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Alleviating the Impact of Human Disturbance on the Breeding Peregrine Falcon

1. Ornithologists*

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The impact of ornithologists on nesting Peregrine Falcons *Falco peregrinus* is discussed in terms of interference with individual pairs and their offspring and the subsequent validity of observations made and data collected. Suggestions are presented for the minimising of this interference.

Introduction

There is international concern over the effects of disturbance to wildlife species; this concern is centred not only on the survival of species, but also on their normal growth, behaviour and reproduction. Among those most affected is the Peregrine Falcon *Falco peregrinus*.

Human disturbance may be defined as any activity by or associated with man which increases the physiological costs of survival or decreases the probability of successful reproduction (Neil, Hoffman and Gill, 1975). Such disturbance includes forestry operation, housing, road building, mining, fire, nature trails, agriculture, drainage of swamps, construction of reservoirs, destruction of prey species, poisoning as non-target victims of pesticides, heavy metals and industrial pollutants, predation by feral animals, electrocution, army manoeuvres, campers and rock climbers (Fyfe 1969; Mebs 1969; Ratcliffe 1969; Herren 1969).

While recognizing the importance of these types of human disturbance, this article will deal exclusively with a second type of disturbance, that by ornithologists with a direct interest in the Peregrine Falcon. The term ornithologist as used here includes photographers, egg collectors, bird banders and bird watchers. We have been prompted to write this article by reports of nesting failures attributed to disturbance by ornithologists, the increasing interest in the Australian peregrine and concern expressed by several individuals over the harmful effects of such interest.

From our experiences with approximately 100 nestings of the Australian peregrine we have developed a set of guidelines which we follow when visiting nest sites. It is our opinion that certain rules should be observed when studying the breeding of any raptor and that it is essential to be what may seem overly cautious, firstly for the sake of the birds and secondly to ensure

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* *This paper is the first of a series concerning humane disturbance on the breeding Peregrine Falcon.*

unbiased data in studies. Fyfe and Olendorff (1976), in an excellent article on minimising the dangers of nesting studies to North American raptors, make similar recommendations; however their paper is not widely available in Australia.

While the opinions we express are largely subjective we present them in the hope of stimulating and encouraging thought, care and sensitivity in dealing with nesting raptors. It is axiomatic that visits made to raptor eyries during any part of the breeding period should be justified in terms of information gained weighed against effect of disturbance.

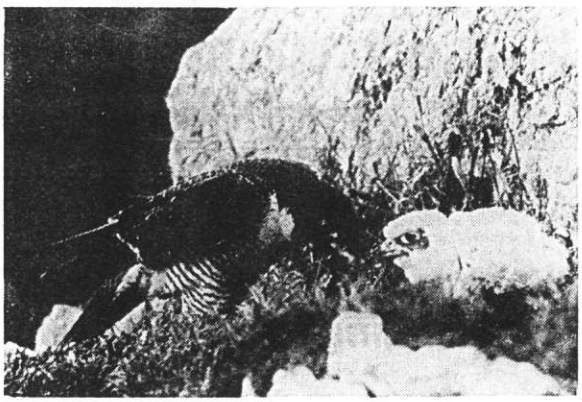
Discussion

I. Physical characteristics of nest site influencing breeding success

Reproductive success of a pair of peregrines depends in part on height of cliff and nest ledge, distance from disturbance, accessibility of cliff/nest and number of suitable ledge sites (Hagar 1969; White 1969; Rice 1969). Ratcliffe (1962) also considers the level of acceptability of the site to the birds to be a critical factor. Hagar (1969) gives each cliff site a 'relative rating' on the basis of three criteria: height of sheer face above talus slope, disturbance caused by public use (hikers, picnic parties etc.) and numbers and suitability of the shelves'. For instance an AAA site is a high cliff, rarely visited, with 'several fine shelves'. Rice (1969) gives a height of over 61 m for an 'A' cliff in a similar grading system.

The influence of the height of the cliff is of particular interest, as Australian peregrines also nest in trees (large stick nests and hollows) which are not high (comparatively). In addition Australian cliffs, with the exception of some sea cliffs, are generally small both in height and breadth and are thus susceptible to greater disturbance.

The critical height and distance from disturbance depends on familiarity with man, individual differences in the birds and type of disturbance. In our experience *regular* human activity in the proximity of an eyrie is less disruptive to nesting peregrines than intermittent or unexpected activity. In addition, we have found peregrines to be less tolerant of disturbance from above than from below; Nelson (1973) and Hickey (1942) concur.



● *Adult female Peregrine Falcon feeding nestlings*

Photo by Jeff Jolly.

The physical characteristics of the nest site and individual differences in birds thus determine our strategy for observation and study.

II. Dangers of disturbance and suggestions for minimising these dangers

(a) Potential dangers to eggs/young during incubation/brooding.

(i) Although evidence from overseas may not be applicable to our Australian subspecies the warnings contained in this evidence should be heeded. Cade (1969) in carrying out surveys of peregrines, *F. p. tundrius,* on the Colville River in Alaska, commenced at the upper end of the river where falcons were still on eggs and finished at the lower end of the river where falcons had well developed young. A re-examination of his notes showed that if a second trip was made down the river, nest failures were much higher on the upper part of the river than on the lower part. Fyfe (1969) reported failure of four successive Gyrfalcon *Falco rusticolus* eyries, on the Anderson River in Canada's Northwest Territories, down river from a sequence of successful nests. Eggs of the unsuccessful falcons were opened and found to be fertile. It was later learned that fur trappers had moved through the area of the four unsuccessful nests during the first week of May when falcons were incubating.

(ii) Irresponsible, inexperienced human activity can result in desertion of sites by parents at any

time from courting to fledging. Adults may be less prone to desertion in the later stages. Some authors suggest that the most critical time is just before egg laying (Nethersole-Thompson and Nethersole-Thompson 1944) and during early incubation. The possibility of desertion also varies with the individual falcon and with familiarity and acceptability of the nest site to the falcons (Ratcliffe 1962; Smith and Murphy 1973).

After the loss of first clutches due to disturbance, second clutches are sometimes laid on a different, less suitable ledge. Disturbance may also lead to partial clutches being laid on two (or more) different ledges (Herbert and Herbert 1965). Second clutches may have reduced fertility (Newton 1974) and contain fewer eggs (Hickey and Anderson 1969).

(iii) Trampling, puncturing or knocking eggs or young off the nest by adult birds 'flushing hurriedly and directly' (Cade 1960) is another danger. 'Clearly, thin-shelled eggs are greatly at risk when sudden disturbances occur' (Nelson 1976). We have seen a Peregrine nearly carry young chicks off a cliff when flushed because she appeared to be brooding the young on top of or between her toes. Fyfe and Olendorff (1976) report similar incubating and brooding behaviour.

Before approaching or climbing to a nest it is important to forewarn the bird so that it leaves quietly and unhurriedly. This can be achieved by approaching slowly and in clear view of the nest. From a distance start talking, whistling, clapping hands etc. until the bird leaves. If the bird is exceptionally reluctant to leave, it is probably better to return another day.

It is important not to kick rocks into the eyrie, and when roping down to an eyrie that is not overhung from above, rope down to one side to avoid the rocks loosened in the process falling into the eyrie.

(iv) If parent birds are kept off or are too upset to return to the nest for a considerable time, increased exposure of eggs/young to the elements and predation will result. Chilling of eggs in colder climates can be a problem (Fyfe and Olendorff 1976), the amount of chilling an egg can withstand varies with stage of incubation (Welty 1962).

Overheating and dehydration of eggs are generally more serious problems, especially in warmer parts of Australia, and exposure to direct sunlight should be avoided.

If it is necessary to visit during incubation and early development make it as brief as possible and plan your visit with regard to weather and time of day. Covering the eggs with a jumper will help reduce moisture and heat loss and prevent overheating.

Newly hatched young are particularly vulnerable to overheating and dehydration (Nelson 1969) and are prone to chilling before they are dried. Adults generally shade nestlings for the first few weeks (Fyfe and Olendorff 1976). Young nestlings, in particular, may also suffer if they miss being fed for an extended time.

(v) Disturbance may further reduce the chances of survival of young due to premature fledging. Warn older young of your approach using a similar method to that used to flush the adult. This may be particularly important over water. Nestlings that do fledge prematurely may be fed by their parents (Craighead and Craighead 1956), but will be exposed to predation and weather.

Shock, hunger or physical damage to flight feathers can cause traces (weak spots) in the growing feathers, increasing the chances of breakage and resulting in reduced powers of flight.

As a general rule we never spend more than 20-30 minutes at an eyrie known to contain eggs and always leave within this time if no young or eggs can be located. (Nest sites are sometimes difficult to locate, especially where deeply recessed shelves are used and no white excrement marks the site.) We never stay longer to take notes, photographs etc., even when the bird has returned to the eggs, as it may not be incubating or brooding, merely squatting over the eggs/young. With eyries we have known for some years and are thus familiar with the individual bird's nest sequence we always avoid visiting the nest while birds are incubating.

(vi) Aerial and terrestrial predation may also be a problem when adults are absent. To decrease the probability of a potential terrestrial predator following your scent to a nest we suggest the technique used by Hamerstrom (1970). Walk past the nest or tree at a distance, turn and retrace part of your path, then walk along a single right-angled path to the nest. On exit destroy your scent by sprinkling napthalene crystals over your trail.

(b). Danger to adults.

(i) The physiological costs of stress and excitement are high as energy use is increased; this is of particular importance during reproduction—a time of high energy expenditure. Even a mild disturbance in an excitable bird such as the peregrine with a high energy cost method of hunting will cause an energy deficit. Compensation is probably easy for one such incident, but repeated disturbances may be more harmful.

(ii) Excited adults defending the nest may also suffer from heat stress on a hot day.

(iii) Physical damage is also a danger. At one stick nest eyrie (where the female had previously struck an intruder), one of us was climbing to the nest to band the young, watching as the female came near to avoid being struck. On reaching the nest the screams from the three young drowned out the female's cackles, making it difficult to judge her proximity and thus face her. She made an attempt to strike through the canopy and hit a branch. Shaken by the impact, she dropped, then quietly retreated, flying with difficulty to a nearby tree. She resumed her attacks after 15 minutes, apparently recovered.

We have found facing the bird to be an effective deterrent; peregrines have been reluctant to strike an observer in the face, but have struck the back or side of the head on three occasions. A soft hat is an effective protection against such attacks, whereas a hard hat may injure the birds. (Although hard hats are sometimes necessary for rock climbing, they could perhaps be padded externally.)

(c) Handling/Banding/Trapping.

(i) Young falcons are generally distracted with a glove or rag and when they strike at and grip this diversionary object the other hand is placed in the middle of the back, encircling the wings and legs (see Figure 1). This method renders the young immobile, unable to bite the handler and unable to flap and injure primaries that are still growing, or sprain leg or wing joints. A similar technique can be used to rescue a nestling that is in danger of falling or jumping from the nest in fear of the bander. The bander should keep as low as possible and use one hand to distract the bird, while the other hand quickly grasps the legs of the bird from the side or behind. Once the nestling is safe, the wings should be encircled as described previously. We prefer not to wear gloves when handling raptors, as tactile senses are necessary to avoid injury to the struggling bird or its feathers. Fyfe and Olendorff (1976) use a different method for handling with success.

Figure 1. *Adult male peregrine illustrating method of handling described in text.*

We find it preferable to have one of us use both hands to hold the bird while the other bands, measures and takes notes.

(ii) It is important not to band nestlings before the tarsus is more or less fully grown, otherwise the band may slip off or become jammed over the joint at the base of the tarsus, crippling the bird. On the other hand, premature fledging may be the undesirable result of attempting to band too late. Fyfe and Olendorff (1976) suggest, as a general rule, that a suitable age for banding is one-half to two-thirds of the way through the nesting period. As a rough guide we avoid banding peregrines before the stage where nestlings show no feathers and after the stage where little down remains on the head; about 3.5-4.5 weeks of age is optimal. Accipiters, Brown Falcons *Falco berigora* and Little Falcons *Falco longipennis* are more prone to premature fledging, as are males of most species.

(iii) Several methods used for trapping adult or free-flying raptors can be dangerous if misused. The Swedish goshawk trap as described by Beebe and Webster (1964) must have netting (*not* wire netting) surrounding it. Most raptors enclosed by wire for even a short time will severely damage feathers, face and especially the cere. Damage to the cere may cause the beak to grow out malformed, in many cases so weakened that it will split and break.

Nooses on bal-cha-tri traps should be tied so that they slip freely (Olsen and Woollard 1975). Improperly tied nooses that remained tight were broken from a bal-cha-tri by a Brown Goshawk *Accipiter fasciatus* in Canberra in 1975. The trapper recaptured the goshawk and removed the tightened nooses, which were constricting its toes.

No trap should be left for any length of time without checking, in fact it is preferable to be in attendance (out of sight) at all times. Most raptors, small raptors in particular, will be taken by larger raptors, dogs, cats etc. However intraspecific aggression resulting in injury or death of the trapped bird is also a danger. Since most raptors are trapped in open ground, a flapping, struggling, ensnared bird is easily seen by and attracts other raptors in the area.

III. Photography and observation of nesting peregrines

It is feasible that one sex may be shyer than the other of the camera lens, observer or hide (Mavrogordato 1973). For example a male may not bring food to an incubating or brooding female because of the presence of an observer. The female may have to hunt food for herself leaving eggs or young. This dichotomy of acceptance of humans has been observed by us and others in several Australian raptors. It has often been reported for instance that male peregrines or male Brown Goshawks do not bring food to the nest; we have found that this type of observation is sometimes the result of some males' greater fear of man or the hide.

If photography or field ethology is the purpose of the visit it should be carried out with a pair of birds the observer has known to have nested successfully in past years. A pair that has been unsuccessful in past years due to pesticides, disturbance, etc., will only have its chances of success lessened further by your visits. If the purpose of the study is to determine why the birds are failing, it is important, firstly, to know that your presence is not a factor in the failure, and secondly, to check for other possible interfering factors. If human disturbance is suspected, a watch should be kept at a distance out of disturbing range of the birds. If pesticides or other pollutants are suspected, egg contents, dead chicks and adults can be analysed and eggshell thickness measured, etc.

It is important for photographers and observers to familiarise themselves with individual behavioural differences in the peregrine and other raptors. When a particular pair of birds is well known to the observer he will be able to recognise subtle, but important, types of disturbed behaviour which may then be averted. For instance, he will know if the birds are relaxed or anxious. For this reason it is advisable to make behavioural observations of, or photograph, birds with which you are familiar.

Hides should be constructed slowly and carefully after young have started to grow feathers. Nelson (1973) suggests that the entrance of the hide should be through brush. If adults don't return within an hour it may be necessary to feed young nestlings. Chopped domestic pigeon, other birds or even fresh fat-free beef can be left with them and if they are hungry they will eat after your departure. (Pigeons must be cooled for several hours to destroy the protozoan *Trichomonas gallinae* which may be fatal to raptors, see for example Ogden and Hornocker 1977). If parent birds don't return within about

three hours the hide should be immediately taken down and a rapid retreat made. This is less likely to happen with peregrines or Brown Goshawks than with Wedge-tailed Eagles *Aquila audax*, or Swamp Harriers *Circus aeruginosus*.

Even when care is taken, extensive observation or measurement of nestlings or adults may be detrimental. Snyder and Snyder (1974) noted that banding returns from Cooper's Hawks *Accipiter cooperii*, that saw men regularly when nestlings were more frequent than those from nestlings which rarely saw men.

For open observation three points may be useful:

(i) Careful habituation of both birds to your presence. Gradually decrease the distance (over several days) from which you can observe and be observed without disturbing the birds.

(ii) Predictability of your movement. Wear the same clothes, move along the same track and move slowly and steadily without appearing overly interested in the birds.

(iii) Learn to understand and recognise the individual bird's moods; develop a 'sixth sense' (Nelson 1973).

There is a great need for co-operation and co-ordination in studies. A pair of Golden Eagles *Aquila chrysaetos* in Scotland laid eggs for three seasons, but none hatched. In 1973 the Office of Conservation watched the pair from a distance for several days and soon realised that the constant procession of other interested observers was the reason for the failure. At weekends the female was kept off her nest up to six hours a day (Newton in Thacker 1974).

The importance of not advertising the location of a nest site in print or by word cannot be overemphasised. There appears to be considerable interest and status attached to knowledge of the location of nesting peregrines and some other raptors by photographers, egg collectors, ornithologists and the general public. It is also important to visit the nest site unobserved by the public in order to attract as little attention as possible.

Summary

For the sake of the birds and to minimise the bias introduced into field studies by disturbance we suggest the following as a guide. Situations and circumstances vary; one must assess and respond accordingly.

- Visit the site (a) only to gain necessary data, (b) with regard to weather, position of sun, etc., (c) preferably in the latter half of the nesting period.
- Where possible approach site from the front, below and in clear view of nesting bird.
- Flush bird with care.
- Take care with falling rocks.
- Band young at an optimal age.
- Stay no more than 20-30 minutes unless the situation is well known. Stay only as long as is necessary to collect data.
- Place and approach hides sensibly.
- For behavioural studies (a) be predictable, relaxed and avoid sudden movement, (b) gradually habituate the birds to your presence, (c) choose birds whose success is known.
- Individual birds vary; use common sense, and be sensitive to their behaviour.
- *Do not* advertise site locations by word of mouth, print or deed.
- Co-operation and co-ordination of studies and observations is essential.

In the words of Fyfe and Olendorff we ask for 'knowledgeable trespass on a bird's territory, or none at all'.

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