

sure that there were considerable errors in longitude in the sketch maps available of the Jervois and Tarlton Range areas. My companion was R. L. Crocker, a graduate in Science, a geologist and soil surveyor, who was then on the staff of the Council for Scientific and Industrial Research at the Waite Institute. I have never enjoyed a happier association on any trip.

Just before leaving I was commissioned by the Anglo-Iranian Oil Company to carry out some investigations for them to amplify my previous geological reports, particularly in the region of the James Ranges and country to the south of the MacDonnells.

We motored all the way from Adelaide, taking the western road to Alice Springs, not the one following the railway line. It is questionable which is the better track. There is very little sand on either, but considerably more stony going to the west and more creeks to cross. The Shell Company have arranged petrol refilling points at stations all the way along the western track, and have been chiefly responsible for opening up this route.

The track follows the east-west Transcontinental Railway from Pt. Augusta to East Well and then runs almost due north through Coober Pedy to Henbury and on to Alice Springs.

The country is very flat right through the South Australian portion of the route, with scarcely a hill and nothing that could be called a range, till the Northern Territory border is reached, where there are hills around Teyon station, and granite masses on Kulgara across the border. Then follow seventy miles of plains on Erldunda station, ending with low ranges and ridges at the Palmer River. Fifteen miles beyond the Palmer the Finke is crossed at Henbury station, where there are more low ranges. Another twenty miles of plains brings us to the Hugh River at Doctor's Stones, where the eastern end of the James Range makes a conspicuous feature. Only the narrow Waterhouse Range breaks the seventy miles of plains between Doctor's Stones and Alice Springs.

The vegetation gradually changes from myall scrub and salt bush assemblage in South Australia to mulga, desert

oak, bloodwood gum and spinifex in Central Australia, as the sheep country is left behind and the cattle country entered. There are no sheep north of the border on this route. There is considerably more high timber and shady trees in the Northern Territory than in that portion of South Australia, where some of the plains are almost treeless.

An interesting story could be written of the journey along this western track alone, but our subject is Central Australia. One must, however, mention the opal fields at Coober Pedy. They lie about a hundred miles to the west of William Creek on the Alice Springs railway, in what is called Stuart Range. The range is really not a range at all, but the edges of a low tableland facing broad and shallow wash-outs. Approaching from the west, nothing but perfectly level plains is seen till one is on the edge of a descent, at the bottom of which the few buildings of Coober Pedy suddenly appear. Opal mining is still going on here in a small way. There is a little store and a big concrete tank provided by the Government and filled by surface run-off. The miners live underground in the opal workings in the sides of the low cliffs. Seams of potch opal can often be seen in the walls of the homes. Many other workings are away from the cliffs and entered by shallow shafts. Coober Pedy produced large quantities of beautiful white opal, and took the place of the original home of the white opal, White Cliffs in New South Wales, which was long ago worked out. Individual specimens were larger and of higher quality than most of the White Cliffs stone, but unfortunately it was found that most of the opal developed cracks and flaws within a year or so of being taken from the ground, and great quantities bought at high prices from the miners became valueless to the merchants. The stone is unreliable, but what survives the test of time is of matchless beauty.

The crossing of the Alberga Creek at Lambina station is a wide and difficult one. They usually kept some camels at the station to help the cars over, so frequent were the calls for help. Here we got some aboriginal spears of the best workmanship and finish I have ever seen. The Pages had a separate guest house where we were most

25' S., and with a native guide he crossed the southern end of the area, between Lake Eyre and the South Australian border, by means of a string of native water-holes, and reached the Queensland border. He was obliged to return the way he went, being unable to penetrate the sandy, waterless country to the north of him. This journey marked the southern boundary of the unknown area. Lindsay then tried to go north-east from the Finke River near Anacoora Bore, but only succeeded in reaching longitude 136° E., in very bad country. He almost reached the point on Day's subsequent route where the Hale floods out. His camels began to knock up, and he was forced back to the telegraph line.

The Northern Territory-South Australian border between Charlotte Waters and Poeppel's Corner had never been surveyed or traversed.

Since those days, Jim O'Neil, the well-known opal miner and discoverer of Coober Pedy, had tried to penetrate the area from the Hale on the western side, and Simon Rieff had perished half a dozen camels in the northern end. O'Neil said he turned back in a sea of spinifex and sand.

Here, then, was an interesting nut to crack.

Further, there were the great lakes, particularly Lake Eyre, whose shores had all been surveyed, but about which nothing was known except the contour of their margins. Was there deep water in them, islands, animal life?

Sixty years of exploration with horse, camel, and, lastly, motor truck had not settled these problems, in that country of great distances and little water. It seemed that here was the opportunity for the aeroplane, and I determined to use it for the first time in Australia for geological and physiological investigations. And then those 150-mile long ranges in the MacDonnells, with their scattered and unconnected patches of geological work, and the uncertainty as to which range was which at different points, could all be easily put in their places by a few hours in the air.

A programme which I drew up received enthusiastic support from the President, Mr. A. A. Simpson, C.M.G., and members of the committee of the Royal Geographical Society of Australasia, South Australian Branch; and through the Federal Government it was arranged that two aeroplanes of

the Royal Australian Air Force, with personnel, should be put at my disposal by the Defence Department, in August 1929.

The expedition lasted nineteen days from leaving Melbourne, and 4,300 miles were flown by the two Westland Wapiti machines.

I had hardly any previous experience of flying, and none of aerial photography, so that I had much to learn in the day at my disposal before we left the aerodromes at Laverton. On my first flight in a Wapiti, the pilot gave me a giddy time, and I came down looking and feeling green. I made six exposures with the camera, broke five plates changing them, and got a poor result with the sixth. The next morning we left Laverton, in drizzling rain, with three men in each plane, and all tightly wedged in. In addition to the pilot in each plane, an aircraftman photographer was to travel in my plane, so that both of us could take photographs, and I could supervise the photography, while the chief mechanic, who was a sergeant, and the wireless operator travelled in the other machine. We had two hand cameras, and the aircraftman used his camera from a prone position through the floor, taking pictures in a nearly vertical direction, while I used mine over the side from the observer's cockpit, for obliques, which always included the horizon. I thus had the cockpit practically to myself, as the other man was lying in the fuselage.

On the first day we flew to Broken Hill. Before we reached the Murray at Mildura, the wet, cold country of the coastal areas had been left behind, and the reds and browns of sand and dry grass lay below us. At Mildura the pilots did a few turns over the town for the benefit of the inhabitants, which made me feel very uncomfortable.

From Mildura, we followed up the Darling to Menindie, and thence along the railway line to Broken Hill, flying over Sturt's first route into the interior, travelled by him eighty-five years before when he reached the south-eastern corner of the Simpson Desert, which we had now set out to explore.

The meanders of the Darling through its flat soil plains showed very plainly from the air. On the last stage of the flight we were in the arid country, and came down low over