Donald Mackay was a wealthy pastoralist with a keen sense of adventure and a patriotic spirit. By 1920 he had ridden a bicycle around Australia and travelled the South Pacific by yacht. Five years later he set his sights on exploring unchartered regions of central Australia and assessing the possibilities for pastoral expansion.

Basedow heard that Mackay was equipping an expedition and offered to assist him in making arrangements. Aware of Basedow’s reputation, Mackay asked him to join the expedition and advise on other personnel. Basedow selected Frank Feast and Bert Oliffe, each of whom had been on two earlier trips with Basedow. At Oodnadatta three Aboriginal assistants were also engaged — Sambo, Ronald and Jack, all Kaiditj men.

Transport was provided by a string of 25 camels, and it was Oliffe’s role to look after them while Feast was cook and general camp assistant. Basedow and Mackay had a buggy drawn by two of the camels to carry their personal equipment, including scientific and surveying instruments and a wireless. From Oodnadatta everything was taken to Charlotte Waters, their starting point. The first day of the expedition, on 27 May, was not without its tribulations: all the non-Aboriginal members of the party had influenza and a camel threw its load at the first creek crossing.

At times their route roughly followed that of the 1903 expedition. Initially they travelled west to the Ayers Ranges, encountering rough gibber (stone-strewn desert) country and an enormous depression that was difficult to descend, as Mackay noted in his diary:

After passing through some Mulga, came to the edge of a cliff some 50 ft. [15.2 metres] deep. We now have considerable trouble in finding a way down and eventually resort to tying some tree branches on to axle of buggy to steady it down. The going now, though rough, was fairly level. Many table topped hills devoid of vegetation had to be gone round, and creeks crossed. There were thirty crossings to be made and then ascent on the further side, it was about the same height as the first we descended. Eventually by the combined effort of the two camels and all hands, we were again on level Mulga country.
From the Musgrave Ranges they travelled to Uluru, where they camped and rested for four days. Basedow busied himself examining the geology and the many rock paintings in the vicinity. On the second day after leaving Uluru for the Olgas, they struck rugged sandhill and mulga country, making progress slow. Continuing north-westerly they reached Mount Currie, where they camped for two nights. While Ronald, Jack and Sambo were filling water drums at a nearby waterhole, they met two local men, the first encountered since leaving Charlotte Waters. The men, Artuatama and Midigerinja, were wary of approaching the camp. But Basedow, who was a reasonably competent Luritja speaker, was able to put them at ease and also ask them the names of places in the locality, which he would later include on an expedition map.

When the party left Mount Currie, on 26 June, Artuatama and Midigerinja accompanied them. They soon came upon a camp of about 20 Aboriginal people, who travelled with the expedition for part of the day. Once they reached the western Petermann Ranges, Artuatama and Midigerinja departed, probably having reached the limits of their country. As Mackay recorded in his diary:

The two local natives seem very shifty, say they are frightened to go over their boundary. We promise to give them some tobacco and turkey twil if they will come along, as they have been most useful giving local names [of geographical features and plants].

It is also likely the men had wanted to keep a general eye on things and ensure the party steered away from sacred sites.

Near the Hull River, in the Petermann Ranges, the country became too rough to take the buggy and they had to retrace their steps. At Ernabella waterhole, back in the Musgrave Ranges, Basedow photographed several trees marked by earlier explorers, including Ernest Giles, William Gosse and Richard Thelwall Maurice. These markings have long since disappeared. Also at Ernabella, Basedow found good use for the leather shoes he brought for his dog Spotty, noting in his diary that 'burrs and three cornered jacks very plentiful; expedition dog Spot wears his boots to great profit, without them he could not move a pace'. From Ernabella the party returned to Oodnadatta, the final destination, arriving on 13 August.

In his assessment of the country explored, Mackay wrote:

From a pastoral standpoint I fear the country traversed by the expedition has no future owing chiefly to the uncertain rainfall … Even if the difficulty regarding water could be overcome an equally serious difficulty has arisen, namely, rabbits, which have gone over this country in a wave, eating out much of the natural feed.

However Mackay was satisfied that they had covered country not previously explored by Europeans. Throughout the expedition Basedow had surveyed the land and three years later published a map that recorded the Aboriginal names of features and marked the expedition route. He also appended a one-page geological report on the Petermann Ranges to Mackay’s 1929 account, in which he highlighted the region’s strong gold-mining prospects.