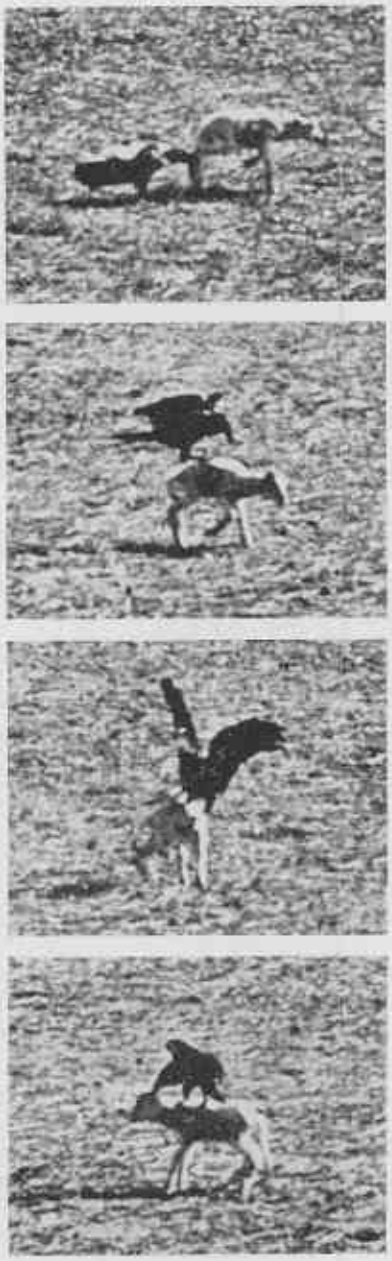
CROW PREDATION NOT SIGNIFICANT IN LAMB MORTALITY



Successive photos of raven attack on 11½-hour old lamb. This "ride" lasted 45 seconds before the lamb sheltered with a ewe, not its mother. When examined later no wounds were found

This is a summary of an article by Ian Rowley, Division of Wildlife Research C.S.I.R.O. Canberra, which appeared in the December, 1969 (Vol. 14 No. 2) edition of C.S.I.R.O. Wildlife Research.

1. INTRODUCTION

Corvids of one sort or another occur throughout Australia. They are all black birds of medium to large size, commonly known as crows, but more correctly there are five species—three ravens and two crows. The Australian raven (*Corvus coronoides*), the forest raven (*Corvus tasmanicus*), and the little raven (*Corvus mellori*) occur mainly in the temperate region. The Australian crow (*Corvus orru*) and the little crow (*Corvus bennetti*) occur in the tropics and the arid interior. Since sheep are run virtually throughout Australia, they come into contact with all five species somewhere in their range as shown in Fig. 1.

All corvids are opportunistic scavengers that feed from a succession of natural sources as seasons change; carrion feeding and predation on birds, mammals and reptiles occurs as opportunities arise. Dead lambs and afterbirth discarded by a ewe provide attractive food for corvids, and since one in every five lambs born dies within a few days, it is inevitable that corvids will concentrate around lambing paddocks. In fact, few healthy lambs are killed by corvids, but many sick animals are finished off by them. This distinction is not readily appreciated by most farmers, in whose minds corvids and dead lambs are firmly linked as cause and effect.

The purpose of this investigation was to assess lamb mortality due to corvids and to describe the conditions under which it occurs. The work was almost exclusively concerned with two of the ravens, *Corvus coronoides* and *Corvus mellori*.

2. METHODS

The study of ravens amongst lambing flocks was confined to South-Eastern Australia, and approached in four ways:—

(a) Investigation of *Corvus* ecology.

(b) Direct observation of lambing flocks.

(c) Post-mortem analysis of dead lambs.

(d) Experiments in aviaries.

(a) *Corvus Ecology*

Two study areas used are relevant to this report; Geary's Gap, N.S.W. (solely *Corvus coronoides*) and Toganmain Station, N.S.W. (both *Corvus coronoides* and *Corvus mellori*).

(i) Geary's Gap

This study area was thirty square miles of Southern Tablelands sheep country, 20 miles north

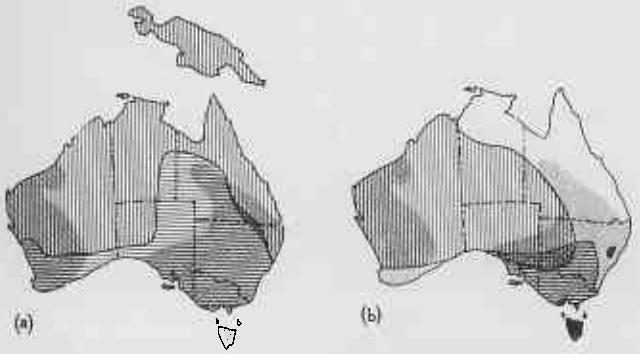


Fig. 1.—(*a*) Distribution of *C. coronoides* (horizontal hatching) and *C. orru* (vertical hatching) compared with that of sheep farming (stippling). (*b*) Distribution of *C. mellori* (horizontal hatching), *C. bennetti* (vertical hatching), and *C. tasmanicus* (black) compared with that of sheep farming (stippling).

of Canberra. At least one member of every pair of corvids in the area was banded to enable recognition up to a distance of a quarter of a mile. Nesting was followed for five seasons, many young were colour-banded and the movements of all birds closely tracked. Over 100 hours of observations were made on the lambing flocks.

(ii) Toganmain Station

This study area was a well-managed property of 100,000 acres, carrying about one sheep to every three acres. Observations were made both during the birds' breeding season and during lambing time. 2,176 ravens were banded, and subsequent recoveries led to an understanding of nomadic and local movements.

(b) *Direct Observation of Lambing Flocks*

Observation was carried out through binoculars from hides, blinds, or observation posts at Toganmain Station, Minnipa Research Centre, S.A. and Roma, Queensland.

(i) Toganmain—Observations were made over four seasons on two unshepherded flocks, each of about 400 animals. An observation post was established overlooking the only watering place and most lambs were born in this vicinity.

(ii) Minnipa Research Centre—Observations were carried out in enclosures for 20 days on a selected group of ewes on the point of lambing. Through most of the day more than 50 corvids were present in and around the lambing flocks.

(iii) Roma—Observations were carried out over 5 days on a small flock.

(c) *Post-mortem Analysis of Dead Lambs*

Collections of dead lambs were chilled and forwarded to Sydney for analysis.

(d) *Aviary Experiments*

Four aviaries averaging 50 sq. ft. in area were stocked with pairs of *Corvus* who were presented with an intact lamb carcass (pairs were used to reproduce the competitive situation which usually arises in the field). The time which elapsed before the eyeball of the lamb was removed was measured for each bird and a maximum of three tests per day every other day were made on each bird to ensure they did not become satiated with meat.

3. RESULTS

(a) *Corvus Ecology*

(i) Geary's Gap—Sixty pairs of *Corvus coronoides* were studied, and it was found that they seldom left their territories, which they patrolled several times a day. They rapidly located any new source of food (e.g., dead or dying animals) and were quick to respond to any departure from the normal pattern of farm operations, whether it was a basket of eggs left carelessly on a gatepost, a "cast" ewe lying upside down, or the fact that the farmer was carrying a rifle instead of a stick. Banding showed that the young raven is nomadic in nature from 6 months (when they leave their parents), and do not settle in one district until they are about 3 years old. It was flocks of these nomadic birds which were mainly present among lambing flocks.

(ii) Toganmain—Observations showed that *Corvus mellori* live as a flock and, except when engaged in yearly nesting activities, will move considerable distances foraging for food.

(b) *Direct observation*

(i) Toganmain—Two flocks of ewes were observed over a total of 32 days spread over four lambing seasons. Although *Corvus mellori* outnumbered *Corvus coronoides* by about five to one, the former were never seen to attack lambs, but fed on insects, seeds and carrion. In 361 hours of observation, no instance of successful predation was seen. *Corvus coronoides* did occasionally attack lambs that appeared weak, but in all cases were repelled by the defending ewe, and no attacks were made on lost lambs which became bogged down in the mud of the dam. Both species avidly ate afterbirth and carrion and when competition arose *Corvus coronoides* always conquered *Corvus mellori*. Consequently *Corvus coronoides* spent far more time feeding on carcases than did other species.

Under these conditions of minimal interference and the complete absence of any form of shepherding, flocks of Merino ewes average 80% of lambs marked to ewes mustered at marking time. Examination of the ewes at marking suggested that about 17% of the ewes had not born a lamb recently (as might be expected at a spring mating). Under these circumstances, predation seems of little importance, and it is unlikely that any change in management practice would significantly reduce the lamb losses.

(ii) Minnipa—In 1966 and 1967 lamb mortality was not heavy. In 1966, five lambs died from 44 ewes, while in 1967, 49 out of 424 lambs died. Despite large numbers of corvids present and the absence of any disturbance throughout most of the day, predation was not responsible for the loss of one healthy lamb.

The lack of effective predation by corvids on the lambs at Minnipa is interesting because ample opportunity for attack existed. Twenty-seven lambs were born in daylight, of which four births were twin deliveries. No damage was caused prior to the actual dropping of the lambs because the ewes circled away from the ravens. After birth, while the ewe was still resting, single ravens would dash in and take beakfuls of membrane and attendant fluids adhering to the new born coat, but no noticeably damaging attacks were made at the lamb's orifices, and once the ewe recovered she butted off the intruding ravens. With twin births, the first lamb born was undefended for up to half an hour, but in no instance was any damage noticed. Ravens made several attacks at the afterbirth membranes unshed by the ewes and fed extensively on these and faeces passed by the lambs. This often took the form of an attack on the anus of the lamb but, unless the lamb was starving and unable to run off, no extensive wounding was observed.

(a) While sleeping, lamb 47 was probed in the anal region by a raven. This healthy lamb jumped up and moved away

(b) *Corvus coronoides* holding the tail of a lamb in its bill. This lamb appears unconcerned but frequently such a lamb runs off with the raven holding on. As in (a) this approach probably enables ravens to distinguish between sick and healthy lambs

At Minnipa the only bird capable of damaging a healthy lamb was the large Australian raven *Corvus coronoides*. Its greater weight, longer reach, larger bill and extreme agility often enabled it to maintain a grip on a running lamb and continue to peck. Possibly because of the tough skin and tightly curled birth coat, no attack of this nature resulted in serious damage.

(iii) Roma—A feature of the attacks here was the concentration on the umbilical cord and the breech. The Southern Queensland raven appears larger than average (particularly its bill) and this, combined with the larger orifices and sensitive skins of the Border Leicester lambs at Roma, probably accounted for the injuries observed. The combination of sensitive skin and large-billed raven is not lethal by itself, but when infection with *Clostridium* spp. occurs, deaths become more frequent. The owner studied 44 new born lambs that had been recently picked by ravens without receiving major wounds. He injected half with antibiotics and left half untreated. Seven of the untreated lambs died, but none of the treated ones.

(c) *Post Mortem Examination of Dead Lambs*

In 1962, all dead lambs from four flocks at Geary's Gap were sent to Sydney for examination. Differences in the severity of predation were comparable to the circumstances on the property. The heaviest predation was noted in the flock which lambed in July, a full month ahead of the other three. Twelve of the dead lambs were healthy and viable apart from the damage caused by the predator. However, this is not a large loss from 700 ewes. Predation was not so effective in the other three flocks which were of similar size.

A mild winter in 1963 resulted in healthier lambs and this was reflected in the improved figures both for the number of healthy lambs killed and the number of dying lambs finished off. In 1965, a dry summer prevented hay reserves from being replenished; newly sown pastures failed to establish themselves and established swards failed to grow after a poor autumn rainfall. This situation led to a drop of weak lambs and a correspondingly large number failed to survive.

(d) *Aviary Experiments*

Experiments with lamb carcasses showed that the large species of corvids were much quicker at removing eyes than the small ones. *Corvus coronoides* and *Corvus tasmanicus* were extremely competent at removing eyes. Both species had long massive bills and this together with their powerful feet enables them to take a firm grip on the lamb and to deliver a powerful thrust generally sufficiently strong enough to burst the eyeball. Four methods of attack were observed:

(i) Picking—raising the beak about 6 inches and driving at the target with considerable force.

(ii) Pecking—relatively harmless and lacking the force of "picking".
(iii) Beaking—removing the flesh by pinching and tearing.
(iv) Spreading—widening the orifices by opening the beak inside the aperture.

Observations indicated that the smaller ravens are never serious predators of young lambs as in all cases they experienced difficulty in causing extensive damage except after prolonged exploratory delving.

4. SUMMARY

The results of the observations suggest that excessive predation is closely linked with mismanagement. When a farmer lambs out of phase with his neighbours he may attract abnormal numbers of birds; the available supply of carrion may be inadequate to satisfy all, and some may turn to predation on live lambs instead of the carrion which originally drew them. Mismanagement by over or under-feeding pregnant ewes, inadequate provision of shelter or insufficient supervision may result in large numbers of starving lambs. Ravens can easily finish these off, but such attacks do not represent a further financial loss to the farmer as these lambs would die anyway. The surveys made show that there are two periods of a lamb's life when it is particularly vulnerable to corvid attack.

(i) During or immediately after birth—Birth is quick for a single lamb of average weight (c. 8 lb), normally presented, and an experienced mother recovers rapidly and actively defends her offspring. However, with larger lambs, extensive exposure during birth and physical damage leading to weakness, creates a condition where predatory attacks are likely. Over-feeding of the ewe during pregnancy is usually responsible for large lambs. Maiden ewes are often severely shocked by birth and are either physically exhausted or will actually desert their offspring leaving them open to attack. Finally the first born lamb of twins is inevitably left defenceless while the second twin is born; twins are generally smaller than other lambs and consequently weaker.

(ii) During the moribund state preceding death from other causes—Starvation is the commonest single cause of lamb mortality in Australia, and may proceed for three or four days before the lamb dies. The decline is magnified under unfavourable climatic conditions and when shelter is inadequate, and in this situation, the lamb is often deserted by the ewe.

To summarise, long and difficult births, twin births, weakness and desertion are the main circumstances that will expose lambs to attack by corvids. Observations suggest that the great majority of normal healthy lambs are not in danger of serious wounding by corvids, due to their agility and tough skin, to vigorous maternal defence and to the size disparity between victim and attacker.

The real causes of predation by corvids on young lambs demands more fundamental remedies than attemps at intensive elimination. Most methods of control such as scaring, shooting, trapping, and blasting at roosts are inadequate, and only poisoning on a large scale can be highly effective. This however has its drawbacks, as baits can remain toxic for many weeks and be transported by birds beyond the owners' property. More recently, the introduction of organic insecticides has provided some readily available chemicals, very toxic to birds, who die in such a way that other birds are not alarmed. Resultant widespread destruction of corvids could therefore take place, but this may have the effect of drastically reducing the main natural remover of carrion and lead to an increase in the breeding of flies. This could give rise to greater losses of stock due to fly-strike than are commonly caused by raven predation.

EAGLE v. BUSTARD

A Wedge-tailed Eagle was reported as having killed a young bustard (wild turkey) near Mallina Station in the North West. The attack was observed by Mr. R. F. Dear, the Department's Fauna Warden at Onslow.

Wedge-tailed Eagle (*Aquila audax*)

While on patrol Mr. Dear saw two young bustards which were obviously distressed. He pulled up some distance away to try and determine the cause of the birds' agitation. However, as the two birds moved to take off, one was struck down and killed by the eagle.

This was the first time Mr. Dear had observed such an attack but he believes it is probably a common occurrence which is mostly unobserved.