Sunbathing Vermilion-crowned Flycatchers Repulse Mates

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Vermilion-crowned Flycatchers (*Myiozetetes similis*, formerly called Social Flycatchers) remain paired the year around (Skutch 1960). I was watching the members of a pair foraging in close association along the bank of a pond (near Escuintla in the Pacific lowlands of Guatemala) on 29 December 1976, when the two came to a patch of relatively bare earth 1–2 m in extent. This was late in the morning of a hot, sunny day. One of them immediately sprawled belly to the earth, with wings and tail widely spread and head back in the sunbathing posture of a passerine (Hauser 1957). When the second flycatcher tried to do likewise, it was driven away. After about a minute, the first bird left and the second one took its place. It too was intolerant, repulsing an attempt of the first flycatcher to sunbathe again. These sequences of alternate sunbathing with attacks on the nonsunbathing partner were repeated five times. I saw no signs of anting, and neither bird preened or scratched in association with the sunbathing.

Could the territorial behavior have had survival value? Sunbathing, with birds sprawled in what appear to be relatively helpless positions, would seem dangerous in terms of predation. As Simmons (1964) noted, sunbathing birds are often "very incautious and easily approached." It might be advantageous, therefore, if one of a pair of Vermilion-crowned Flycatchers were on guard while its partner sunbathed, the exclusiveness insuring that only one partner at a time would be in the awkward position. While such a behavior might not evolve in birds traveling in flocks or in monogamous birds with temporary pair bonds, it might do so among Vermilion-crowned Flycatchers, which have permanent pair bonds and forage as pairs.

A question is why should Vermilion-crowned Flycatchers, which live in the open and are in the sun much of the time anyway, sunbathe in the heat of midday in a tropical lowland? There was no indication that any of the usual reasons given for sunbathing, as summarized by Hauser (1957) and Simmons (1964), among others, applied. According to Stiles (pers. comm.), the birds should have been in fresh plumage, having finished their annual molt several months previously. Houston (1980) has recently theorized that sunning in vultures serves to warm feather proteins, enabling feathers distorted by pressures involved in soaring to resume normal shapes. Could this principle apply to other birds as well, if other kinds of flying can also pressure contour feathers? The extra heat to be found against bare earth on a hot day would then be useful as a form of feather maintenance. Lanyon (1958) found that heat rather than light was the incentive to sunbathing in captive meadowlarks. An added point is that a standard way of straightening distorted feathers, when preparing specimens, is to hold them in a jet of steam.

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Ingestion of Plastics by Laysan Albatross

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Ingestion of plastic particles by seabirds has been reported for the Laysan Albatross (*Diomedea immutabilis*) by Kenyon and Kridler (1969), Fork-tailed Storm-Petrels (*Oceanodroma furcata*), Horned Puffins (*Fratercula corniculata*), and Parakeet Auklets (*Cyclorrhynchus psittacula*) from the Aleutians (Ohlendorf et al. 1978), adult and nestling Leach's Storm-Petrels (*Oceanodroma leucorhoa*) from New-

foundland and New Brunswick (Rothstein 1973), and in regurgitated gull and tern pellets from Long Island Sound, New York (Hays and Cormons 1974). In addition, Common Puffins (*Fratercula arctica*) from Britain have been reported to ingest rubber thread cuttings (Parslow and Jeffries 1972). A recent study by Day (1980) revealed that 15 of 37 species of marine birds in Alaska contained plastic, although the origin of ingested plastics was not determined. The observations of Laysan Albatross presented here suggest that a quantity of ingested plastic may have a harmful effect.

During our recent stay (6 November 1979 to 26 March 1980) on Midway Islands (28°13'N, 177°23'W), we fed small telemetry pills to two incubating adult Laysan Albatross to record body temperature. These plastic-coated, cylindrical transmitters (Mini-Mitter Company, Inc.) were 11.5 mm long and 7.5 mm in diameter. After recording body temperature continuously for 30 and 50 days in two separate birds, these plastic pills were passed from the adults by regurgitation to their chicks. The Mini-Mitters continued to transmit body temperature data from the chicks for 3 and 31 days, respectively. At the time of our departure, 40 days later, neither pill was found regurgitated around the nest, and we presumed it was still lodged in the digestive tract. Retention of the relatively small, smooth-surfaced pill indicates that even small, hard objects do not readily pass through the proventriculus and gizzard of adult birds to enter the lower digestive tract. We never observed plastic fragments in the excreta of any albatross.

Further proof of regurgitation of plastics to chicks was obtained during post-mortem examination of four young birds that appeared to have died of natural causes. Plastics were found in the stomach in each case. In one of these, the large amount of indigestible matter contributed to intestinal obstruction. A mass of stomach oil and regurgitated food (about 1 liter) was found in the stomach of a 6-week-old chick but none in the intestines. Another young albatross had bulky plastic materials and squid beaks in the proventriculus and ulcerations of the mucosa.

Imprinted brand names and labels on bottle and tube caps, toys, etc. found in regurgitated pellets and dead albatross carcasses suggested that 108 of 109 identifiable plastic items were manufactured in Japan. There was a single plastic cap from an American-made product. In a study by Fisher and Fisher (1972) the mean distribution of banded adult albatross recaptured at the beginning of the nesting season was east of Japan, in an area defined by 32–36°N and 145–155°E. This zone has particularly rich food supplies due to the turbulence of the colliding cold Oyashiro Current and the warmer Kuroshio Current. During the first 3 months of chick-rearing, the mean distribution of recaptured banded adults was from an area closer to Midway defined by 30–35°N and 150–175°W. It is likely that prevailing winds and the North Pacific Current transported the plastic objects eastward and that the birds picked up the flotsam just north of Midway.

How do Laysan Albatross ingest these items at sea? The best explanation may lie in an examination of their diet and foraging habits. Midway's Laysan Albatross obtain most of their food from squid (70% by volume), fish, and flying fish (Family Exocoetidae) ova (Harrison and Hida 1980). Flying fish lay their eggs at the surface, especially on flotsam. Plastics buried within regurgitated egg masses have been recovered from Laysan Albatross (C. Harrison pers. comm.). There is also a possibility that the plastic litter ingested by albatross resembles in color the marine animals upon which they feed. Japanese tuna fishermen using lines and plastic squid and fish lures are known to catch many Laysan Albatross each year (Fisher and Fisher 1972). The Black-footed Albatross (*Diomedea nigripes*) has been widely reported to scavenge trash thrown overboard and will follow ships for long distances (Fisher 1973). Plastics may be consumed in this manner, but there are no specific reports to confirm this mode of ingestion. It should be noted that on 11 February 1980 a dead Parakeet Auklet was found washed up on a Midway beach. An autopsy of this bird revealed eight small black plastic spherules (3–4 mm) in the esophagus similar to those described elsewhere (Ohlendorf et al. 1978, Rothstein 1973, Hays and Cormons 1974). Apparently, seabirds are unable to adapt to the widespread occurrence of indigestible, floating, plastic litter. Before the appearance of plastic-particle pollution, most surface objects were probably edible, and thus natural selection could not have favored seabirds that avoided nonedible materials (Rothstein 1973).

Some albatross regurgitate the plastic items along with squid beaks, lenses, and bones in "castings" without any apparent harmful effects. The incidence of such castings among fledgings is unknown, but fresh albatross castings collected from French Frigate Shoals in the Northwestern Hawaiian Islands had a mean weight of 96.6 g ± 37.1 (SD), $n = 5$. These castings generally appear as fledging birds begin wing-stretching exercises and may lighten the final fledging weight considerably. Castings contained many whole squid beaks: the mean number was 81.7 ± 40.4 (SD), $n = 15$, which may reflect, in part, the feeding history of the chick.

The long-term effects of plastic ingestion are difficult to evaluate. With the help of stomach contractions, the plastics exert a grinding force upon each other during the period of retention. If pollutant chemicals are entering the blood by pinocytotic digestion of microscopic particles in the intestines, then

appreciable residues of pollutants may be present. Polychlorinated biphenyls (PCBs) have been found on the surface of polystyrene spherules, apparently absorbed from seawater, in a concentration of five parts per million (Carpenter et al. 1972), and it may be assumed that organochlorines are associated with other oceanic plastic items. Measurable residues of DDT, DDE, and PCBs were detected in visceral fat from Black-footed and Laysan albatross on Midway (Fisher 1973). Although the origin of such ingested pollutants may be in the North Pacific food chain, it may also be associated with plastics ingested by albatross.

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Ficus ovalis Seed Predation by an Orange-chinned Parakeet (*Brotogeris jugularis*) in Costa Rica

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Parrots and parakeets (Psittacidae) are often thought of as frugivorous, and fruits are often listed as the food of parrots observed feeding in the wild (e.g. Forshaw 1978, Parrots of the World, London, David and Charles, Newton Abbot). On the other hand, from observing parrots of all sizes feeding in the wild in Central America and in captivity, I have the impression that a parrot is rarely frugivorous and usually preys on the seeds inside the fruit, whether the fruit is immature or mature. I have never encountered an unambiguous case of seed dispersal by parrots. Psittacids that eat figs, however, are often mentioned to me as potential exceptions to this generalization, and the tiny Orange-chinned Parakeet