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COLLISIONS BETWEEN AIRCRAFT AND BIRDS AT TOWNSVILLE, QUEENSLAND

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SUMMARY

Records of 110 birds (14 species) and 4 flying-foxes (1 species) involved in 124 collisions with aircraft at Townsville, Queensland, from April 1965 to September 1968 are presented.

Tentative suggestions based on destruction of attractive foods are made for controlling major species concerned, notably the fork-tailed kite (*Milvus migrans* (Boddaert)).

I. INTRODUCTION AND METHODS

Increasing aircraft traffic and the present conversion from airscrew- to jet-propulsion has resulted in concern about the hazard caused by birds (note Figure 1) in the Townsville district of north Queensland.

From April 1965 to September 1968 collisions in the district between aircraft and birds reported by pilots were investigated. The animals involved were sought on the ground and, together with any other obviously struck individuals found in the course of searching, were identified and examined for sex, age, breeding condition, stomach content and extent of damage suffered.

The aircraft movement pattern was derived from all arrivals and departures at Townsville in the period August 5-11, 1968. Distribution of collisions as to time was determined only broadly: dawn, 0400-0959 hours; day, 1000-1559 hours; dusk, 1600-2159 hours; night, 2200-0359 hours.

II. RESULTS

One hundred and twenty-four collisions occurred on 80 separate occasions; 76 of these occasions were at low altitudes within the aerodrome boundary while the remainder took place in the approaches to the main runway (Figure 2). One hundred and ten animals were located subsequently.

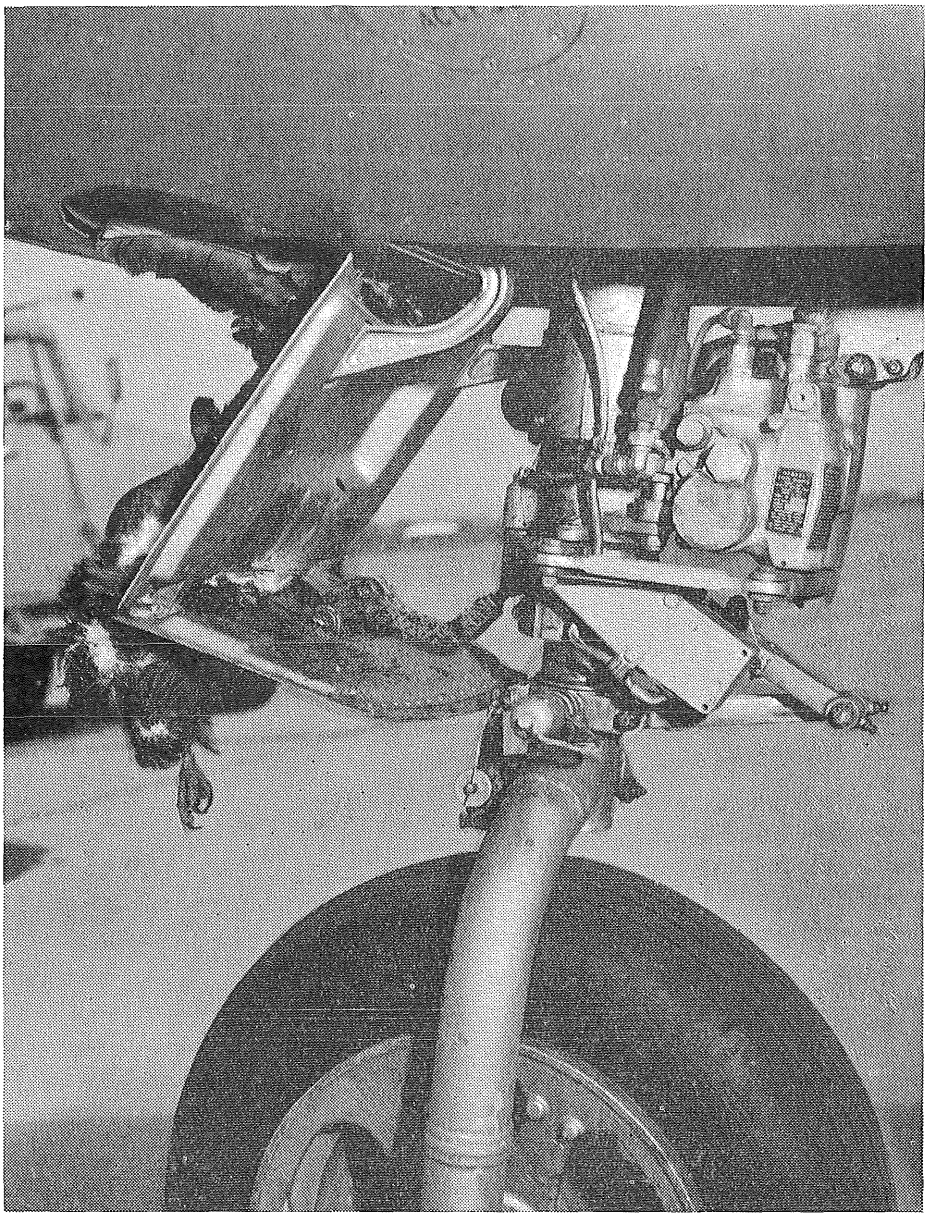

Fig. 1.—Fork-tailed kite struck by Sabre jet-aircraft, Townsville, Q., August 1958, showing bird on nose-wheel cover-flap.

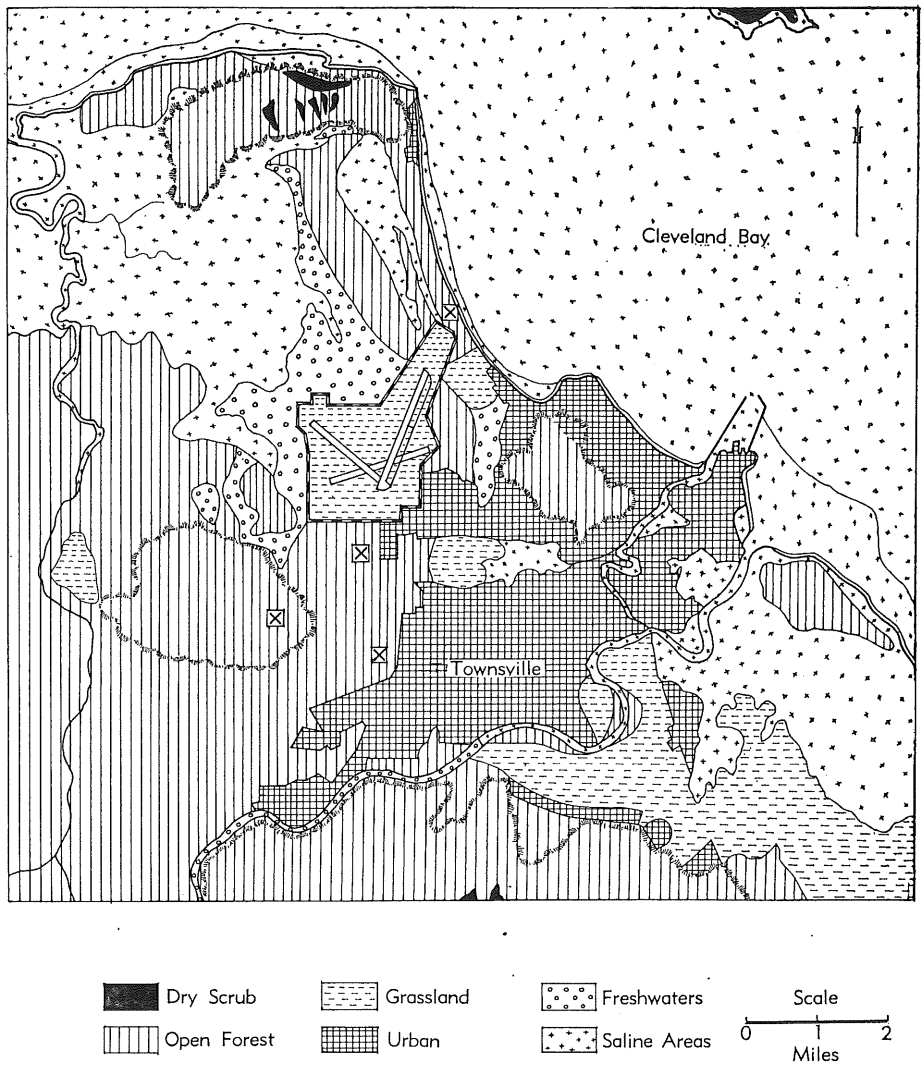

Fig. 2.—Locations (X) of collisions outside the aerodrome boundary, and distribution of fauna habitat types at and near the aerodrome, Townsville, Q.

The number of each species hit, number of occasions involved, month and time period, as well as sex, age, breeding condition, extent of injuries caused by collision, and stomach contents of each specimen, are given in Table 1.

Figure 3 shows frequency of collisions in relation to time periods and to numbers of aircraft movements.

TABLE 1

SPECIMENS EXAMINED FOLLOWING COLLISIONS BETWEEN AIRCRAFT AND BIRDS AT TOWNSVILLE, APRIL 1965—SEPTEMBER 1968

Species	Collisions			No. of Birds												Stomach Content
				Sex		Age			Breeding Condition of Adults		Injuries		Stomachs			
	Number hit/ Number of occasions	Month	Time Period	Males	Females	Adults	Juveniles	Fledglings	Gonads Enlarged	Gonads Regressed	Extensive	Confined	With Food Contents	Empty		
Fork-tailed kite (*Milvus migrans* (Boddaert))	21/21	i-iii, v, vi, viii-x, xii	Dawn, day	8	3	9	6	..	2	4	8	8	10	..		Grasshoppers* (*Locusta migratoria* (L.)*, *Gastrimargus musicus* (F.)*, *Oedaleus australis* Sauss.); mole-crickets (*Gryllotalpa* sp.); beetles (*Cybister* sp.); other insects* (lacewings and mantids (spp. indet.)); frogs* (*Bufo marinus* (L.)*, *Cyclorana alboguttatus* (Gunther)*, *Hyla caerulea* (Shaw), *Hyla inermis* (Peters), *Limnodynastes ?ornatus* (Gray)); birds (sp. indet.)
Southern stone curlew (*Burhinus magnirostris* (Latham))	13/11	iii-vi	Dusk, night, dawn	2	3	9	..	..	..	5	10	1	5	..		Seeds of Townsville lucerne (*Stylosanthes humilis*), awnless barnyard grass (*Echinochloa colonum*)*, and budda pea (*Aeschynomene indica* L.); fruits of chinee apple (*Zizyphus mauritiana* Lam.); molluscs (sp. indet); grasshoppers* (*G. musicus**); beetles* (*Gnathophanus* sp.*, *Gonocephalum* sp., *Megacephala* sp., *Melanterius* sp., Elateridae (sp. indet.)); water-bugs (*Sphaerodema rusticum* F.); frogs (*Hyla gracilenta* Peters, *Hyla nasuta* (Gray)); snakes (*Natrix mairii* (Gray))

Nankeen night heron (*Nycticorax caledonicus* (Gmelin))	12/8	ii-v	Day, dusk, night	1	5	12	..	..	3	4	10	1	5	..	Seeds of awnless barnyard grass and other grasses; grasshoppers* (*Bermius* sp.); winged termites* (sp. indet.); beetles (sp. indet.); frogs* (*C. alboguttatus**)
Grass whistling-duck (*Dendrocygna eytoni* (Eyton))	32/2	vii, viii	Dusk	1	..	..	1	..	..	..	1	..	..	1	..
Gould's flying-fox (*Pteropus gouldii* Peters)	4/4	ii, iii, x, xi	Dawn, dusk	2	..	2	..	..	2	..	1	..	..	..	..
Brolga (*Grus rubicundus* (Perry))	4/3	ii, vi, x	Dawn, day	1	3	3	1	..	..	3	2	1	1	1	Tubers of bulkuru sedge (*Eleocharis dulcis* (Burm. f.) Trin.); grasshoppers (sp. indet.); other insects (sp. indet.)
Straw-necked ibis (*Threskiornis spinicollis* (Jameson))	2/1	vi	..	..	..	..	..	..	..	..	..	..	..	..	..
Jabiru (*Xenorhynchus asiaticus* (Latham))	1/1	ii	Dawn	..	1	1	..	..	..	1	1	..	1	..	Frogs (*C. alboguttatus**); turtle (*Chelodina novaeguineae* Boulenger); indet. animal material
Black-backed magpie (*Gymnorhina tibicen* (Latham))	1/1	x	Dawn	..	..	..	1	..	..	..	1	..	1	..	Plant seeds (sp. indet.); beetles and bugs (spp. indet.)
Magpie lark (*Grallina cyanoleuca* (Latham))	6/5	v-vii	Dawn	3	1	1	2	..	..	1	2	2	2	..	Seeds of water snowflake (*Nymphoides indica* (L.) O.K.); beetles* (*Apion* sp.)

TABLE 1—continued

SPECIMENS EXAMINED FOLLOWING COLLISIONS BETWEEN AIRCRAFT AND BIRDS AT TOWNSVILLE, APRIL 1965—SEPTEMBER 1968—*continued*

Species	Collisions			No. of Birds											Stomach Content
				Sex		Age			Breeding Condition of Adults		Injuries		Stomachs		
	Number hit/ Number of occasions	Month	Time Period	Males	Females	Adults	Juveniles	Fledglings	Gonads Enlarged	Gonads Regressed	Extensive	Confined	With Food Contents	Empty	
Australian pratincole (*Stiltia isabella* (Vieillot))	4/4	i, ii xii	Dawn	1	3	1	3	..	..	1	3	1	3	1	Winged termites (sp. indet.); grasshoppers* (sp. indet.); beetles (sp. indet.); bugs (sp. indet.)
Masked plover (*Vanellus miles* Boddaert)	3/3	ii, iii vi	Dusk	1	1	1	..	1	..	1	..	2	1	..	Seeds of awnless barnyard grass; grasshoppers (sp. indet.)
Welcome swallow (*Hirundo tahitica* Gmelin)	4/1	iv	Dawn	2	1	4	..	..	..	2	3	1	3	..	Insects* (spp. indet.)
Nankeen kestrel (*Falco cenchroides* Vigors and Horsfield)	2/2	v	Day	1	1	2	..	..	..	2	2	..	2	..	Grasshoppers* (*G. musicus**)
Red-capped dotterel (*Charadrius ruficapillus* Temminck)	1/1	iii	Dawn	..	..	..	1	..	..	..	..	1	1	..	Indet.

* Found in more than one specimen.

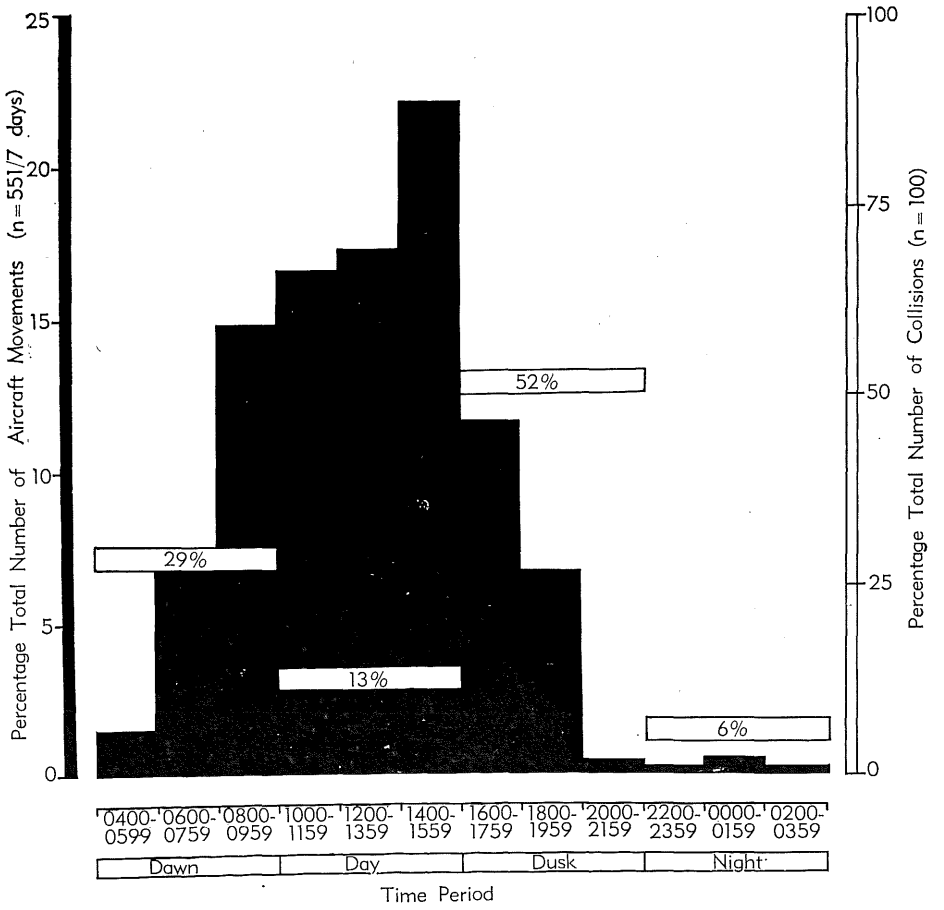

Fig. 3.—Frequency of collisions at Townsville, Q., in relation to time periods and numbers of aircraft movements.

III. DISCUSSION

Of 244 species of birds and 18 of bats utilizing the six habitat types in the immediate vicinity of the Townsville aerodrome (from Lavery 1968; Lavery and Hopkins 1963; Lavery and Johnson 1968; also Figure 1), relatively few collide with aircraft. The species hit were mostly common fauna in the district. All available evidence supports the contention that species hit were primarily present on and near the aerodrome at, or moving to or from, food sources mainly within the aerodrome boundary; accordingly, most collisions were at times corresponding with species feeding habits rather than frequency of aircraft movements (Figure 3). All species struck would have died eventually as a result of collision but smaller forms were less extensively damaged (Table 1).

The fork-tailed kite was the major pest species concerned (note Figure 1); it is a large bird (weight approximately 600 g.) feeding in the district, particularly in the mornings, by preying mainly on insects and smaller predators of these at cultivated grasslands and by scavenging at adjacent urban and saline areas. Apparently constant numbers of adults occur throughout the year and nesting takes place for at least two-thirds of each year (Lavery, Seton, and Bravery 1968) in adjacent open forset. Ecological studies, concerned for example with changes in species distribution due to modification of environment by man at eastern Australian drought-refuge (see Kirkpatrick 1967; Mack 1953), have been in progress for several years for conservation purposes.

Of the other species hit, the southern stone curlew is a large bird (approximately 800 g) but is principally ground-moving (as tends to be the masked plover) for foods in urban areas reached by crossing the aerodrome from fundamental open forest habitat; these birds contributed mostly to the few collisions in the night period which otherwise might be considered important because of frequency per aircraft movement (Figure 3). Nine of the 12 nankeen night heron (weight 700 g) collisions, also mainly nocturnal, occurred during February-May 1968 when an irruption took place locally following extreme flooding. These conditions also may have given rise to the two occasions when grass whistling-ducks (weight 750 g) collided with aircraft. This species is abundant in the district, congregating at a relatively undisturbed lagoon from which dawn and dusk feeding movements by gregarious flocks occur in all directions throughout most of each year (Lavery 1967); in 1968 the flooding resulted in destruction of the retaining wall of the traditional roosting area and consequently disruption of the population and unusual local habits. The brolga (weight 5 kg) and Gould's flying-fox (weight 700 g), also moving across the aerodrome and its approaches to distant feeding grounds, likewise largely gave rise to fortuitous collisions. The remaining species hit were relatively unimportant because of comparative infrequency of collision and because of size (e.g. welcome swallow 15 g) and seasonal occurrence; possibly others of these small birds were hit and not detected, and it is noteworthy therefore that massed flocks are uncommon.

Since rearrangement of aircraft traffic times is deemed impractical, tentative suggestions for at least interim control of the problem must be based on foods, primarily of the fork-tailed kite. Grasshoppers and frogs (directly as well as indirectly) are controlled using 3 oz lindane per acre, in this instance best applied by low-volume boom spray on a buffer strip approximately 100 yd in width around the tarmac. These measures should control some other birds (see Table 1). Unnecessary and widespread applications of insecticide which might help to induce other insect problems should be strictly avoided.

The commonest plant food was awnless barnyard grass (*Echinochloa colonum* (L.) Link.); control is achieved by filling with earth and levelling all low-lying areas. Similarly, removal of other undesirable adjacent habitat types

(e.g. urban, by covering rubbish and screening eaves of buildings) should be undertaken eventually. Prevention of seeding of native grasses such as the predominant forest blue grass (*Bothriochloa intermedia* (R.Br.) A. Camus) by current low-level mowing practices is resulting in replacement by important food species such as Townsville lucerne (*Stylosanthes humilis* H.B.K.); failure to gather clippings will likewise result in loss of forest blue grass. Indiscriminate grass fires which will result if no mowing is undertaken, and burning of grass clippings, lead to concentrations of scavenging fork-tailed kites. Accordingly, adjustment of mowing schedule to encourage existing salt-tolerant couch grass (*Cynodon dactylon* (L.) Pers.) should be considered; in the meantime some control of Townsville lucerne should be undertaken using 2,4-D weedicide compound.

Control of species and foods beyond the aerodrome boundary is impractical and relatively unimportant at this juncture.

The survey of collisions should be continued to measure effectiveness of controls and to detect any changes in the status of the species involved.

IV. ACKNOWLEDGEMENTS

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