

SAMUEL WHITE'S ORNITHOLOGICAL EXPLORATIONS IN NORTHERN SOUTH AUSTRALIA IN 1863

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In commemoration of the centenary of the death of Samuel White, 1835-1880.

INTRODUCTION

'Possibly no Australian field naturalist spent more time and money in the pursuit of ornithology than did Mr. Samuel White, of the Reedbeds, near Adelaide.' So wrote A. J. Campbell (1900: xiv). One could add that rarely has so little come down to us from one who did so much. It is towards a fuller appreciation of Samuel's work that the present study is a contribution.

Samuel White, father of Captain Samuel Albert White (1870-1954) and correspondent of John Gould, came to South Australia with his younger brother William in 1842, their father John having taken up land at the Reedbeds on the lower Torrens in 1836. In 1860 John White met his death through an accident with horses, leaving Samuel, then 25, free to pursue his interests in natural history. From then until his own untimely death at 45, Samuel's life was one of extensive travel and adventure.

Almost all we know of Samuel is contained in the biographical notes written by his son (S. A. White 1920). Yet if, as we are assured, Samuel kept detailed notebooks, why do we know so little? The answer is that S. A. White being only ten when Samuel died, the latter's notebooks passed, in an old desk, not to him but to his uncle William, who eventually gave the desk empty to S. A. White, having managed to lose its contents (Mrs. M. B. White, pers. comm.).

The subject of the present study is Samuel's first major expedition, his attempt in 1863, at the age of 28, to cross the Australian continent from south to north. Some historical perspective will be helpful here. In 1860-61 Burke and Wills travelled to the Gulf of Carpentaria *via* Cooper's Creek but perished on the return journey. In 1862 McDouall Stuart reached the north coast of the Northern Territory *via* Mount Margaret (see below) and returned safely. Through Campbell (*loc. cit.*) we know that Samuel had signed an agreement to accompany the Burke and Wills Expedition, but finally decided to go by himself after a disagreement concerning the quantity of luggage he needed for collecting purposes.

Campbell's and S. A. White's accounts of Samuel's epic journey of 1863 are under-

standably sketchy. With his man Cottrell, Samuel set out for 'seven or eight months . . . in a spring dray with two horses . . .' (Campbell) or with ' . . . three horses attached to a dray, with ten months' stores' (White). According to the latter, his intention was to reach the Gulf of Carpentaria; however, we shall consider below circumstantial evidence that this was not his original destination. 'By August 23rd', wrote S. A. White, 'we know that he was at St. a 'Becket's Pool [ca 30° 10' S, 138° 20' E], for it was here he collected the type specimen of *Artamus melanops*. Pushing on past Lake Hope, and away to the north of Lake Eyre, taking his position each day and marking it down on a blank map, beset by privation and hardships beyond description, and attacked by hostile natives, but never daunted he and his companion were shaping their course for the centre of the continent. One disaster after another befel [*sic*] them, and when north of Lake Eyre the last horse died. That indomitable spirit of the explorer was forced back. The dray, with nearly all the valuable specimens, had to be abandoned in the desert, and the two men set out on the homeward journey on foot . . . it must suffice to say that Samuel White and his faithful servant reached his home at the Reedbeds after months of tramping.'

In the absence of Samuel's notebooks, any attempt to elucidate his expeditions must rely on a close examination of what meagre information we already possess, together with a search for any previously overlooked sources. In the latter respect, some small degree of success has been attained. Samuel being a correspondent of John Gould, it seemed reasonable to suspect that some of his letters (excerpts from which were published by Gould) were preserved amongst Gould's papers in the Zoological Library, British Museum (Natural History). Such proved to be the case. In response to my enquiry, Miss Ann Datta of the above department kindly located and photocopied for me four letters from Samuel to Gould (January 25, May 26, June, and August 24, 1864), and the drafts of three replies from Gould (March 21, July 19, and October 22, 1864). This correspondence, begun soon after Samuel's return from his attempt to cross the continent, was prompted partly by the identity of certain

specimens procured on that journey, and contains numerous pieces of information not excerpted by Gould. Samuel's letters are not as informative as one could wish, containing almost no reference to the expedition itself; yet used in conjunction with data from other sources such as specimens in the Gould Egg Collection (BMNH), the William White Egg Collection (SAM) and the S.A. White Collection (Adelaide), they throw further light on Samuel's courageous but ill-fated journey.

Below appears all the available information on the birds encountered by Samuel on his expedition of 1863, together with a discussion of the significance of some of his observations and a review of his route. Samuel's ornithological notes in particular have been presented in some detail, this being considered both proper to the commemorative aspect of the study and important to its function as a basis for further research.

LIST OF SPECIES

PLUMED WHISTLING-DUCK

Dendrocygna eytoni

Skin in S. A. White Coll., '248, female, Lake Hope, 13 October 1863.'

Samuel (*in litt.* June 1864) despatched eggs of this species to Gould with the following remarks:

'No. 4, "D. Eytoni", the nest was in a log, the number of Eggs they lay I am not sure of but the Blacks say about 8 or 10, mostly in the sandhills, from Coopers Creek.'

His remarks were quoted with a few emendations by Gould (1865c: 376). There are at present no eggs of this species from Gould in the BMNH (M. Walters *in litt.* May 19, 1980).

D. eytoni is an uncommon and irregular visitor to South Australia, with most records from the lower South-East and the North-East (Parker *et al.* in prep). In the North-East, whence there are some nine reports, it has been noted on Eyre Creek, the Diamantina and the Cooper, in times of flood. There are no other unequivocal breeding records from the State, though 'young' were reported on the Diamantina in May 1930.¹

LETTER-WINGED KITE *Elanus scriptus*

Skin in S. A. White Coll., '261, female, Manuwalkaninna, 28 October 1863'; two eggs

¹ Terrill & Rix (1950: 71) listed a specimen of the Wandering Whistling-Duck *D. arcuata* in the White Collection as being from Cooper's Creek. If this locality were correct, the specimen would represent the sole acceptable record of *D. arcuata* from South Australia. Recourse to the specimen and to the register of the collection compiled by Mrs M. B. White in 1942 reveals that the original data-sheet is lost, the annotation in the register being 'Lake Hope or Cape York'. In fact, the specimen's original number, 1109, indicates that it was part of the collection made by Samuel in the Cape York district in August-September 1878.

in Gould Coll., BMNH, reg. no. 1884. 10.1.45-46, inscribed '7'.

'... I have the *E. scriptus* which I found in great numbers on Coopers Creek between Lats 27° and 28° being always in companies of from 10 to 20 or 30, they fly when near the ground with a heavy flapping motion but will soar very high at times when I think their movements very graceful, they are rather inquisitive [*sic*] but not so bold as [*Milvus migrans*], nesting as near each other as possible, the nest is composed of sticks lined with the fur of rats (evacuations from the stom.) upon which they seem to live chiefly, the eggs are four or five in number with a white ground blotched and marked with reddish brown darker at the small end, the markings may be easily removed by wetting. The eyes in your figure² do not agree with this bird, they being red instead of yellow as in your figure . . . ' (White *in litt.* January 25, 1864).

These remarks were quoted by Gould (1865b: 55-56) with a few alterations; the egg-measurements 'one inch and three-quarters long, by one inch and three-eighths broad,' for instance, attributed by Gould to White, appear nowhere in the latter's account. Gould also acknowledged his error in the matter of the iris-colour, though changed this to 'reddish orange', not red as advised by White.

In his letter of June 1864, White told Gould that he was sending eggs of *E. scriptus* (which Gould had earnestly requested in his letter of March 21), and gave further notes on the species:

'... the nests were placed on the topmost branches of small trees some times several in a tree, roughly made of small sticks lined with bark leaves and hair of rats . . . when the Bird is driven from the nest she flies [*sic*] off to the rest when they all come sailing round, number of Eggs 4 or 5, they vary much in color (No. 7 is a dark one I have found them quite white) these Birds were most numerous at Lake Hope.'

Two eggs of *E. scriptus*, inscribed '7', in the Gould Egg Collection (BMNH) are presumably those sent by White, though the information accompanying them, transcribed onto the bottom of a pillbox by Gould himself, is slightly at variance with White's comments:

'Both from the same nest: breeds in S. Australia N. of Lat. 29°. The bird sits on low trees on open ground. Generally gregarious. Food—eggs & crickets.'

E. scriptus is not known to eat 'eggs & crickets'; curiously, these items were mentioned in a letter from White (May 26), in a list of things eaten by one of the harriers *Circus*, and may have been inadvertently transposed by Gould to *E. scriptus*.

² White nowhere stated which of Gould's work he had before him. However, it must have been *The Birds of Australia* (1840-1869) rather than *Birds of Australia and the Adjacent Islands* (1837-1838), for *Elanus scriptus*, being described in 1842, did not appear in the latter work.

Samuel appears to have been the first ornithologist to note that *E. scriptus* breeds in colonies and preys upon rats (actually the Long-haired Rat *Rattus villosissimus*), facts confirmed by Jackson at Davenport Down on the Diamantina in 1918 (Jackson 1919, Parsons 1921). To the North-East of South Australia *E. scriptus* is apparently an irregular but seasonally not uncommon visitor, following the episodic plagues of *R. villosissimus*, and nesting in colonies in Coolibah *Eucalyptus microtheca* along watercourses, and in *Hakea* spp. and *Acacia cambagei* among sandhills (Parker 1980).

BLACK KITE *Milvus migrans*

Skin in S. A. White Coll., '173, male, Mathews's Station, NW, 25 August 1862 [*sic*, error for 1863].'

'Mathews's Station' was Mundowdna, at 29° 44' S, 138° 14' E, a run taken up shortly before the time of Samuel's visit (Howard Pearce pers. comm.).

LITTLE EAGLE *Hieraeetus morphnoides*

Skin in S. A. White Coll., '184, female, Chambers Creek, 12 September 1863'; egg in Gould Coll., BMNH, *ex* S. White, reg. no. 1884. 10.1.29, 'S.A.'

Gould (1865b: 12-13) wrote of this species:

'Captain Sturt obtained it at the Dépôt in South Australia [= the Milparinka district, NSW]; and Mr. White, of the Reed Beds, near Adelaide, has sent me a drawing of another obtained by him in the same country . . . Very recently I have received a second specimen of the egg of this species, presented to me by Mr. S. White of Adelaide, who, I believe, obtained it in the interior of South Australia.'

The 'drawing' referred to by Gould was actually a set of photographs, which Samuel sent to Gould in the belief that the species concerned was not figured in Gould's *Birds of Australia*. In his letter of May 26, Samuel sent Gould details relating to this specimen, copied from his now lost notebooks:

'[I]ris Brown, Tong[ue] moderate almost strait [*sic*] & fleshy, Ext[er]n [= wingspan] 50 inches, stom. membranaceous Lizards & flowers of some plant, cere whitish, feet lead color, Female shot from the nest, stony plains interior, These Birds were not numerous I saw them in pairs N of the 28° lat, their cry is a round whistle, repeated several times . . . I found it rather difficult to approach this Bird when in the open and when surprised in a tree it always flew with a loud whistle . . .'

In his letter of June 1864 he gave further details:

'No. 6, this is the Egg of the bird figured in the photos I sent you last mail, the nest is composed of sticks lined with bark & leaves, the bowl about 15 in. in diam. Number of Eggs 2, I never saw more than two eggs in one nest.'

SPOTTED HARRIER *Circus assimilis*

Egg in BMNH, reg. no. 1962.1.122, 'Lake Hope', no other details. (1962.1. is a blanket-registration for all old previously unregistered eggs).

Gould (1865b: 60-61) wrote under this species:

'An egg sent to me by Mr. White of Adelaide, and taken by him at Lake Hope in the interior of South Australia, is white, one inch and seven-eighths long by one inch and a half broad.'

White (*in litt.* June 1864) supplied further details:

'No. 5, "C. Jardinii" the nest is build in the ordenry [*sic*] way of sticks lined with leaves, number of Eggs 4 (sometimes 3) this egg was brought from Lake Hope.'

MARSH HARRIER *Circus aeruginosus*

Egg in William White Coll., SAM, reg. no. B3329, 'Lake Hope, Sept. 1863, Brown Swamp Hawk.'

BROWN FALCON *Falco berigora*

Eggs in William White Coll., SAM, B3312, c/2, 'Lake Hope 1865 [*sic*].'

Samuel (*in litt.* June, 1864) sent eggs of the inland form '*occidentalis*' to Gould, with the remarks:

'No. 8, "I. occidentalis" the nest is as usual composed of sticks lined with leaves number of Eggs generally 4 varying in intensity of coloring and differ in little or nothing from "I. berigora" [the dark southern form].'

These remarks were quoted by Gould (1865b: 34).

BLACK-TAILED NATIVE-HEN

Gallinula ventralis

White (*in litt.* June 1864) despatched an egg or eggs of this species to Gould with the following information:

'No. 10 is of the "T-ventralis," and is darker than I have before seen them, this was taken about 40 miles north of Lake Hope [possibly in vicinity of Pilachilpna WH or Narrawalpinna WH in Cooper's Creek, see below].'

Gould acknowledged receipt of this egg *in litt.* October 22, 1864. Under this species he wrote (Gould 1865c: 327):

'The eggs are seven in number, of a cream-colour, thinly sprinkled with irregularly shaped spots of chestnut-red, some of which appear as if beneath the surface of the shell; they are an inch and a half long by one inch and an eighth broad.'

The fact that the eggs of *G. ventralis* are greenish, not cream, in ground-colour, suggests to me not that White wrongly ascribed his material to *G. ventralis* but that Gould inadvertently employed here a description of the eggs of some other gallinule.

The eruptive *G. ventralis* is seasonally common in the North-East, occurring with floods

and heavy rains, and breeding in flooded Lignum *Muehlenbeckia cunninghamii* (Parker 1980).

FLOCK BRONZEWING *Phaps histrionica*

White (*in litt.* June 1864) despatched eggs of this species to Gould, with the remarks:

'No. 2, "P. histrionica" Nothing more than the bare sand for a nest, mostly under a small bush, number of Eggs 2, I saw great numbers of these Eggs on the sandhills round Lake Hope in Oct. and a part of Nov. The birds were then traveling [*sic*] southwards in large flocks.'

Gould (1865c: 130) quoted part of these remarks, though left out all reference to breeding. However, because most other reports of breeding in *P. histrionica* state that it nests on grassy plains, often in Mitchell Grass *Astrebula*, White's report of its breeding on sandhills is of singular interest. The original sandhill vegetation of the Cooper drainage (chiefly the Sandhill Canegrass *Zygochloa paradoxa*) having been widely devastated by rabbits since Samuel's day, it is perhaps unlikely that *P. histrionica* would now be much disposed to breed in the district in the way that Samuel observed it to, though it still visits the North-East in small numbers (*e.g.* Cox & Pedler 1977).

BLUE BONNET *Northiella haematogaster*

Skin in BMNH, Gould Coll., reg. no. 1881.5.1.5599, *ex* S. White, 'Cooper's Creek, 9 Oct. 1863'; holotype of *Psephotus xanthorrhous* var. *pallascens* Salvadori, 1891 (= *N. h. pallascens*) (Warren 1966: 218).

White (*in litt.* January 25, 1864) believed that his skins of *N. haematogaster* differed from the one figured by Gould, which White considered to be 'so much darker and I think a little larger.' He sent two of his specimens to Gould with the following information, copied from his notebook:

'981—I[iris] Dark brown, T[ongue] as usual, Ext. 15 in., Stom. fleshy, seeds & gravel, Crop seeds of herbs & shrubs, Male Coopers Creek Octr 9—63. I saw these Birds in considerable numbers on this creek. The [illegible word] and mode of flying is much like the "Platycircus" [*sic*], I could not find a nest. 972, Female, SA.'

In his letter to Gould of May 26, 1864, White stated:

'... of [*N. haematogaster*] I shot about 20 but not differing from those I sent excepting the young having the bill of a yellowish tint.'

Gould (*in litt.* March 21, 1864) agreed that White's specimens were different. However, in naming them he demurred, contenting himself finally (Gould 1865c: 64) with the following remarks:

'... found in abundance by Captain Sturt at the Dépôt and by Mr. White ... at

Cooper's Creek . . . Captain Sturt's [specimens] are a little darker on the upper surface than those transmitted by Mr. White.'

Salvadori (1891) named these pale birds *pallascens*.

The present known range of *N. h. pallascens* is the North-East of South Australia along the Warburton, the Cooper and the Strzelecki, where it is common in Coolibah (Parker 1980). This form is certainly strikingly different from the populations of southern South Australia, but its connexions, if any, with populations to its east remain to be determined.

CHANNEL-BILLED CUCKOO

Scythrops novaehollandiae

Skin in S. A. White Coll., '522, female, Cooper's Creek.'

Gould (1865b: 629) wrote under this species:

'It is not easily tamed, for Mr. White observes, that he kept a wounded one alive for two days during which it would eat nothing, but bit everything that approached it very severely.'

The letter from which this quotation was taken is not among those so far found amongst the Gouldiana at the BMNH.

S. novaehollandiae is an uncommon visitor to the North-East, occurring in times of flood; indeed, one of its vernacular names is Flood Bird.

CRIMSON CHAT *Ephthianura tricolor*

ORANGE CHAT *E. aurifrons*

White (*in litt.* January 25, 1864) wrote:

'... about this latitude [27° to 28° S] I saw ... also the *E. tricolor* & *aurifrons* in great numbers they live chiefly on caterpillars and build in low shrubs, the number of eggs being 4 or 5 white or pinkish white spotted with rust red, on my last ornithological trip north of Adelaide I saw these birds in great numbers from Port Augusta to the 27° lat ...'

These remarks were quoted by Gould (1865b: 380-381).

RED-BROWED PARDALOTE

Pardalotus rubricatus

'... about this latitude [27° to 28° S] I saw the *P. rubricatus* in considerable numbers ...' (White *in litt.* Jan. 25, 1864, quoted in Gould 1865b: 159).

This bird is widespread and common in the North-East, where it occurs mainly in Coolibahs along watercourses.

BLACK-FACED WOODSWALLOW

Artamus cinereus

Skin in BMNH, Gould Coll., reg. no. 1881.5.1.4282, *ex* S. White, Saint A'Becket's Pool, 23 August 1863; holotype of *Artamus melanops* Gould, 1865 (Warren & Harrison 1971: 341).

White, noting that his material seemed different from Gould's illustration, sent this specimen to Gould with the following information, copied from his notebook:

'756. I[r]is Dark Brown T[ongue] moderate, horny & rough at tip, Ext. 14 in. Stom. fleshy small coleoptera, Bill [?] bluish at base, St. abeckets pool, (lat. 28° 30') Aug. 23-63. I have never seen this Bird south, they collect at night as do the "sordidus" [Dusky Woodswallow] and make much the same call, they seem to be plentiful all over the north country I saw them here feeding on the ground, soaring high in the air and clinging in bunches as do the others. Male and female seem to be much alike.'

Gould replied (*in litt.* March 21, 1864):

'Your specimen much puzzles and interests me since it so closely assimilates to my *Artamus albiiventris* as almost leads me to infer that the species is likely to vary. The only difference between your form and *albiiventris* being in the black under tail coverts in the one and white in the other. I shall feel very much obliged if you would observe as many examples [two illegible words] can then let me know if there are any intermediate [in] coloring in the undertail coverts, that is if some are part only black and white.'

Replying (*in litt.* May 26, 1864), White stated:

' . . . I shot in all about 30 or 40 and brought home about 20 skins in all of which I saw but little difference except in the very young ones which were a little speckled with dusky brown mostly on the head and back. They were very plentiful in the N.W. about Chamberses Creek & Mt. Margret [*sic*] . . . '

Gould (1865a), described White's black-vented form as *Artamus melanops*, and shortly afterwards (Gould 1865b: 149-150) summarized White's observations under that name.

White gave the latitude of St A'Becket's Pool as 28° 30' S, an error repeated by Gould and by Whittell (1954: 758). This was corrected to 30° 10' S, 138° 20' E by Warren & Harrison (1971: 341), who, however, repeated Whittell's further error of locating it near Etadunna on the Birdsville Track. St A'Becket's Pool, now long silted up, was in fact on the Leigh Creek between Farina and Lyndhurst.

DISCUSSION

From the above we can extract certain localities and dates that may be of use in reconstructing Samuel's route in the Far North. These are:

Port Augusta, no date (*Ephthianura tricolor*, *E. aurifrons*)

St A'Becket's Pool, August 23, 1863 (*Artamus cinereus*)

Mundowdna, August 25 (*Milvus migrans*)

Chambers' Creek, September 12 (*Hieraetus morphnoides*)

Mount Margaret, no date (*Artamus cinereus*)
Manuwalkaninna, October 28 (*Elanus scriptus*)
Lake Hope, September (*Circus aeruginosus*),
October 13 (*Dendrocygna eytoni*), October
and part of November (*Phaps histrionica*).

Cooper's Creek, October 9 (*Northiella haematogaster*)

About 40 miles (64 km) north of L. Hope, no date (*Gallinula ventralis*)

Reedbeds, Adelaide, January 25, 1864 (White *in litt.*)

Chambers' Creek, which runs into the western end of Lake Eyre South, was discovered by McDouall Stuart in 1859. Today known as Stuart Creek, it was leased to Stuart in August 1863 and at the time of Samuel's visit had a resident manager. Mount Margaret station (also known as Umbum), some 150 km north-northwest of Stuart Creek, was, until the establishment in early 1863 of Peake Outstation 60 km further northwest, the most northerly inhabited run in South Australia; in January 1862 it had been Stuart's jumping-off point for his epic crossing of the continent (Webster 1958). Mundowdna, Manuwalkaninna and Lake Hope had likewise been taken up shortly before Samuel's visit (Howard Pearce pers. comm.).

According to S. A. White, Samuel took his position each day and marked it down on a blank map. One may ask what map Samuel used. Plans of the country between Port Augusta and Mount Margaret would have been available to him from earlier surveys, particularly those of Stuart, with whom Samuel had presumably been in contact during the former's sojourns in Adelaide. In the absence of formal surveys of the country northeast to Lake Hope, Samuel may have relied upon directions from local station hands. It is the question of what map, if any, he was using for the country beyond Lake Hope that is of particular interest. Wills (1860-61) and both Howitt and McKinlay during subsequent relief expeditions (1861-63) made sketch-maps of this area (Pearce pers. comm.). If these were not officially available at the time of Samuel's trip, he could possibly have obtained unauthorized copies before his departure (assuming that he had *originally* planned Cooper's Creek as an alternative route, see below). Whatever the case, he was probably able to reconstruct the topography for several days' ride up the Cooper from Lake Hope from verbal accounts given to him by station hands at Manuwalkaninna and Lake Hope.

Samuel several times mentioned latitudes, e.g. St A'Becket's Pool, 28° 30' S (*Artamus*

cinereus) and 'on the Cooper between 27° and 28° (*Elanus scriptus*, *Ephthianura* spp., *Paradotus rubricatus*). From S. A. White's comment that Samuel took his position each day, one might assume that he was using a sextant. This appears not to have been so, however. As we noted above, Samuel's latitude for St A'Becket's Pool was out by 1° 40'. Moreover, his remarks concerning the area of abundance of *Elanus scriptus* do not tally. In his letter of January 25, he stated that he found this species in great numbers on Cooper's Creek between 27° and 28° S, whereas *in litt.*, June, he wrote that it was most numerous at Lake Hope. Assuming that he equated 'between 27° and 28° S' with Lake Hope (Lake Hope being actually about 40-45 km south of 28° S), and bearing in mind his incorrect citation of St A'Becket's Pool, one finds it difficult to avoid the conclusion that in his idea of latitude Samuel may have been consistently out by 1° 30' - 1° 40'. More reliable perhaps are his actual mileages, *e.g.* 'about 40 miles north of Lake Hope,' which he may have calculated from the known rate of travel of his team.

A further apparent discrepancy is the date of collection of *Elanus scriptus* at Manuwalkaninna, October 28. According to his notes under *Phaps histrionica*, he spent October and part of November based at Lake Hope, some 100 km northwards. If he undertook a flying trip back to Manuwalkaninna during this period, it may have been on a mail run, Manuwalkaninna being the mail-depot for Lake Hope station (Pearce pers. comm.).

Also to be considered here is how far north Samuel reached. According to S. A. White, he turned back, when his last horse died, somewhere north of Lake Eyre. As the northern bounds of Lake Eyre were not formally determined until 1874-75, by the Lewis Expedition, this remark can only be taken literally if Samuel had actually been following up the eastern shoreline of the lake and so knew himself its northern limits—which appears not to be the case. The furthest north location alluded to by Samuel was on the Cooper at 27° S, yet we have already noted the possibility that his latitudes were out by perhaps 1° 30' - 1° 40' southwards. His furthest definitely known point was 'about 40 miles north of Lake Hope'; here he collected an egg or eggs of *Gallinula ventralis*, which strongly suggests that he was in an area of flooded Lignum on the Cooper itself, possibly in the vicinity of Pilachilpna Waterhole or Narrawalpinna Waterhole. As argued below, he may not have penetrated much further than this before turning back.

The season of 1860-61 saw the beginning of the first really bad drought experienced by European settlers. It lasted about six years (Pearce pers. comm.). Yet that Samuel collected *Dendrocygna eytoni* and *Scythrops novaehollandiae* in the Cooper system indicates that this creek had recently come down in flood; and that he also encountered *Rattus villosissimus*, and breeding *Elanus scriptus*, *Ephthianura tricolor* and *E. aurifrons*, indicates further that the country had been inundated well beyond the normal limits of the watercourse, producing a good growth of vegetation. These indications by themselves would be sufficient to postulate a major flooding of the Cooper from Queensland in 1863. But it is not necessary to rely upon them alone, for actual documentation of the occurrence is to be found in the South Australian *Register* for December 4, 1863: 'The latest letters from Lake Hope contain the intelligence that there was 12 feet of water in Lake Apperdea [Appadare]. Lake Hope is also filled to the brim, and where there was only 5 feet 6 inches there now exists 33 feet of water. The creek [Cooper's] had ceased running into the Lake, but was going westward, and filling other lakes in the neighbourhood . . . Rain is, however, much wanted to improve the feed and surface waters.'

Thus, this flooding of the Cooper accounts for how Samuel could have encountered birds of high flood and good ephemeral growth in the middle of a drought. It may also explain, as I suggest below, both the major deviation in his route and the eventual failure of his expedition.

CONCLUSIONS

The following preliminary reconstruction of Samuel's expedition of 1863, while largely speculative, does not, I believe, stray too far from the facts established above.

Samuel's first intention was probably to cross the continent from south to north along the route proven by Stuart the previous year, *i.e.* using Mount Margaret as the last and first outpost. It may be no coincidence that Samuel took stores for ten months, the same period Stuart was away from Mount Margaret in 1862.

At or near Mount Margaret station, Samuel turned back, doubled Lake Eyre South and headed for Cooper's Creek. Possibly at Mount Margaret or earlier he had learnt of the coming down of the Cooper, and decided to abandon a drought-stricken route for one along which water was available. From their main base on the Cooper (near present-day Inna-

mincka), Burke and Wills had crossed the continent to the Gulf of Carpentaria in 1860-61. It is thus possible to interpret Samuel's action as a switch from Stuart's route to that of Burke and Wills.

Whether Samuel had contemplated Burke and Wills' route as an alternative before leaving Adelaide, or whether he made the decision only in the field, may never be known. If the former, which I consider the more likely, he would probably have had copies of the sketch-maps made by Wills, and by Howitt and McKinlay of the relief expeditions. He would then not have been heading for Burke and Wills' base camp near Innamincka, but for where they turned north from the Cooper along the 140th meridian. This spot is some 150 km up the Cooper from Lake Hope. We know that after a stay of at least a month at Lake Hope, Samuel got as far upstream as 'about 40 miles [64 km] north of Lake Hope.' For some distance north of this lake the Cooper runs, between fairly high banks, through sandhill country, outlying swamps and channels being few or absent; here the going would have been relatively good. From 50-60 km upstream, however, right across to Innamincka, there are extensive floodplains and swamps, 'rotten' clay flats and numerous subsidiary channels. Traversing this country in normal conditions is arduous enough. Attempting to do so with dray and horses after a major flood would have been at the very least incredibly difficult, and almost certainly impossible. It may well have been this country that finished the horses and forced Samuel to turn homeward.

'The dray', wrote S. A. White, 'with nearly all the valuable specimens, had to be abandoned in the desert.' So far I have located only seven skins and seven eggs from this trip (a further known skin and three eggs sent to Gould being untraced). However, more specimens may have reached Adelaide than is currently supposed, judging by Samuel's comment to Gould (*in litt.* May 26, 1864) that he shot about 30 or 40 *Artamus cinereus* on the trip and brought home about 20. This alone

suggests that the amount of material that survived the expedition, though still only a small part of the whole, was substantial. Had all Samuel's specimens been preserved, our knowledge of the ornithology of the Cooper's Creek district would have begun in 1863. As it turned out, the real laying of the foundations of this knowledge was, fittingly, left to his son Captain S. A. White, who in 1916 was ornithologist on the South Australian Museum Expedition to Cooper's and Strzelecki creeks (White 1917).

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