Breeding success was similar to that found in other studies. The Little Eagles fledged two chicks from one of ten successful nests; Debus (1984) found one in six in the RAOU's Nest Record Scheme, but no broods of two in his Armidale study. Ten of 11 attempts at breeding succeeded to give 1.0 young/pair and 1.1 young/successful pair (brood size). Debus (1984) found 0.5 young/pair at Armidale and Baker-Gabb (1984) found 0.8 in north-western Victoria, fewer than Mt Mugga. Both those authors reported an average brood size of 1.1, the same as Mt Mugga. The Brown Goshawks had a brood size of three; Aumann (1986) found 2.4 in his Victorian study area and Baker-Gabb (1984) 2.2. At Mt Mugga Brown Falcons fledged an average of 1.8 young; Baker-Gabb (1984) reported 2.4.

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METHODS FOR ATTACHING PATAGIAL TAGS, AND A DESCRIPTION OF A NEW METHOD

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Patagial tags have been used for field identification of individual birds since at least 1953 (Koskimes and Routamo cited by Anderson 1963). To judge by the ornithological literature, their use is increasingly widespread as the technique becomes more widely known and better developed.

Three decisions follow on the initial decision to use patagial tags: (a) what material to use for the tag; (b) how to attach the tag; and (c) how to pierce the patagium. This last stage is crucial both for the welfare of the bird and for the continuing successful attachment of the tag, yet it has received little attention in the literature.

In general, the material used to attach the tag to the wing is used to pierce the patagium. Thus, where steel pins are used (Koskimes and Routamo 1953; Anderson 1963; Blackman 1973; Cowling 1973; Hart 1987), they are made sharp so as to pierce the tissues. Similarly, nylon rods can be cut to a point for this purpose (Picozzi 1971; Reimer, pers.comm.).

Where stainless steel or other wire is used (Brereton and Pidgeon 1967), it will either be fine enough to pierce the patagium or can be cut to a point for this purpose. Where nylon fishing line has been used a hole has first been punched with a leather punch (Maddock 1989). Others (Hester 1963, 1963a; Parry 1967) have used aluminium poultry wing bands to hold tags in place. These bands were placed through slits in the patagium which were presumably first cut with a blade. Recently Cummings (1987) has pioneered the use of a commercial fastening gun (a Buttoneer II), which uses a nylon fastener inserted through the patagium with a heavy duty needle.

In planning a wing-tagging operation on Sacred Ibis *Threskiornis aethiopica* I had the following considerations:

Steel pins were not desirable because of the complexity involved in securing them over the tag (see for example, Anderson 1963).

Wire seemed to involve a risk of cutting through the tissue of the patagium as a result of wear.

Nylon rods, if sufficiently flexible to reduce the risk of damage through wear, cannot take sufficiently firm points to pierce the patagium cleanly. Experiments tried using different thicknesses of 'whipper snipper' cord verified this. An additional problem with this method is that a portable heat source is required to flatten the ends of the rod over the tag.

Any fastening or piercing technique had to be appropriate for ibis nestlings, so that adult-sized poultry wing tags were not able to be used. In any event, the creation of a slit in the patagium, as distinct from a hole, seems more likely to result in tearing of the tissue when the wing is extended.

When the wing is extended the patagium is kept tensely stretched by the deltoid muscles and so any puncture should weaken the pataguim as little as possible.

It is necessary to avoid damage to the *tensor accessorius* and to the blood vessels near the leading edge of the wing.

Use of a leather punch had the disadvantages that it caused some bruising damage to the tissue (particularly in Ibis nestlings, which have a more fleshy patagium than egret nestlings) and that there was a time-lapse between punching and threading the fastening through the hole. I found that if the wing was allowed to move during this period it was likely that the skin would move in relation to the underlying tissue, thus obscuring the hole. This latter problem is more acute for ibis than for egrets.

The solution adopted was to use nylon fishing line to attach the wing tags, passing it through the patagium inside a modified hypodermic syringe needle (Fig. 1).

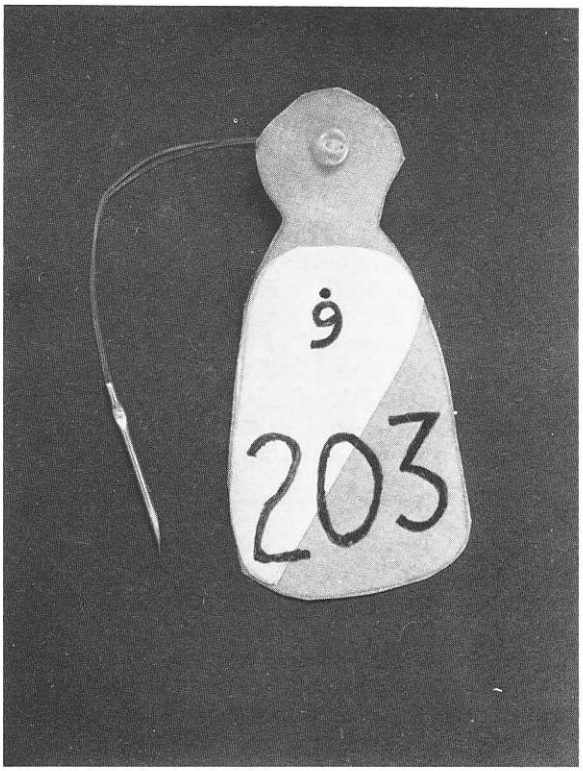

Figure 1. *Wing tag with nylon fishing line passed through modified hypodermic needle.*

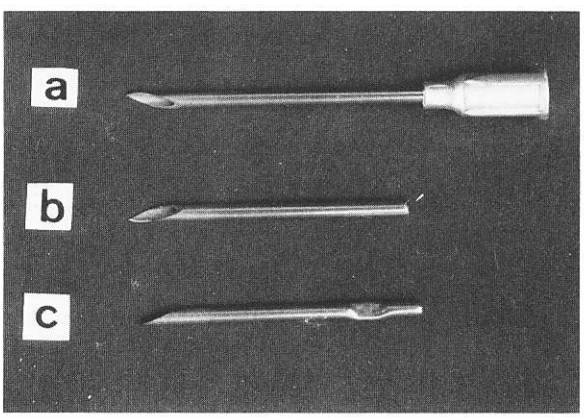

Figure 2. *Stages in modification of hypodermic needle. a. — unmodified needle; b. — mounting block removed; c. — shaft squeezed about 1 cm from blunt end.*

With a hacksaw, the mounting block is removed from a hypodermic needle of sufficient internal diameter to hold easily two thicknesses of the fishing line (Fig. 2b). The shaft of the needle approximately 1 cm from the blunt end is then squeezed closed (with a pair of pliers) until the two ends of the line can just be inserted but the internal diameter is such that the line is firmly wedged in the needle (Fig. 2c). The loaded needle can then be passed through the patagium with a minimum of effort and virtually no damage to the tissues. The resultant hole closes around the fishing line which is withdrawn from the needle and threaded through the tag. Maddock (1989) gives a description of the tag and the use of appropriate washers and knots.

More than 200 Sacred Ibis and various species of egret nestlings have been tagged with this technique over the last 18 months. Many of the Ibis have been handled daily up to fledging, and a small number were kept for or recaptured a month after fledging. No instance of damage or adverse reaction has been observed, nor has loss of tags been observed.

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REVIEW

Private Lives: Ages, Mates, Movements of Some Australian Birds. P. Reilly, 1988. Kangaroo Press. 80 pp. rrp $A12.95.

At last there is a single reference that those of us who present lectures on the subject of bird banding can consult for a basic, yet interesting, outline of the topic. Pauline Reilly has compiled a 'beaut' little book which includes virtually all of the information a lecturer would require for an interesting, informative and titillating talk on the role of banding in the unravelling of many of the mysteries in the private lives of birds.

A brief explanation of the reasons for banding birds and an outline of the history and role of the Australian Bird Banding Scheme are followed by accounts of 43 Australian species, from different families, to demonstrate some of the more interesting results derived from banding. The information given for each species includes, as appropriate, basic comments on behaviour, social structure, breeding, feeding, movement and longevity. All 43 species are illustrated by colour photographs, and numerous black and white photographs are used to show various aspects of banding and provide additional illustrations of birds. Eighty-one references are cited.

While it will appeal to bird banders, for the purpose mentioned above, 'Private Lives' will achieve its objective of arousing curiosity in anyone with an interest in birds, and is worthy of a place on the bookshelf.

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