrow, more especially as vegetation is abundant, green and excellent, and water plentiful. Bearings and distances to-day: 135°, one and three-quarter miles; 110°, one-quarter of a mile; 95°, two miles; 115°, three-quarters of a mile; 94°, one mile; 100°, one mile; 55°, one mile; 74°, one mile; 60°, one and three-quarter miles; 70°, half a mile; 90°, four and a half miles = fifteen miles on course.

Wednesday, September 2nd, 1896.—Camp No. 5. Remained at Binyarinyinna Rocks to examine the water supply which Mr. J. C. Thompson reports to be permanent. On examining the outcrop, which is large and covers an area of fifteen acres, sixty-six depressions, all of which contain more or less water were found; and in addition to these there were innumerable others of less capacity which were dry. Many of those containing water are of considerable superficial extent, but unfortunately are shallow, none exceeding 12in. in depth; therefore water can only be relied upon from this source for a limited time after rain; but in the alluvial deposit at foot of the eastern side of the outcrop, which is of considerable depth, five shallow shafts have been sunk, as follows:—Shaft No. 1 is 5ft. x 3ft. x 15ft. deep, is not timbered, contains 3ft. of water, and is valueless. Shaft No. 2, 5ft. x 3ft. x 19ft., is not timbered, is enclosed with a light post and rail fence, is fitted with a handwhip and bucket, a light hewn gum trough, and contains 3ft. of good fresh water; water for a few camels or horses is available here. Shaft No. 3, 5ft. 6in. x 3ft. x 13ft. deep, not timbered, but one end secured by flat granite slabs, one collar set of heavy gum timber, enclosed with light post and rail fence, and fitted with hewn gum trough, rope, and hand bucket, contains 8ft. of good fresh water, sufficient for thirty camels or ninety horses; if deepened and enlarged probably a much larger supply would be obtained. Shaft No. 4 is 6ft. x 3ft. 6in. x 8ft. deep, with small chamber on west side of shaft, is enclosed by light post and rail fence, and fitted with hewn gum trough, contains a small supply of good fresh water. Shaft No. 5, adjoining shaft No. 4, fallen in, valueless. On the northern end of the outcrop three other shafts have been sunk, but all have fallen in and are dry, damp earth showing at bottom. Another shaft has been sunk in a depression on the top of the outcrop; this depression, which is of considerable extent, has been filled in by drift sand and detritus from the granite, which is in a state of disintegration; the shaft has also fallen in, but a little water is showing at a depth of 4ft. Should the sand and debris be removed from this depression, there is no doubt water will remain here for some time after rain. On the N.W. side of the outcrop there is what at one time has been a large rockhole. This is now completely filled with drift sand and detritus. An excavation has been made here, in which water has been obtained, which is now 2ft. 6in. deep. This water is good, but discolored by roots of black grass and other vegetation, which is growing vigorously in the deposit. The area of this depression, if cleaned out, is 48ft. by 18ft. by a mean depth of 2ft., the greatest depth being 4ft. Fully two-thirds of this huge outcrop is formed of bare sloping rock, forming an excellent catchment, from which, by gravitation, the water not held in the rocky depressions is conducted into the alluvial deposit at foot of the outcrop, where it sinks, and is thus protected from evaporation. It will therefore be readily understood that during winter months, or after heavy thunderstorms in summer, a considerable quantity of water is available under present conditions; but in order to render this supply permanent the shafts should be enlarged and deepened, and better appliances be provided for raising and distributing the water. Distance on foot whilst examining rockholes, shafts, and in returning to camp, three miles.

Thursday, September 3rd, 1896.—Camp No. 6. Resumed journey at 8·25 a.m. on bearing of 92°; still on track followed by Mr. J. C. Thompson when he came through with horses, and which he states he discovered, although it has been traversed during the past ten years. Travelled nineteen miles, and camped on good bluebush, acacia, and quondong. With exception of the northern end of Lake Cowan, which was sufficiently dry to cross without endangering the camels, the whole of the country traversed to-day carries excellent cotton, salt, and blue bush, with occasional small patches of good spear and oat grasses, the succulent and nutritious bushes being represented by quondong, sandalwood, and dwarf wattle, there being no mulga or other large acacias. Bearings and distances travelled to-day: 92°, quarter mile; 87°, three-quarter mile; 72°, one and three-quarter miles; 97°, one and a quarter miles; 100°, quarter mile; 147°, three-quarter mile; 135°, three-quarter mile; 110°, one mile; 160°, two miles; 175°, two and a half miles; 162°, two and three-quarter miles; 124°, half mile; 95°, one mile; 118°, one mile; 148°, one and three-quarter miles; 132°, three-quarter mile = nineteen miles on course.

Friday, September 4th, 1896.—Camp No. 7. Resumed journey at 7·35 a.m. on bearing of 130°; still following old track (Thompson's ?). Travelling through heavy Morrell, high mallee, broom, titree, and bluebush. At five miles arrived at Moochabinna rockhole and soakage. Here three small excavations were found in the alluvium on north side of the granite outcrop. Two of these contain a small quantity of good soakage water, and if sunk deeper a fair supply would probably be obtained, which would, if not too heavily stocked, last for some months after rain. But this water cannot by any means be regarded as permanent, the supply in the alluvium consisting solely of surface waters collected and deposited by the sloping rocks forming the outcrop; there is also a small rockhole, 5ft. x 3ft. x 2ft., which contained a few inches of stagnant water. After examining the water supply, climbed the outcrop and took bearings, as follows:—A high round-topped hill ten miles distant bears 65°; three high hills connected by lower saddles, and forming spurs to the Frazer Range, thirty miles distant, bears 118°; northern end of Frazer Range, forty miles distant, bears 125°; visible southern end of Frazer Range, forty miles distant, 132°. From Moochabinna proceeded to Walogerina Spring (?), reaching there in nineteen miles from camp No. 6. With exception of a few small patches of bluebush, acacia, and speargrass (the latter being found on burnt ground only), the soil traversed this day is most inferior, being perfectly devoid of and incapable of producing vegetation containing nutritive or succulent qualities. After liberating camels on good pasturage, which, in limited quantities, is invariably found adjacent to these granite outcrops, proceeded to and examined rockholes and soakage, or as they are called in this

this district, springs. On and near the outcrop found two small rockholes, which at a most liberal computation would be perfectly dry by evaporation alone one month after heavy rain; and on the eastern side at foot of the rocks, on the site of an old native well, an excavation of irregular shape, its dimensions being 4ft. deep by a mean diameter of 9ft., bottoming upon granite. This hole contains 9in. of thick muddy water, with a superficial area of 6ft., consequently the supply is small. Two chains easterly from here a shaft has been sunk to a depth of 6ft., and carried 2ft. into the granite, which here is less solid than at the old native well, being broken by veins; here the depth of water is 18in., and it is pure and sweet. Should this shaft be deepened there is a probability of a fair supply being obtained, but how anyone possessing the slightest experience can class it as a permanent water in its present condition passes my comprehension. Distances and bearings travelled—151°, one and a half miles; 170°, one and a quarter miles; 150°, one and a half miles; 170°, half a mile; 142°, half a mile; 135°, two and a half miles; 180°, one mile; 162°, one mile; 170°, two and a half miles; 160°, two miles; 170°, three miles; 150°, one mile; 180°, three-quarters of a mile = nineteen miles on course.

Saturday, September 5th, 1896.—Camp No. 8. Resumed journey at 7·30 a.m. on bearing of 175°, following Thompson's track on a general S.E. course. Travelled twenty miles and camped in sandhills adjoining a long narrow swamp carrying good green samphire and other salsolæ, the sandhills being clothed with fair salt and blue bush, quondong, and wattle. With exception of two miles of country comprised in three small patches, the country traversed this day is from good to fair pastoral land, the vegetation comprising excellent saltbush, good bluebush, herbage, and everlastings, but very little grass; the whole, with exception of the salt and samphire swamps, being heavily wooded with Morrell trees, large and dwarf mallee, and titree, and a plentiful supply of broom. No water was met to-day. Bearings and distances—175°, two and three-quarter miles; 180°, quarter of a mile; 215°, quarter of a mile; 170°, one mile; 200°, three-quarters of a mile; 170°, one mile; 145°, four miles; 95°, one and a half miles; 130°, half a mile; 100°, one and a half miles; 120°, three-quarters of a mile; 115°, three-quarters of a mile; 140°, one and a half miles; 110°, one and a half miles; 135°, two miles = twenty miles on course.

Sunday, September 6th, 1896.—Camp No. 9. Resumed journey at 8·20 a.m. on bearing of 90°, continuing along Thompson's track. At half a mile altered bearing to 100° and continued for three miles; then on bearing of 115° for two and a half miles, when the Ten-mile Tank was reached; this is an excavation and embankment formed in a sloping alluvial deposit between bare granite outcrops which supplies the catchment area. The contents of the excavation is 40ft. x 20ft. x 3ft., of the embankment 40ft. x 4ft. x 2ft. x 18in. high, therefore the quantity of water conserved is so limited it cannot be regarded as permanent; but the catchment area being large and good a much more considerable body of water could be conserved if the excavation was enlarged and deepened and the embankment extended and raised. On completing this examination, travelled on to Dempster's Station in Frazer Range. After establishing camp climbed the range and obtained check bearings to Binyarinyinna and Moochabinna; also endeavored to pick up Mount Norcott, forty miles to south-west, but the light being unfavorable was unable to do so. With exception of a strip of two miles which contains no nutritious vegetation, the fifteen miles of country traversed this day comprises from good to fair pastoral country, a small area around the Ten-mile Tank being specially good. In evening took camels to station, filled water casks, and obtained two sheep.

Monday, September 7th, 1896.—Camp No. 10. Resumed journey. Travelled quarter of a mile due north, then entering pass in the range, continued on bearing of 40° for one mile, then 85° for one and a half miles, then 90° for one and a half miles. At noon a sharp shower fell, and as there was every appearance of a wet afternoon setting in, camped and erected tent, after having travelled the short distance of six miles through excellent soil and vegetation the whole way. Distance on course, six miles.

Tuesday, September 8th, 1896.—Camp No. 11. Resumed journey at 8 a.m. on bearing of 85°, and continued to Newman's Rocks, which were reached at twenty miles. With exception of a few small patches of spinifex, the country traversed this day carries good salt and blue bush, which forms the predominant growth, under Morrell, large mallee, various acacia and broom, with occasional patches of good herbage, spear and oat grasses. On arrival at Newman's Rocks liberated camels, established camp, and then examined the outcrop, rockhole and shafts. Found the rockhole to be 10ft. x 8ft. x 3ft., and that it contains 2ft. 6in. of rainwater. It is situated at the foot of a large bare sloping rock, which supplies an immediate catchment area of two and a half acres. A small embankment at this hole has been constructed, which encloses the eastern foot of the rocks, by which the overflow, after hole has been filled, is impounded; but the soil of which the embankment is constructed is so pervious that the water quickly soaks away and is lost. Then examined shafts in alluvium, quarter of a mile N.E. of the outcrop, and found shaft No. 1 to be 7ft. x 6ft. x 12ft. deep, timbered with round undressed gum for 6ft., the remaining 6ft. being through decomposed granite not requiring timber. This shaft contains 6ft. of good soakage water, slightly impregnated with salt. A hand-whip, bucket, and hewn gum trough have been fitted, but all are out of order, and require renewing prior to water being raised and distributed for any quantity of stock. Shaft No. 2 is 6ft. x 4ft. x 11ft. deep, timbered with gum saplings set vertically for 8ft., the remaining 3ft. being through decomposed granite not requiring timber; it is located 12ft. westerly of shaft No. 1; has no appliances. Shaft No. 3 is 5ft. x 4ft. x 6ft. deep; is situated four chains westerly of shaft No. 2; is untimbered, and contains 20in. of good water; no appliances. These three shafts are situated in the main watershed of the outcrop, which comprises an area of ten acres. At foot of the main blow the granite is disintegrated, and where Nos. 1 and 2 shafts are sunk is broken by veins, through which the water caught on the bare rock sinks. It is therefore reasonable to assume that should these shafts be deepened a permanent supply of good water will be obtained. At present the total supply is 3,435galls., upwards of one-third of this being in the rockhole; therefore, this water in its present condition cannot be regarded as permanent; but I would add that, in addition to the rockhole which contains water, there are innumerable shallow depressions distributed over the surface of the outcrop. These, immediately after rain, all contain water, and would probably induce a superficial observer to pronounce this to be a permanent water when visiting and examining it shortly after a downpour.

Wednesday, September 9th, 1896.—Camp No. 12. Resumed at 8·15 a.m. on bearing of 110°. Travelled eighteen miles, and camped on fair blue and salt bush, a little herbage, dwarf wattle, and a few quondong. With exception of some good soil, which forms an area of about half a mile, of which Newman's Rocks are the centre, and occasional patches of blue and salt bush, the soil and vegetation traversed this day is inferior, the greater portion of the undergrowth consisting of spinifex. Bearings and distances: 110°, one and a half miles; 120°, one mile; 135°, one and a half miles; 130°, two miles; 135°, two miles; 130°, one mile; 140°, four miles; 135°, one and a half miles; 120°, two and a quarter miles; 170°, one mile = eighteen miles on course. No water. Thursday,

Thursday, September 10th, 1896.—Camp No. 13. Resumed journey at 8·10 a.m. on bearing of 155°, which was continued to one and a half miles, and then altered to 180°, on which bearing the track ran for three miles, when for one mile the trend was again 155°, when Flat Rocks water of Thompson was reached. These rocks consist of a large, flat, shallow depression, the area of which is about four acres. After rain a considerable body of water is collected here, but the depressions in this granite basin are all so shallow that the water soon disappears by evaporation, and there being no depth of alluvium at the base of or adjacent to the rock, there is no probability of obtaining a soakage by excavation, and this is so obvious that no attempt in that direction has been made. After examining these rocks, continued on to Wahgunninna Rocks, which was reached in seventeen miles from Camp No. 12. After camels were liberated and watered, examined outcrop and rockholes. The rocks are composed of granite, and outcrop for fully half a mile long by a quarter mile in width. Here the Ponton Brothers, who occupy the country, have constructed several small embankments, whereby comparatively large bodies of water are conserved, in addition to quite a number of fine natural rockholes which occur in the granite. Many of these were full of pure rainwater, at which upwards of fifty head of cattle were watering; but in my opinion this water will not be available for travelling stock in quantity, as doubtless the lessees require it for their own sheep and cattle, more especially during the summer months. The seventeen miles of country traversed this day, with exception of two patches of inferior spinifex equalling a width of four miles, comprises from fair to excellent pastoral land, blue and salt bush being exceptionally good, and other salsolæ green, vigorous and abundant, and for the last six miles bunch and spear grasses were plentiful. Bearings and distances travelled this day: 155°, one and a half miles; 180°, one and a half miles; 155°, one mile; 30°, two miles; 100°, one and a half miles; 125°, two and a half miles; 110°, three-quarter mile; 120°, quarter mile; 100°, one mile; 70°, half mile; 95°, two and a half miles; 90°, half mile; 100°, one and a half miles = seventeen miles on course.

Friday, September 11th, 1896.—Camp No. 14. Resumed at 8 a.m., on bearing of 90°. Arrived at Ponton's station, Belladunia, at fourteen miles, passing and examining Boomer Rocks *en route* at seven miles from camp No. 13. This is also a large granite outcrop containing many large but shallow rockholes. Embankments have been constructed by the lessees, but no large body of water is conserved, there being no depth of alluvium, and the embankments are not of sufficient height or extent. During the night observed Spica and Alpha Aquilae, and proved Ponton's station to be in lat. 32° 28′, by which, and my traverse from Binyarinyinna, which is fixed on Western Australian Land Office plans, I find that Mr. J. C. Thompson's position of this station is twenty-eight miles too far to N.W. Bearings and distances travelled this day: 115°, three miles; 100°, one and three-quarter miles; 150°, one a quarter miles; 130°, two miles; 140°, one mile; 110°, one-half mile; 115°, three and a half miles; 110°, one mile = fourteen miles on course; extra, on foot, not on course, five miles = nineteen miles.

Saturday, September 12th, 1896.—Camp No. 14. Examined the granite outcrop at Ponton's station, which is very large; also the tank constructed at the head station on north side of outcrop in deep alluvium. The mean depth of this tank is 16ft., and on the outcrop there are innumerables holes of considerable superficial extent, but all are shallow. Messrs. Ponton Bros. inform me that this and another large tank some miles north of the station are their main waters; that they have no permanent water on the run, which comprises an area of 200,000 acres of excellent pastoral land, but that, in consequence of the absence of an assured supply of water, they cannot carry more than 10,000 sheep, and that with even that limited quantity in seasons of drought they have had heavy losses when removing stock to the coast. Also met Mr. P. Coleman, an old resident in this district. He informs me that he is well acquainted with the track described by Mr. J. C. Thompson, which he (Mr. Coleman) traversed ten years ago, and that Mr. Thompson has grossly exaggerated the size of the various rockholes situated on the route. Self, on foot, five miles.

Sunday, September 13th, 1896.—Camp No. 14. In camp, recruiting camels.

Monday, September 14th, 1896.—Camp No. 15. Resumed journey at 8·10 a.m. Travelled S.W. for three-quarters of a mile and struck new telegraph line; ran it on bearing of 83°, passing through excellent pastoral country, well clothed with good salt and blue bush, spear and bunch grasses, open mallee (large), and sandalwood, broom, and a few quondong, with occasional acacias and rare clumps of Morrell trees, to twenty miles, when finding good green, succulent salsolæ plentifully interspersed amongst the drier salt and blue bush, camped for the night; no water. Distance on course, twenty miles.

Tuesday, September 15th, 1896.—Camp No. 16. Resumed at 7·30 a.m., on bearing of 83°, and followed line to 261st milepost from Eucla. The whole of the country traversed this day consists of superior pastoral land, the vegetation comprising excellent salt and blue bush, spear and bunch grasses, green salsolæ and other good herbage; the timber comprising open Morrell forest, sandalwood, broom and large mallee, all of which are abundant and vigorous, also a few acacia and quondong. Camped at twenty miles on no water. Observed Saturn and Pegasus, latitude 28° 27′ 47″.

Wednesday, September 16th, 1896.—Camp No. 17. Resumed at 7·40 a.m., on bearing of 83°, continuing along telegraph line. Travelled to 237th milepost west from Eucla—twenty-four miles; and camped on good salt and blue bush, salsolœ, quondong, and dwarf wattle, the larger growth comprising open Morrell forest, mallee, and sandalwood. This class of soil and vegetation obtains the whole twenty-four miles traversed this day. Noticed two spots where it is probable good stock water would be obtained at a moderate depth, but flat limestone is on the surface and outcropping the whole distance; it will therefore be difficult to obtain sites for reservoirs, although good catchment areas are available.

Thursday, September 17th, 1896.—Camp No. 18. Resumed at 8 a.m. continuing along new telegraph line on bearing of 83° to 229th milepost from Eucla. Continued along line to fourteen miles from Camp No. 17, and then struck for Ombellyabbie rockhole, which was reached at six miles, and the vegetation being good, although there was no water, we camped. Ombellyabbie is one of Thompson's main rockholes; it is a blowhole on a limestone rise, its holding capacity when full, 600 gallons; is now quite dry. The country traversed to-day along telegraph line—fourteen miles—consists of from indifferent to fair soil, and vegetation as previously described between Ponton's station and this point; but when the telegraph line was left and we struck for Ombellyabbie rockhole, mallee and broom became exceedingly dense, the sole undergrowth being poor wiregrass and spinifex until the limestone rise was reached, when an area of about twenty acres of better soil carrying saltbush, herbage, grass, quondong, and acacia was met, and upon which we camped. Bearings and distances travelled this day: 83°, fourteen miles; 180°, three miles; 170°, half a mile; 160°, one mile; 150°, one and a half miles = twenty miles; no water in camp.

Friday,

Friday, September 18th, 1896.—Camp No. 19. Resumed at 8·20 a.m., on bearing of 70°, following Graham's-road, cut in 1876, run by Thompson in May last. At eight miles arrived at Boodina rockhole, which is situated on a limestone rise. This, when full, will hold 200galls.; it is now dry. The next rockhole reached was Oodlegabbie, the capacity of which is 200galls.; this was also dry. At sixteen miles reached Nullarina rockhole, which, when full contains 200galls.; here we found 30galls., result of a recent shower. This was divided amongst the camels, they having been five days without water. At seventeen miles camped on the worst pasturage met since leaving Coolgardie. The country traversed to-day consists of inferior soil, carrying dense dwarf mallee, broom, titreee, coarse wiregrass, and spinifex Bearings and distances travelled: 70°, one mile; 110°, one and a half miles; 80°, one and a half miles; 90°, one and three-quarter miles; 110°, two and a quarter miles; 70°, three miles; 50°, two miles; 40°, half a mile; 50°, half a mile; 100°, three miles = seventeen miles on course; no water.

Saturday, September 19th, 1896.—Camp No. 20. Resumed at 8·15 a.m., on bearing of 100°. At three and a half miles arrived at Willimar rockhole on a limestone rise. This is misnamed Wally on Thompson's plan, who gives its contents as 2,500galls. On inspection saw at once this was much overstated, therefore carefully measured the hole, with the result that it was found that when the hole is full to overflowing it cannot contain more than 200galls. A shower had fallen here yesterday, and 100galls., which half-filled the hole, had been caught. Gave each camel 10galls., when they were satisfied. Then ran down track on bearings and distances as below to another limestone rise; here there was no rockhole. Then on to Kodnumbie rockhole, misnamed Chictynunb by Thompson, and stated by him to hold 3,000galls. This contained 7ft. of water, yesterday's rain having been heavier here; its contents, when full, is 1,000galls. From here we ran down track to where it crosses new telegraph line at 194½ miles west of Eucla, and from thence to Jillbunda rockhole, which is misnamed Jack rockhole by Thompson, who gives its capacity as 2,500galls. On examination this proved to be a shallow basin of considerable superficial area, capable of catching a considerable quantity of water; but the depth is insufficient to prevent rapid evaporation, the only spot where water will stand for any time after rain being in a deeper depression, which contains 200galls. when full. Here there was no water, but vegetation was fair, and having travelled a good stage, we camped. With exception of a few small patches of speargrass and one open saltbush flat of limited extent, the country traversed this day is most inferior, the vegetation consisting of dwarf mallee, spinifex, and coarse wire grass. Bearings and distances travelled: 100°, two miles; 50°, one and a half miles; 45°, one and a half miles; 60°, three miles; 95°, two miles; 70°, one and a half miles; 50°, three and a half miles; 82°, four miles = nineteen miles.

Sunday, September 20th, 1896.—Camp No. 21. Resumed at 8·20 a.m., on bearing of 140°. At four miles arrived at Willarumba rockhole. This when full contains 200galls.; it is now dry. Then altered bearing to 60°, and in five miles reached Billbillia rockhole, the capacity of which is 100galls. This was also dry. Then on bearing of 44° for fourteen miles, when Cockleberry (misnamed Cockbilly by J. C. Thompson, who gives its capacity as 3,000galls.) was reached. On arriving here found a little wet mud, the water having all been used by the Eyre's Sandpatch Telegraph Station stock, which I afterwards learned had been removed during the morning of the day I arrived. The outside limit of the holding capacity of this rockhole, or, properly speaking, tank (it having been enlarged by the stationmaster at Eyre's Patch), is 1,000galls. The soil immediately round Cockleberry is from fair to good, but there was no feed, the country adjacent to the water having been eaten out. Bearings and distances this day: 140°, three miles; 60°, five miles; 44°, fourteen miles = twenty-two miles.

Monday, September 21st, 1896.—Camp No. 22. Resumed at 7·10 a.m., on bearing of 146°, striking into coast five miles west of Eyre's Sandpatch, as I had been informed there is a good sand well, with good saltbush, acacia, and other camel feed in that locality. Reached there in fourteen miles. Examined the well, and found plenty of water, and as pasturage, consisting chiefly of salt and blue bush, mesembryanthemum (pigface) was abundant, with a fair supply of dwarf acacia, turned out and camped. Distance, fourteen miles, on bearing of 146°.

Tuesday, September 22nd, 1896.—Camp No. 23. Went round camels. Saw they had filled themselves, and were contented after their past three nights of hard times. Resumed at 9·55 a.m. Travelled along old telegraph line for five and a half miles on bearing of 110°, and arrived at Eyre's Sandpatch Telegraph Station. Here met Mr. W. Graham, the stationmaster, who informed me there was excellent camel feed in the sandhills between the station and the coast. Therefore moved on to near well and established camp. The five and a half miles traversed to-day consists of high white sandhills covered with a dense growth of acacia, dwarf wattle, hakea, salt, and blue bush on the level country, and mesembryanthemum; in places sand is drifting.

Wednesday, Thursday, Friday, September 23rd, 24th, 25th, 1896.—Remained in camp recruiting camels and plotting route from Coolgardie to this point.

Saturday, September 26th, 1896.—Camp No. 26. Resumed at 8 a.m. on bearing of 357° for six miles, following new loopline from Eyre's Sandpatch Telegraph Station to the new telegraph line; then on bearing of 48° for eight miles, passing Graham's shed tank, which was quite dry, at twelve miles, and camped at Burnaby rockhole, also dry. This is a small rockhole, the natural contents of which does not exceed 100galls. This has been added to by the erection of a low masonry wall roughly cemented on the inner face, but it is now in such bad repair as to be practically useless. The hole being located on face of the cliff is difficult of access, therefore as a stock watering-place it is of little value. The first six miles of country traversed this day is very inferior, as it consists of high white drift sandhills covered with dwarf mallee, broom, and heath *(Epacris)*, with a little saltbush and mesembryanthemum; the remaining eight miles is from fair to good pastoral land, comprising salt and blue bush, with occasional good patches of dense speargrass. Distance, fourteen miles; no water.

Sunday, September 27th, 1896.—Camp No. 25. Resumed at 7 a.m., on bearing of 80°. Travelled to Minyidigina rockhole, which was found to be small and dry; but there being good pasturage, camped at eighteen miles. Country traversed to-day all comprises good salt and blue bush, speargrass, and open belts of sandalwood, jamwood (local name for bastard myall), with occasional clumps of fair-sized and dwarf mallee and titree.

Monday, September 28th, 1896.—Resumed at 7·45 a.m., on bearing of 67° for eight miles, then altered to 52° for twelve miles, when Madura Station (formerly owned by the Earl of Carnarvon, but now deserted) was reached, travelling through excellent pastoral country the whole distance, good salt and blue bush, spear and bunch grasses, with green salsolæ and herbage being abundant. Timber was represented by numerous belts of sandalwood, jamwood, and quondong. At Madura met Mr. T. Knowles, late manager of Caroona and Nonning

Nonning runs, in the Gawler Ranges, South Australia. He is accompanied by Mr. H. W. Harslett, late manager of Parakylia Station, north-west of Port Augusta, South Australia. They are *en route* with forty-five horses to the goldfields. These gentlemen informed me they had attempted to run Thompson's track from the South Australian boundary, but finding all his waters dry and the contents much overstated, after travelling sixty miles without a drink for their horses, they had abandoned his route and come in to Madura, their horses having been thirty-six hours without water. Whilst we were in conversation Mr. J. C. Thompson arrived with twenty-five more horses. On interviewing him, he stated he also had to abandon his former route, as he found all waters previously visited by him on his first journey dry. This he attributed to these waters being heavily stocked by the lessees of the country on which they are located and the water being used by the construction parties of the new telegraph line. On my informing him that all rockholes visited by me were much smaller than stated by him and very much out of position, he replied, that in regard to capacity, he had accepted statements of other persons who had known them previously; as to their position, he had no knowledge of plans or survey work, and had simply supplied a general description of his route to the South Australian Survey Department, and that he did not consider himself responsible for the plan supplied to me. The only water available at Madura Station is in two large underground tanks and a house tank; the sheep well, which was 170ft. deep, and contained a good supply of stock water, having fallen in. Distance travelled on course, twenty miles.

Tuesday, September 29th, 1896.—Camp No. 27. Resumed at 8·15 a.m., on bearing of 95°, and travelled eight miles; then altered bearing to 90° and travelled nine miles, passing through open sandalwood belts, good salt and blue bush, and well-grown vigorous speargrass, for the first nine miles; the last eight miles bluebush was fairly abundant, saltbush became scarce, and speargrass increased both in quantity and growth; the whole forming excellent pastoral country. Camped at seventeen miles, without water.

Wednesday, September 30th, 1896.—Camp No. 28. Resumed at 7·30 a.m., on bearing of 81°, with new telegraph to south of course, distant one and a half miles. Travelling through good salt and blue bush, spear grass, mallee, sandalwood, and broom, to opposite seventy-ninth milepost on new telegraph line west from Eucla, and camped on good green salsolæ and herbage, but no water. Passed and examined Morabba rock-hole; it was quite dry, being of limited capacity (not exceeding 90galls). Distance on course, seventeen miles.

Thursday, October 1st, 1896.—Camp No. 29. Resumed at 7·15 a.m., on bearing of 87°, and travelled to Mundrabilla Station. Called and inquired for the lessees (Messrs. Kennedy and McGill). Was informed they were both absent at the woolshed (Emu well), six miles further east. Travelled on to Emu well, watered camels, and established camp a quarter of a mile to east in a mallee, large titree *(Melalucca)*, and sandalwood *(Pittosporum)* belt, where good saltbush, green salsolæ, and speargrass are abundant; then walked to woolshed and met Messrs. Kennedy and McGill. In course of conversation learnt that both at the station and here there is an inexhaustible supply of stock water, upon which for three months during a drought the station people lived. This supply is obtained at a depth of 170ft. below the cliffs. Mr. McGill also informed me there had been 5in. of rain during June and July of this year, and that this is one of the best seasons experienced in this district during the past twenty-six years. All country traversed to-day is good pastoral land, the vegetation being similar to that described yesterday. Distance travelled, twenty-one miles, on course of 81°. Purchased one sheep for 15s.

Friday, October 2nd, 1896.—Camp No. 30. Resumed course at 8·30 a.m., on bearing of 81°, following old road to Eucla. Passed Cheeta and Winganna sheep wells to the Government Kangaroo underground tank, which contained a little stagnant water in the bottom. Here the vegetation has all been eaten off; therefore travelled one mile further east and camped on excellent saltbush, green salsolæ, speargrass, sandalwood, and acacia. Camels will do well to-night. All country traversed to-day is excellent pastoral land. Distance on course of 81°, seventeen miles; no water.

Saturday, October 3rd, 1896.—Camp No. 31. Resumed at 7 a.m., on bearing of 81° for eight miles; then altered to bearing of 71° for thirteen miles, which brought us to within eighteen miles of Eucla. Then entered what afterwards proved to be an extensive open saltbush plain, intermixed with bluebush, green salsolæ, and mesembryanthemum. Turned off line. Travelled to a belt of myall and sandalwood to protect camels and ourselves from a keen wind coming in from the coast. All country traversed this day is clothed with good salt, blue, and cotton bush. Speargrass is abundant, dense, and vigorous, and, with the exception of the large open plain which now lies before us, sandalwood, myall, and large titree *(Melalucca)* is plentiful, the only essential lacking to promote successful occupation being water. Distance on course, twenty-one miles.

Sunday, October 4th, 1896.—Camp No. 32. Resumed at 6·50 a.m., on bearing of 71°, and proceeded to Eucla Telegraph Station, reaching there in eighteen miles. Received wire from the Surveyor-General which had been sent to Coolgardie on August 29th. Then went on to Eucla well; filled one pair casks, and established camp one mile east of telegraph station. Shall rest camels here to-morrow, and wire office, as pasturage is good in costal sandhills. All country traversed this day is good, and carries excellent salt and blue bush and speargrass, with sandalwood and myall in limited quantities. Distance, nineteen miles.

Monday, October 5th.—Camp No. 32. (Eucla). Resting camels.

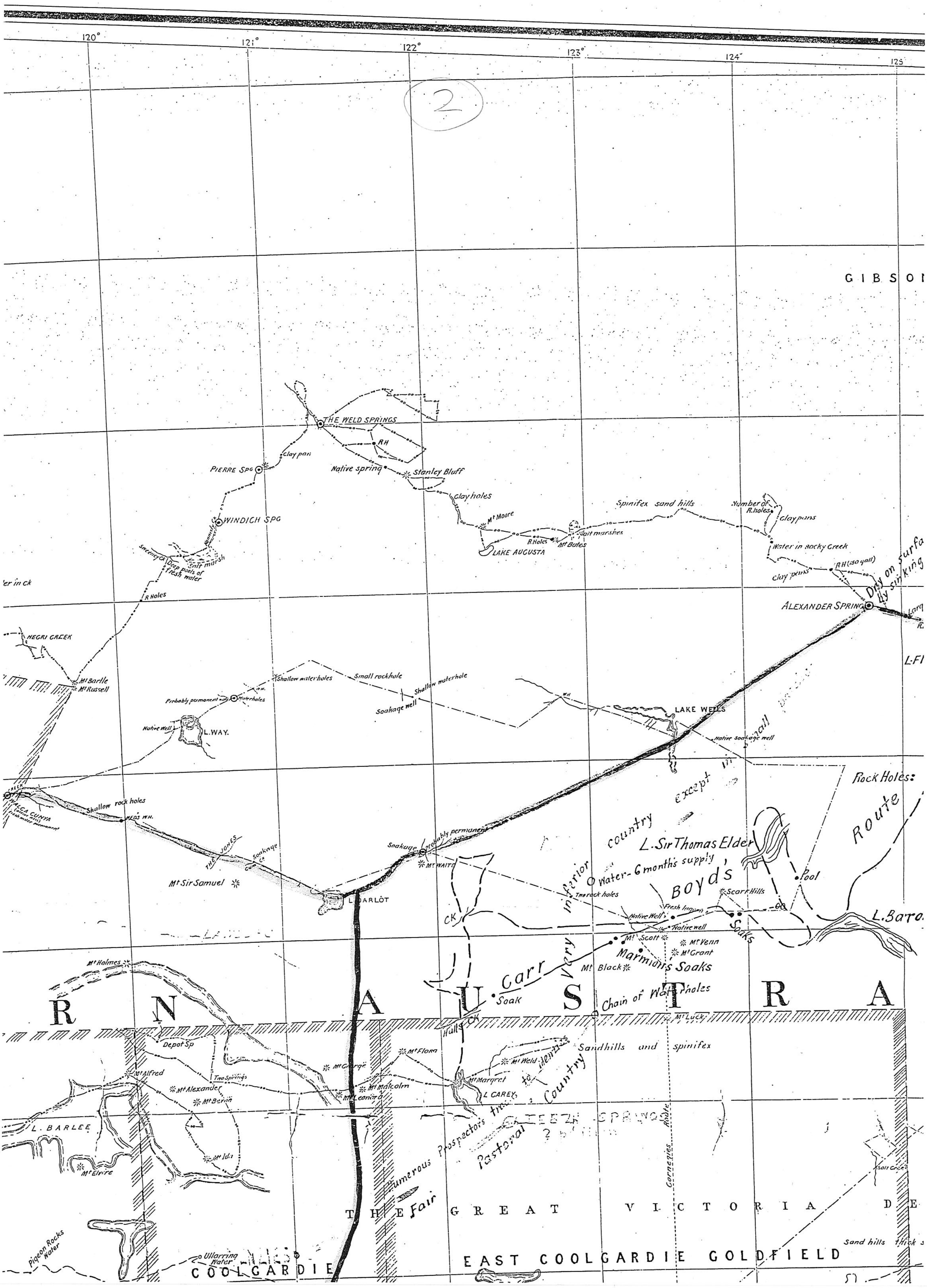
Tuesday, October 6th, 1896.—Camp No. 33. Loaded camels, then rode to station. Inquired for wires; none to hand. Returned to camp, and at 9·5 a.m. resumed, on bearing of 350°, to two and a half miles, when foot of the cliffs were reached. Here, at an underground tank (by permission of Mr. Stock Inspector Beere) filled casks and resumed, on bearing of 85°, for eight miles, when, having travelled over inferior soil with little vegetation, and striking a good strip of salt and blue bush, bunch and spear grasses, and sandalwood, camped and liberated camels. We are now in South Australia. Distance, eleven miles.

From Wednesday, October 7th, to Monday, October 19th, 1896, the party continued journey through surveyed lands to Fowler's Bay. Full detail of each day's proceedings have been kept, and will be forwarded if required, but are not considered necessary, the department having a full description of the country traversed. On arrival at Fowler's Bay I was directed to leave camels and return to Adelaide per boat. This was done, and Adelaide reached on November 10th, I having been at sea nineteen days.

S. G. HÜBBE, Leader of Expedition.

117°
118°
119°
20°
Horse Shoe Find
Mt Muitland
Splendid pools of fresh water probably permanent
Fine pool water in ck
Abbots
NEGRI CREEK
RIVER
Mt Hale
MURCHISON
Mt Matthew
Yalgar
Mileurah
Birrin
Mulgara C.P.
Mt Barlee
Mt Russell
Mt Murchison
Yalgoo
NANNINE
Star of the East
Nanadie W.
MURCHISON GOLDFIELD
Bonnie H.
Murgoo
SANFORD
Meka
RIVER
CUE
L. AUSTIN
Wheelarra
Jones
Nangoarrana
W Mt Magnet
East Mt Magnet
Challar W.
Mt Halm
Tillering Pk
Gabiana
LYNTON
Ederga
Spa
Mbgga Mugga
Ingulla Sp.
New Culleway Sp.
Mt Kenneth
GERALDTON
L. BARLEE
Pinyalling
Fullawarra
Malga
Mt Elvire
Mt Edon
LAKE MONGER
DONGARRA
WESTER

2


120°
121°
122°
123°
124°
125
GIBSON
THE WELD SPRINGS
RH
Clay pan
PIERRE SPG
Native spring
Stanley Bluff
Clay holes
WINDICH SPG
Kennedy Ck
Sweeney Ck
Salt marsh
Deep pools of fresh water
R Holes
NEGRI CREEK
Mt Bartle
Mt Russell
Mt Moore
LAKE AUGUSTA
R.Holes
Mt Bates
Salt marshes
Spinifex sand hills
Number of R.holes
Claypans
Water in Rocky Creek
RH (150 gall)
Clay pans
Dry on surface by sinking
ALEXANDER SPRING
L.FI
Shallow waterholes
Small rockhole
Shallow waterhole
Soakage well
Probably permanent water
Waterholes
Native Well
L.WAY.
WH
LAKE WELLS
Native soakage well
small
Rock Holes:
Route
except in
country
inferior
L.Sir Thomas Elder
Water - 6 months supply
Boyd's
Pool
Scorr Hills
Two rock holes
Fresh lagoon
Native Well
Native well
Soaks
L.Baro
Shallow rock holes
NED'S WH.
WALCA CUNYA
THE JONES
Sonkage Cum Ck
Soakage
probably permanent
MT WAITE
Mt Sir Samuel
L. DARLOT
CK
Mt Scott
Mt Venn
Mt Grant
Marmion's Soaks
Mt Black
Very
L. Carr
Soak
Chain of Water holes
Mt Holmes
R N A U S T R A
Halls CK
Mt Luck
Depot Sp
Mt Flora
Sandhills and spinifex
Mt Alfred
Two Springs
Mt Alexander
Mt Bevan
Mt George
Mt Malcolm
Mt Leonora
Mt Weld
Mt Margret
L CAREY
Country
to identify
Numerous Prospectors track
Pastoral
L. BARLEE
Mt Ida
Mt Elvire
Corneqies Route
Salt Creek
THE GREAT VICTORIA DE
Fair
Pigeon Rocks Water
Ullarring Water
COOLGARDIE
EAST COOLGARDIE GOLDFIELD
Sand hills thick

125° 126° 127° 128° 129°

3

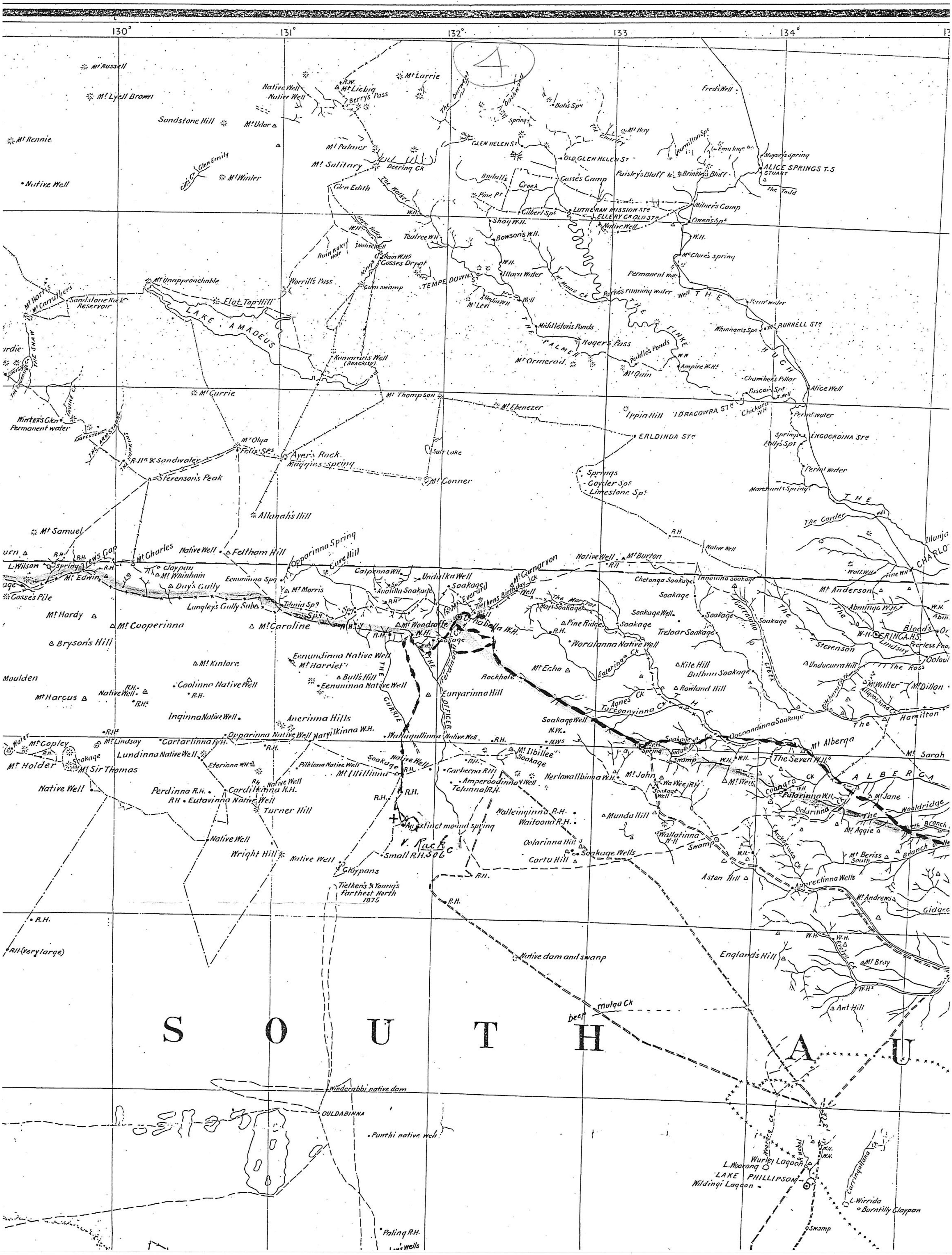
GIBSON'S DESERT

Mt Rennie
Native Well
Warmans Rocks
Native Well & R.H.
Mt Destruction
Mt Barlee
Lake Christopher
Circus Water
Forrest Cr
Weld Water
Tyrdall Sps
Louhrmans Sps
Desolation Glen
Stockers Water
Gordons Sps
The Rebecca
The Pocket
Weld Pass
Mc Bains Sps
Henry Hull Sps
The Hull
Mt Harris
Mt Carruthers
Sands Rest
Edith Hull Sp
Flemming Water
Mt Russell
Glen Cumming
Mt Curdie
Brackish water
The Shaw
Louisa Cr
The Columbia Cr
Irvine Cr
Winters Glen
Permanent water
Number of R. holes
Clay pans
Water in Rocky Creek
R.H (150 gall)
Clay pans
Dry on surface water by sinking 6 ft
ALEXANDER SPRING
Large R.H.
Four immense R.H.
Mt Charles
Two R.H.
Two large R.H.
Native Well R.H.
The Cup
Bimonan
Soak
Mt Herbert
R.H. 60 gallons
J.C. Dunn Soak
Water not permanent
Barlee Spr.
Lightning Rock
Mt Scott
Mt Aloysius
Spring
Mt Gosse
Mt Cockburn
Mt Samuel
L. Wilson
Spring
Mt Edna
Terzi Soakage
Gosses Pile
Mt Hardy
Latitude Hill
Bryson
Mt Moulden
Mt Harcus
Mt Agnes
R.H.
Permano Hill
Water
Mt Copley
Mt Holder
Native Well
Mt Cooper
Fort Mueller
Mt West
Country
Fair
Forrests rockhole
Mt Whitby
Mt Swinces
Tank
Burrows Hill
Skirmish Hill
Rockhole in gully
Clay pan
Small rockholes
Small rockholes
Small rockholes
3 Rockholes
Rock Holes:
Wanon Soak
Mascotte Soak
Route
Pool
Scarr Hills
Soaks
L. Baron Von Mueller
An extinct mound Spring
Tilley
Salt Creek
Clay Pans
R.H.
R.H.
R.H. (very large)
BOUNDARY DAM
Small native dam
Sand hills dense scrub
Mallee and bushes
Open grassy, Myall. blue bush, salt bush, and broom.
Sand hills thick scrub mallee
Clay pan
Under Pack 50lb

R A L I A

O R I A D E S E R T

OLDFIELD


4
130°
131°
132°
133
134°
Mt Russell
Mt Lyell Brown
Sandstone Hill
Mt Udor
Mt Rennie
Native Well
Glen Emily
Gills Ck
Mt Winter
Native Well
Native Well
R.W.
Mt Liebig
Berrys Pass
Mt Larrie
The Derwent
Dashwood
Bobs Spg
spring
Mt Palmer
Mt Solitary
Deering Ck
GLEN HELEN St
The Chewings
Mt Hay
Hamilton Spg
Emu lagn
Moyses spring
ALICE SPRINGS T.S
STUART
The Todd
Fred's Well
OLD GLEN HELEN St
Gosse's Camp
Paisley's Bluff
Brinkley's Bluff
Rudalls
Creek
Glen Edith
The Walker
Pine Pt
Gilbert Sps
LUTHERAN MISSION St
ELLERY CK OLD St
Native Well
Milner's Camp
Owen's Sps
Shag W.H.
Bowson's W.H.
W.H.
McClure's spring
Hope Valley
W.H.
Teatree W.H.
Rain water Hole
Native Well
Rain W.Hs
Kings Ck
Gosses Depot
Stokes
TEMPE DOWNS St
Illara Water
W.H.
Permanent water
Mt Unapproachable
Worrill's Pass
Gum swamp
McMinns Ck
Parke's running water
Well
THE FINKE
Perml water
Mt Harris
Mt Carruthers
Sandstone Rock Reservoir
Flat Top Hill
LAKE AMADEUS
Undiaw H
Mt Levi
Well
Middleton's Ponds
Rogers Pass
THE PALMER
Whinnamis Sps
RURRELL St
Peddle's Ponds
W.H
Ampire W.Hs
Mt Ormerod
Mt Quin
THE HUGH
Chambers Pillar
Alice Well
Ruscoe Sps
Well
THE SHAW
Kamarau's Well
(BRACKISH)
Mt Currie
Mt Thompson
Mt Ebenezer
Ippia Hill
IDRACOWRA St
Chickara W.H
Perml water
Winter's Glen
Permanent water
IRVINE CK
THE ARMSTRONG
THE HOPKINS
Mt Olga
Felix Sps
Ayer's Rock
Maggies spring
R.Hs & Sandwater
Stevenson's Peak
Salt Lake
Mt Conner
ERLDINDA St
Springs
Polly's Sps
ENGOORDINA St
Springs
Goyder Sps
Limestone Sps
Perml water
Marchant's Springs
THE
Allanah's Hill
The Goyder
Well
Illunja
CHARLO
Mt Samuel
R.H.
Native Well
Mt Charles
Native Well
Feltham Hill
Opparinna Spring
Cave Hill
Native Well
Mt Burton
RH
L.Wilson
Spring
Lews Gap
R.H.
Claypan
Mt Whinham
Mt Edwin
Day's Gully
Gosses Pile
Eenuminna Spg
Mt Morris
Calpenna W.H.
Undulka Well
Analilla Soakage
Soakage
Mt Everard
Mt Carnarvon
Tietkens Birthday Ck
Well
Chetonga Soakage
Innomina Soakage
Wall W.H.
Fine W.H.
Mt Anderson
Abminga W.H.
W.H.
Langley's Gully Sub
Tilmia Sp
Mt Hardy
Mt Cooperinna
Mt Caroline
Mt Woodroffe
W.H.
Ernabella W.H.
The Marryat
Mays Soakage
Soakage
Soakage Well
Soakage
Gurrabullo Creek
Soakage
The
The
W.H. ERINGA H.S.
Bloods
Lindsay
Peerless Pool
Bryson's Hill
Pine Ridge
Treloar Soakage
Stevenson
Woralanna Native Well
R.H.
Mt Kintore
Eenundinna Native Well
Mt Harriet
Moulden
Bull's Hill
THE CURRIE
Eenuminna Native Well
THE FERDINAND
Rockhole
Eateringa Ck
Mt Echo
Kite Hill
Bulbun Soakage
Undacurra Hill
The Ross
Thompson
Mt Walter
Mt Dillon
Bitchera Ck
Allgoochina Ck
Mt Harcus
Native Well
R.H.
Coolinna Native Well
R.H.
R.Hs
Eunyarinna Hill
Rowland Hill
Agnes Ck
Tarcoonyinna Ck
THE
Hamilton
The
Inqinna Native Well
Anerinna Hills
OFFICER
Soakage Well
N.W.
N.Ws
Oocoondinna Soakage
Mt Alberga
R.H.s
Mt Copley
Mt Lindsay
Cartarlinna R.H.
Opparinna Native Well
Naryilkinna W.H.
Wallagullinna Native Well
R.H.
Mt Ibbillee
Soakage
Spring
Indulkina
Swamp
W.H.
W.H.
The Seven W.Hs
Mt Sarah
Mt Holder
Soakage
Mt Sir Thomas
Lundinna Native Well
R.H.
Eterinna W.H.
Pilkinna Native Well
Soakage
Native Well
R.H.
Mt Illillinna
R.H.
Carbeena R.H.
Amperoodinna Well
Telunna R.H.
Nerlowallbinna W.H.
Mt John
Wa Wee R.H.
Soakage Well
Mt Weir
Coongra Ck
W.H.
Pularinna W.H.
ALBERGA
Mt Jane
Native Well
Perdinna R.H.
Cardilkinna R.H.
R.H. Native Well
R.H.
Eutavinna Native Well
Turner Hill
R.H.
R.H.
An extinct mound spring
Nalleinqinna R.H.
Waitoona R.H.
Munda Hill
Oolarinna
The Wooldridge
North Branch
Mt Aqqie
Native Well
Wright Hill
Native Well
V. Rack 506 C
Small R.H.
Claypans
Oolarinna Hill
Soakage Wells
Cartu Hill
Wallatinna W.H
Swamp
W.H.
Arckaringa Ck
Mt Beriss South
Branch
Tietken's & Young's farthest North 1875
R.H.
R.H.
Aston Hill
Appreetinna Wells
Mt Andrews
Gidgea
R.H.
R.H. (very large)
Native dam and swamp
England's Hill
W.H.
W.H.
Evelyn Ck
Mt Bray
W.Hs
Deep
Mulga Ck
Ant Hill
S O U T H
A U
Winderabbi native dam
OULDABINNA
Punthi native well
Woorong Ck
Habel
W.H.
W.H.
Wurley Lagoon
L. Woorong
LAKE PHILLIPSON
Wildingi Lagoon
Carringallana Ck
L. Wirrida
Burntilly Claypan
Swamp
Paling R.H.
wells

135° 136° 137° 138° 139° 140°

5

QUEENSLA

U S T R A L I A

Illunja
CHARLOTTE WATERS.T.S.
FINKE
W.H.
Abminga Ck
Blood's
C.A.H.S.
Ormsby's Well
Ck
Peerless Pool
Oaloolarina W.H.
Ross
Mt Dillon
Waterhole
Hamilton
Oolarburrinna Well
Mt Sarah
Six mile well
R C A
MACUMBA.H.S.
Ross W.H
W.H.
THE MACUMBA
Storm Ck
Wooldridge
North Branch of Neales
Branch of Neales
Angle Pole W.H.
OODNADATTA
THE Springs
Gidgea Ck
NEALES
Mt Toondina
Algebuckina W.H.
THE NEALES
W.H.
COOTANOORRINA H.S.
LAKE EYRE (NORTH)
STRANGWAYS.T.S
Elizabeth Spg
Coward's Spg
Blanche Spgs
Well
W.H.
W.H.
Coorie Appa W.H.
LAKE EYRE (SOUTH)
FINNISS SPRING H.S.
MARREE
Herrgott Springs
Claypan
Mc Douall Peak
Mt Paisley

139°

140°

141°

23°

24°

25°

26°

27°

28°

29°

J E E N S L A N D

I A

S

Vide C.S.O. PREMIER
for telegram 8th Oct
letter 5th Nov 189[?]

For orig! plan prep^d for Photo. V. Park 507

L. BARLEE
Mt Alexander
Mt Bevin
Mt Malcolm
Mt Leonora
L CAREY
Mt Elvire
Mt Ida
Numerous Prospectors from
Pastoral
Fair
GREAT VICTORIA D
Pigeon Rocks Water
Ullarring Water
COOLGARDIE
EAST COOLGARDIE GOLDFIELD
Sand hills
Clay pan
myall pines quendon
Mt Jackson
Roaring Gimlet
Siberia
New Find
Mt Youle
Broad Arrow
Cashmans
Black Flag
Dead Finish
GOLDFIELD
Wealth of Nations
Premier
White Feather
Hannan's Find
Great Boulder
KALGOORLIE
QUEEN VICTORIA'S SPRING
Streich Mound
Mt Quin
L. Roe
L. La Page
Small rockhole
THE PONTON
Clay pan
Mt Walter
Mt Burgess
NUTSFORD
Hunts Slate W
Mt Monger
Mt Belches
Salt lakes
COOLGARDIE
Londonderry
Charlbine
SOUTHERN CROSS
Mt Clara
Boorabbin
Woolgangie
Yerdi
LEFROY
Parker Hills
Toonone
Mt Edwards
Mt Eaton
Salt Lakes
Small R.Hs
Simon's Hill
Well 100f. deep
Rocky Hill
Care Hill
L. COWAN
Mt Holdha
DEMPSTER'S STN
Mt Thirsty
Mt Norcote
DUNDAS HILLS
NORSEMAN
Boojarbeenyer W.
Mt Dean
Carraning
L. Carmody
Mt Tamar
DUNDAS
Coonambinya RH
Mahnoonam Soak
Mt Glasse
DUNDAS GOLDFIELD
Corraiinga
Clear Stroak W
Double Tank
Sheaoak Hill
Fitzgerald Pks
Silver Wattle Hill
Jardies Rk
Mt Ridley
Duck Rks and Holland Sps
Mt Heywood
Mt Beaumont
Three Cups
Jenabillup Ck
Mt Symmons
Mt Dean
Cockatoo Ck
Crossing
Mt Burdett
Wild dog
Benje Benjenup Lake
Howick Hill
Mt Baring
ISRAELITE BAY
Dempster
ESPERANCE
Mt Merivale
Stokes In
Butty's Hut
ESPERANCE BAY
Pt Cheyne
Carid
Sandy Bight
G. Pasley
Gotham Inlet
Pt Charles
Doubtful Island Bay
Hood Pt
C Knob
C. Riche
Pt Culver
Weld. T.S
Israelite Bay

Proposed route of the W.A. Stock Route Expedition
- under Mr. Hubbe - shown in red.
Copy supplied to Mr Hubbe 31st. Oct 1895
excepting that portion marked "Carr Boyd's Route."

O. PREMIER
from 8th. Oct and
to 7th Nov 1895.

NOTE. Waters said
Other water
Extinct Mou
Rock Holes n
Native Wells
Railway Liu
Telegraph.

Journal Packet 8
No. 3

119° 120° 121° 122° 123° 124°

Salt Creek

R I A D E S E R T

Open grassy, Myall. blue bush, salt bush, and broom.

Sand hills thick scrub mallee

- D F I E L D

Clay pan

myall pines quondong, and spinifex.

Sand hills dense scrub

Small native dam

Mallee and bushes

BOUNDARY DAM

N U L L A B O R

Fairie and Wooley's Wagon

DELISSE

Iron tank

Track

DELISSER 1865

Waggon

RH

RH

Coompana Tanks

RH R

All rock holes between Eyres Sandpatch + Eucla on Thompsons track dry, pasturage green + plentiful

H A M P T O N - T A B L E L A N D

Vide S.G.O 9486/96

EUCLA T.STN

T H E G R E A T A

EYRE.T.S.

Eyre's Sand Patch

Twilight Cove

Red Rock

Pt Dover

Pt Culver

Weld.T.S

ISRAELITE BAY

EXPLO

THE TELE

THE WEST

Stu
Gile
Gos
For
Jon
Cha
Tiet
Lin

NOTE. *Waters said to be permanent shewn thus* ⊙
Other waters ... *do.* ... •
Extinct Mound Springs ... *do.* ... +
Rock Holes marked ... *R.H.*
Native Wells ... *N.W.*
Railway Lines shewn thus ...
Telegraph Lines ... *do.* ...

MAP

SHEWING

EXPLORATION ROUTES

BETWEEN

OVERLAND TELEGRAPH LINE, SOUTH AUSTRALIA

AND

WESTERN AUSTRALIAN GOLDFIELDS

ROUTES SHEWN THUS

Stuart	1858_60	××××××××××××××
Giles	1872_76	— — — — —
Gosse	1873	— × — × — × — × —
Forrest	1874	— oo — oo — oo — oo —
Jones	1880	— ‹ — ‹ — ‹ — ‹ —
Chambers	1883	= = = = = = = =
Tietkens	1889	— · — · — · — · — · —
Lindsay	1891_92	— · — · — · — · —

SCALE

MILES 10 5 0 10 20 30 40 50 60 70 80 MILES

W. Ernest Bridge
Surveyor

U S T R A L I A

LAKE EYRE (NORTH)

STRANGWAYS. T.S

Elizabeth Spgs
Cowards Spg
Blanche Spgs

Well
W.H.
W.H.
Coorie Appa W.H.

LAKE EYRE (SOUTH)

FINNISS SPRING H.S.

MARREE
Herrgott Springs

Mc Douall Peak

Mt Paisley

Well
Mt Eba H.S (old)

Deep Well

L. YOUNGHUSBAND

Andamooka W.H.

LAKE TORRENS

BELTANA

LAKE FROME

L. HARRIS

L. HANSON

L. HART

LAKE GAIRDNER

L. WINDABOUT

ISLAND LAGOON

PERNATTY LAGOON

L. MACFARLANE

L. AGRAMAN

HAWKER

QUORN

PORT AUGUSTA

COCKBURN

EYRE'S PENINSULA

LAKE GILLES

YUNTA

PETERSBURGH

PORT PIRIE

GLADSTONE

GULF

KOORINGA

Lake Newland

WALLAROO

MORGAN

MURRAY RIVER

SPENCER'S GULF

PORT LINCOLN

C. Wiles

YORKE'S PENINSULA

GULF ST VINCENT

ADELAIDE

KANGAROO I.

S.60
6210/
5268/

A

WALES

NEW SOUTH

LAKE
FROME

COCKBURN

YUNTA

MORGAN

MURRAY

RIVER

29°

30°

31°

32°

33°

34°

35°

140°

141°

142°

12

S.20
6210/96
5268/96

21