The results (Table 1) show that the breeding population has increased fivefold since 1963—we counted 98 chicks (most of them approaching the size of an adult) and 5 eggs, as compared with 14 chicks and 6 eggs in the same places in 1963. The most striking increase has been at Vahsel Moraine in Southwest Bay, where we saw 40 adults, 16 chicks, and 1 egg, as compared with 6 adults and 1 egg in 1963. We found a total of 193 adults in or near the colonies at Spit Bay and Vahsel Moraine, and single pairs at Red Island, West Bay, and Atlas Cove. In contrast to our observations in 1963 and 1965, we saw no King Penguins at Skua Beach, Fairchild Beach, or Saddle Point. Because of the lateness of our visit we saw only one juvenile, which was just finishing its molt to adult plumage.

The breeding population at Spit Bay as a whole has grown almost linearly since 1963, at the rate of about 11 pairs per year, but the growth rate of the north colony appears to be declining, while that of the south colony is increasing (Table 1). The reason is not clear, although the south colony has moved since 1965 to a level area of tussock grass some 100 yards northeast of the area of lush grass and Kerguelen cabbage it previously occupied, and its habitat now resembles that of the north colony. Movement between the two colonies seems unlikely, for they are separated by a mile of tussock grass and swamp where we have never seen any King Penguins, and by a sea distance of 12 miles around the Spit.

The hospitality and support given by the crew of 'Southwind' are gratefully acknowledged.—G. M. Budd, *Department of Environmental Health, School of Public Health and Tropical Medicine, The University of Sydney, New South Wales, 2006.*

Woodpecker nest failures in creosoted utility poles.—Woodpeckers of several species damage wooden utility poles throughout the Holarctic region (Turcek, 1960). Dennis (1964) states that seven species are largely responsible for damage in North America. Two of these, the Red-headed (*Melanerpes erythrocephalus*) and Pileated (*Dryocopus pileatus*) Woodpeckers, are especially troublesome in the southern and eastern United States.

Most poles used in this region are impregnated with creosote before being installed. Length of time poles are in service seems to have some effect on rate of damage, with newly installed (hence recently creosoted) poles being most readily attacked (Dennis, 1963). Some damage, which is of little consequence, consists of shallow excavations along surface checks. Of more concern are large internal cavities for roosting and nesting, which extend downward 12 to 24 inches in the cores of poles. They considerably reduce the strength of the poles and provide an opening for decay organisms through the outer shell of wood that contains the highest concentration of preservative.

Several theories have been advanced to explain why woodpeckers are attracted to poles. These include search for food, acoustical stimulation from vibrations of poles and wires, good vantage points, protection from snakes and ectoparasites, and pecking to prevent abnormal bill growth. All have been discussed at length by Turcek (1960) and Dennis (1963, 1964), and most have been disproved. The fact remains that the birds excavate and nest in poles containing oily preservative when there are many suitable trees nearby. The attraction of the poles becomes still more difficult to understand in that the study reported here showed nests in relatively new poles to be unsuccessful.

During the spring and summer of 1965, 1966, and 1968, 37 nests of Red-headed and 6 of Pileated Woodpeckers in creosoted poles of southern pine were watched periodically in central Louisiana. Heights of nests ranged from 8 to 45 feet above

the ground. The poles were from 30 to 55 feet in length and 17 to 25 inches in circumference at the tops; they had been in service 3 to 4 years. Most were in utility lines along frequently traveled or major highways; some were in more remote areas where transmission lines transected stands of mixed hardwoods.

To minimize disturbance to the birds, nests were examined only frequently enough to estimate when clutches were completed, when hatching occurred, and how the nestlings fared. With the exception of one nest cavity that was within 8 feet of the ground, all poles were climbed and the contents of the nests were checked by use of a swivel mirror and flashlight. The mats of wood chips on which the birds laid their eggs were, in these poles, rich in creosote.

In conjunction with the field observations, the lethality of creosote on embryos was tested. Six dozen eggs of Domestic Fowl (*Gallus domesticus*) were incubated in three groups, each of which contained 12 eggs on wood chips and 12 eggs not resting on chips but exposed to fumes from them. Chips in each group represented one of three levels of creosote—0, 6.5, and 10 pounds per cubic foot of wood. Normal treatments of poles are 8 to 12 pounds.

I recorded a total of 61 clutches in the 43 nests. Each pair of Pileateds made only one nesting attempt, but 41 per cent of the pairs of Red-heads laid two clutches and 8 per cent had three.

No young hatched in 54 per cent of the clutches, and only 23 per cent of all eggs hatched. Clutches in which no eggs hatched averaged about the same size as those producing some young—4.2 and 4.1 eggs, respectively. Hatching success was slightly greater for Red-headed than for Pileated Woodpeckers, but nests of Pileateds were too few to allow firm conclusions to be drawn from this difference. Renesting attempts were no more successful than initial attempts.

All young of both species succumbed by the 3rd day after hatching. Significantly, nests in nearby dead trees were successful, as many juveniles of both species were seen after each nesting season. No attempt was made to observe a large number of nests in trees, but eight nests in trees near the poles were watched closely in an attempt to take young for an aviary and all produced fledglings.

Toxic effects of creosote are probably responsible for the low hatching success and mortality of young birds. Oils similar to those extractable from creosote are known to reduce hatchability of eggs, and toxic emulsions have been sprayed on nests to control "pest" species (Gross, 1952; Dow, 1956).

The incubator tests clearly showed that creosote is lethal to Domestic Fowl eggs. All 24 eggs in contact with creosoted chips and 22 of the eggs exposed only to fumes from creosote failed to hatch. In contrast 15 of the 24 eggs used as controls hatched, 6 of the others were infertile and 3 embryos died. All addled eggs were opened to determine the age of embryos at death. Embryos in eggs on creosoted chips usually died within the first week; those in eggs exposed only to vapors lived longer. The shell membranes of eggs touching treated chips had black spots approximately 2 mm in diameter where creosote had collected. When opened, those eggs had a strong odor of creosote rather than the characteristic odor of hydrogen sulfide.

Maximum temperatures in the nest cavities averaged somewhat higher than ambient—37.1°C versus 33.9° for 17 comparisons made in the hot months of July and August. Two maxima of 41.1°C were recorded in the cavities, a temperature near that King and Farner (1961) list as the deep body temperature of another Piciform, the Downy Woodpecker (*Dendrocopus pubescens*). It seems unlikely that temperatures in the poles were lethal during the nesting period in April and May, but they may have been high enough to enhance the volatilization of the creosote.

Most woodpecker damage to poles occurs within the first few years after construction of a line. It is not known how long poles must be in service before the preservative is no longer lethal, but two successful nests were noted in a pole that was 15 to 20 years old. It appears, then, that creosoted poles become satisfactory nest sites for woodpeckers only after a period of weathering reduces the creosote concentration level.

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Independent evolution of the Dodo and the Solitaire.—In the minds of many ornithologists, the extinct Dodo (*Raphus cucullatus*) and Solitaire (*Pezophaps solitarius*) are closely linked: both are thought to have been giant flightless pigeons (e.g. Mayr and Amadon, Amer. Mus. Novitates, no. 1496: 34, 1951; Wetmore, Smithsonian Misc. Coll., 139: 28, 1960) and both were found on the Mascarene Islands. This linkage has almost certainly been responsible for these birds having been placed in the same family or superfamily by most authors.

Almost everyone who has had the opportunity to examine skeletons of these two birds has been strongly impressed with the differences between them (for a summary, see Hachisuka, The Dodo and kindred birds, London, H. F. & G. Witherby, Ltd., 1953, pp. 43–44). Those who are familiar with the Mascarene Islands are aware of their volcanic nature and remoteness from each other. Rodrigues, the home of the Solitaire, lies 365 miles east of Mauritius, where the Dodo lived. A deep trench, the Rodrigues Fracture Zone, between these islands precludes any former land connection between them. As rafting of a large flightless bird between two such islands is extremely unlikely, we are left with the strong probability that these two birds were independently derived from flying ancestors. If this is so and if the morphological differences between the Dodo and a flying pigeon are sufficiently great to justify family status for the Dodo, then the equally distinct Solitaire, representing a separate phyletic line, must also be accorded family status, whether or not both were derived from the same flying ancestor.

This approach to the relationships of the "didine" birds necessitates a reappraisal of the one or more species said to have occurred on Reunion Island. In his review of the group, Hachisuka (op. cit.) listed a white dodo (*Victoriornis imperialis*) and