Photo by M. F. Soper, from Bruce Coleman

The wandering albatross (Diomedea exulans) is a sea bird, but the chicks, like the full-sized one on the nest at right, remain ashore for the first 280 days of their lives. Some albatrosses continue to feed their chicks as long as they remain ashore.

Flight From The Nest

by Alexander F. Skutch

By human standards, some birds are better parents than others. The parents of some species abandon their chicks after hatching; others keep their young with them long after they have left the nest.

To produce fewer offspring and take better care of them is one of the most significant trends in the evolution of animals. Aquatic animals that release their eggs in the water and give no further attention to them, such as the oyster and the cod, spawn millions at a time. Man, who takes longer and better care of his progeny than any other animal, usually gives birth to one offspring at a time. Man also has one of the lowest rates of reproduction in the animal kingdom, but it is still excessive in relation to his population needs.

In certain groups of cold-blooded animals, including insects, fishes, amphibians, and reptiles, we can find some species that carefully nurture their young. But only among the warm-blooded vertebrates—the birds and mammals—is such care practically universal. With the exception of the primitive monotremes of Australia, the embryos of mammals develop within the mother's body, and in all species she nourishes them after birth with her milk. The embryos of birds develop outside the mother's body in hard-shelled eggs that must be kept warm, by the parents or otherwise. After hatching, the chicks or nestlings may or may not receive food from the parents' mouths, but, with a few curious exceptions, the young of all birds are warmed and guarded by their parents for a longer or shorter period.

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Photo from National Audubon Society

Gannets feed their young on regurgitated food. After three months of liberal feeding, they weigh more than their parents. But once they enter the water, gannet chicks seem to become independent.

The whole course of parental care in birds includes three stages: incubation, care of young in the nest, and care after leaving the nest. The third stage usually ends when the young bird can find enough food without parental feeding or guidance. But in species with the strongest family bonds it merges into a fourth stage, in which the juveniles, although well able to satisfy their own needs, continue to accompany the parents, finding increased safety in this close association and learning from them, sometimes while helping them to attend later broods.

The lengths of these stages in the rearing of a family of birds vary enormously. Incubation periods range from about 10 days in a few small birds of hot climates to around 80 days in the larger albatrosses; the usual range for familiar songbirds is 11 to 15 days. Precocial birds that hatch with a thick downy coat, such as ducklings and domestic chicks, usually stay in the nest no more than a day or two and some, such as grebes, may, if alarmed, jump out in less than an hour after they escape the shell. Altricial birds, those which usually hatch with only sparse down or wholly naked skin, are as a rule unable to leave the nest until they are over a week old and may remain within it for several months. The third stage, that of parental care after leaving the nest, is equally variable, and presents some of the most curious contrasts in the natural history of birds.

Megapodes abandoned at birth

The only birds—indeed, the only warm-blooded animals—that, so far as is known, receive no attention at all from their parents after they are hatched or born are the chicks of the megapodes, or mound-birds, of Australia, Indonesia, and tropical islands of the western Pacific. These rather large, big-footed, terrestrial, gallinaceous birds never incubate their eggs with their own bodies but employ a variety of substitutes. Some bury their big eggs in the ground, just close enough to an active volcano or a hot spring to provide the right degree of heat. Others deposit them in sun-warmed sand by the seashore; and yet others scratch together great mounds of decaying vegetation, in which their eggs are heated by fermentation. In the drier parts of Australia, the mallee-fowl (*Leipoa ocellata*) skillfully combines heat of fermentation with that of the sun, working so hard to regulate the temperature of its large mounds that one wonders why it does not sit restfully on its eggs as other birds do. After a long incubation period, megapodes hatch in an advanced stage of development. They begin life with the strenuous task of digging their way up to the surface of the incubator mound, rest awhile, then wander off alone, never knowing a parent's guidance or protection.

Birds that receive scarcely any parental care after hatching may be designated "superprecocial." The only

other example known to me is the parasitic black-headed duck (*Heteronetta atricapilla*) of Argentina. Hatched from an egg that its mother drops into the nest of a rail or some other large marsh bird, the duckling remains long enough for its down to be dried by the heat of its brooding foster parent, then swims off alone, finding all its own food, keeping warm, and avoiding enemies as best it can.

A few other birds receive no parental attention after leaving the nest, but unlike the megapodes and black-headed duck, they are altricial and have a long nestling period before they go. Among these are certain swifts, including the common swift (*Apus apus*) of Europe, the young of which, after six or seven weeks of careful nurture in the nest cavity, fly away in the absence of their parents and evidently lose all contact with them. The adults appear to migrate southward as soon as their young no longer require their attention, and the juveniles must not only gather their own food after their first flight but likewise find their own way to their wintering ground in Africa.

It is chiefly among marine birds that parents desert their young as soon as the latter leave the nest, and sometimes earlier. Petrels and shearwaters have long incubation and nestling periods. While the single downy chick is growing up in its subterranean burrow, on a remote island or inaccessible slope, the parents, who may forage in the sea many miles away, visit it only at long intervals, lasting days or even a week, to deliver a copious meal of regurgitated food. Often the young bird is left quite alone, fasting and losing weight, before it finally emerges from its tunnel, almost always by night to escape the murderous gulls, and finds its way alone to the sea, where from the first it appears to be wholly independent of its parents. In the Manx shearwater (*Puffinus puffinus*), which has received much attention from British ornithologists, the incubation period averages 51 days, and the young remain in the burrow for 70 days. During the last two to 15 days of this interval, or on the average for 8½ days, they fast, losing more than four ounces of weight, before they go to sea. Subtracting 8½ from 70, we find that 61½ days is the average duration of parental care of nestlings by the Manx shearwater.

Although a similar terminal "starvation period" was earlier reported for another family of tube-nosed swimmers, the albatrosses, recent studies have not confirmed this. At least some albatrosses continue to feed their chicks as long as they remain ashore, which in the wandering albatross (*Diomedea exulans*) is a period of about 280 days; but we lack evidence that any member of this family receives parental attention after it has left its nest or the immediate vicinity.

In the auk family, the common puffin (*Fratercula arctica*) resembles the shearwaters in being deserted by its parents even before it leaves the nesting burrow. The nestling may fast in solitude for from six to nine days before, at about 49 days of age, it goes off alone to the sea, which gives about 42 days as the duration of parental care. Other members of this family are attended by their parents as long as they remain ashore, and possibly even after their dramatic departure.

The downy chicks of penguins of a number of species leave their nests long before they are grown and gather in flocks or creches that may contain many individuals. Returning from a fishing expedition in the ocean, each parent recognizes its own young amid the crowd, and it will rarely give food to any other. Although the burrow-nesting little penguin *(Eudyptula minor)* of Australia may go to sea when about 60 days old, bigger species remain ashore much longer, about six months in the case of the largest member of the family, the emperor penguin (*Aptenodytes forsteri*). The young of the somewhat smaller king penguin (*Aptenodytes patagonicus)* are dependent on their parents even longer, from 10 to 13 months. This long interval includes the harsh winter of high southern latitudes, when the young bird's meals are very widely spaced, much of its nourishment must be used to maintain its body temperature, and development languishes.

Penguin parents dote on chick

Because they continue so long to attend their single chick, king penguins can breed successfully only twice in three years, in each cycle starting early the first year, beginning later the second year, after their first young has gone to sea, and continuing to feed the second chick so long into the third year that they must omit laying in this year. Like the tube-nosed swimmers and the puffins, young penguins appear to be independent of their parents after they enter the water.

The same is true of the North Atlantic gannet *(Sula bassana)*, which after three months of liberal feeding by its parents, weighs more than they do. Then, too heavy and weak to fly well, it flutters down from its high, rocky islet to the ocean, where, abandoned by its parents, it lives on its reserves of fat until it can fish for itself.

Although closely related to the gannets, the boobies of tropical waters treat their young quite differently, continuing to feed them long after their first flights. Thus the chick of the widespread brown booby (*Sula leucogaster*) remains at or near its nest until it flies at an age that may range from 86 to 103 days, or even longer in a year when food is scarce. Then, for many weeks, the juvenile returns to its birthplace to be fed by its parents, who may indulge it for a full year, and possibly as long as 15 months, after it hatched. Other species of boobies have comparably long periods of parental care. The great

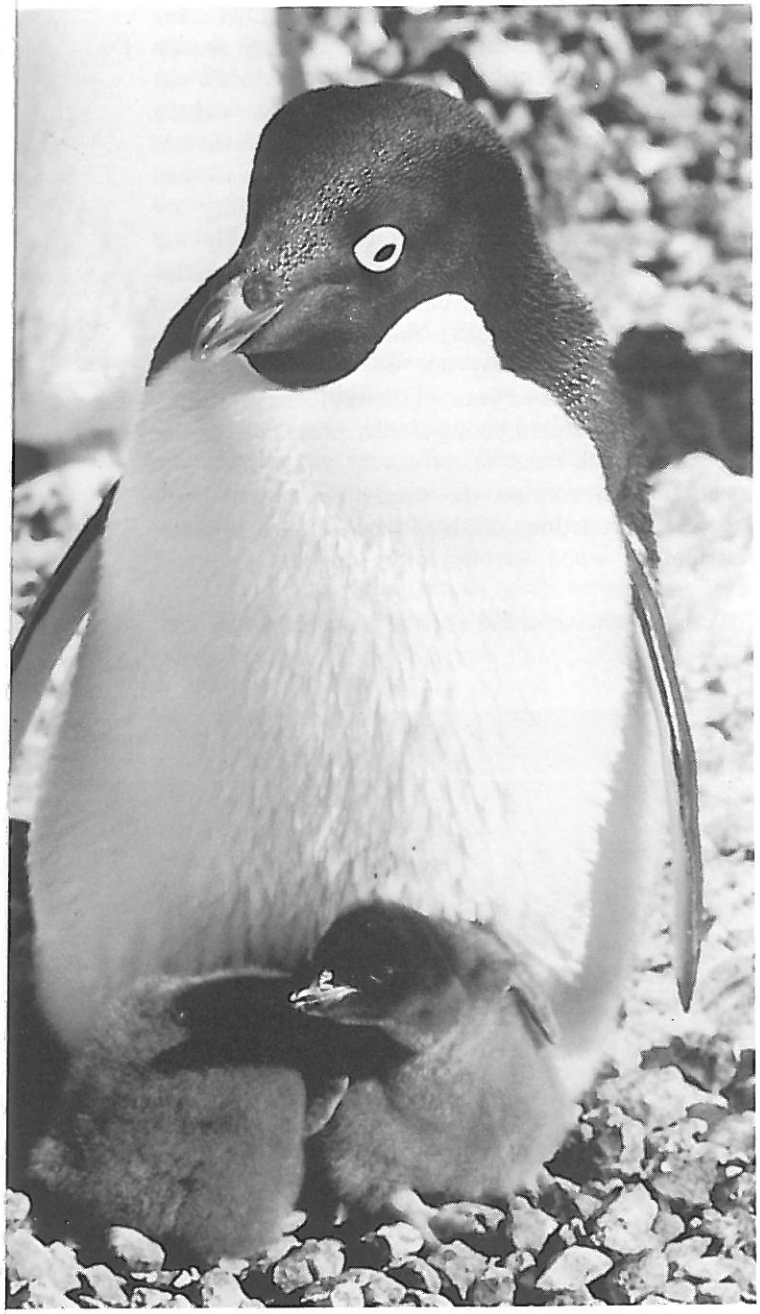

Photo by Michael C. T. Smith, from National Audubon Society

On Ross Island, Antarctica, an Adelie penguin stands over its two chicks. The chicks of many penguin species leave their nests and gather in large flocks. Parents returning with food from a fishing expedition can somehow pick out their own young from the crowd.

contrast between boobies and gannets is evidently caused by differences in the availability of food. Gannets, fishing in cold waters rich in oxygen and, therefore, in marine life, can feed their chicks much more abundantly than boobies that forage in oxygen-poor warm seas where food is scarcer. Accordingly, boobies need much more time to rear their young to independence.

Frigatebirds, which often nest on the same small islands with boobies, begin to fly when six or seven months old, then continue to return to the nest site, and to be fed there by their parents, for many additional months, sometimes until they are a year and a half old.

The prolonged parental care of certain terns takes a very different course. Since these terns migrate soon after their young can fly, the nest site cannot serve as a point of rendezvous for parents and dependent offspring. The latter migrate with the adults, and continue to be fed by them far from their birthplace. Off the coast of Peru, in December and January, young royal terns (*Sterna maxima*) six or seven months old, were being fed by adults that were presumably their parents. Bands that some of these juveniles wore proved that they had hatched in the southern United States, thousands of miles away. Among the species known to feed their young while on migration or in their winter homes are the elegant tern (*Sterna elegans*), Sandwich tern (*Sterna sandvicensis*), and common tern (*Sterna hirundo*).

Guiding young to food

With the exception of the Australian magpie-goose (*Anseranas semipalmata*) and screamers (*Anhimidae*), waterfowl do not feed their young from the bill, but most species lead them to feeding areas and protect them. The duration of such guidance is most variable. Many ducks, including the canvasback *(Aythya valisineria),* abandon their ducklings before they can fly, a desertion induced by the onset of the molt, which leaves the parent duck temporarily flightless and in need of seclusion. Ducklings thus prematurely abandoned often gather in large flotillas consisting of several broods of varying ages, all under the leadership of one or more adult ducks, who may or may not have young of their own. In default of adult guidance, the younger ducklings follow older ones; but without experienced adults to lead and protect them, the ducklings are more easily captured by predators.

Among geese and swans, family bonds are more enduring. Young Canada geese *(Branta canadensis)* migrate southward with their parents, stay with them over the winter, often amid large flocks, then in the spring return to the breeding ground with them, after which the family breaks up. Bewick's swans *(Cygnus*

bewickii), which do not breed until four or five years old, may stay with their parents for several years, migrating back and forth with them.

In terrestrial precocial birds, which pick up their own food under parental guidance, we find similar variation in the length of parental care. Shorebirds that nest in the far north must develop rapidly, to be ready to migrate before the brief Arctic summer ends. White-rumped sandpipers (*Calidris fuscicollis*) fly well at 17 days of age and soon thereafter separate from their parent. At lower latitudes, killdeers *(Charadrius vociferus*) may remain with their parents until six weeks old, even while the latter are raising a second brood. Domestic chickens raised in the tropics and roaming free, stay with the hen until she drives them away. Usually she begins to sing, shakes them off, and resumes laying when they are between two and three months old, but rarely she indulges them for nearly four months, roosting in a tree with her large chicks beside or even beneath her. Young ostriches (*Struthio camelus*) follow their parents, a single male and female, one of whom may be a step-parent, for about a year. At the approach of danger, the cryptically colored young crouch motionless, or else the female leads them unobtrusively away, while the father tries to confuse the enemy by means of an elaborate distraction display, much as some little shorebird or wood warbler might do—surely a sight worth seeing!

Turning now to small altricial land birds, we may

White-rumped sandpipers (Calidris fuscicollis) **like this one can fly well at the age of only 17 days. Soon afterward they separate from their parents. Shorebirds that nest in the far north must develop rapidly, to be ready to migrate before the end of the brief Arctic summer.**

Photo by Helen Cruickshank, from National Audubon Society

Puffins like these desert their young before the chicks can leave the burrows where they nest. The nestling may fast in solitude for six to nine days until, at about 49 days of age, it goes off alone to sea.

Photo by Roger Tory Peterson, from National Audubon Society

Photo by Norman Myers, from Bruce Coleman

Young ostriches follow their guardians, a single male and female, for about a year. One of the guardians may actually be the avian version of a step-parent.

This elegant tern (Sterna elegans) **will migrate with its chick and feed it during the long journey or in their winter home.**

Photo by Jen & Des Bartlett, from Bruce Coleman

begin with the hummingbirds. Although we have a few reports of males feeding the nestlings, we are uncertain whether this is habitual in any species. Nearly always the whole task of building the nest, hatching the eggs, and rearing the young falls to the female, who is a devoted parent. The two young rarely fly from the nest until they are three weeks old and often delay a few days more. Then, at least in tropical species, their mother continues to feed them for several weeks. In Costa Rica, a scaly-breasted hummingbird (*Phacochron cuvierii*) was fed until at least 65 days old, a rufous-tailed hummingbird (*Amazilia tzacatl*) until 58 days, and a band-tailed barbthroat (*Threnetes ruckeri*) up to the age of at least 56 days. Juvenile hummingbirds do not follow their darting mother as she collects food but wait in a definite spot, to which she returns to regurgitate to them the nectar, tiny insects, and spiders that she has gathered.

For their size, young woodpeckers remain long in the relative safety of the nest cavities that their parents have carved into dead or sometimes living trees. In northern United States, Canada, and Europe, they leave the nest, able to fly well, when they are three or four weeks old, and are fed by their parents for two or three weeks more. In warmer regions, permanently resident woodpeckers attend their young much longer. In Costa Rica, a male golden-naped woodpecker *(Tripsurus chrysauchen)* fed a 94-day-old son, who had been flying around for two months and was well able to feed himself. In this species, the young continue to sleep with both parents in the nest hole or some replacement cavity for nearly a year, leaving only as the following breeding season begins. Even more indulgent are the red-cockaded woodpeckers *(Dendrocopos borealis)* in Florida, who feed their young up to the age of five or six months. How long parental feeding continues depends not only upon the young birds' need but also upon the sociability of the species.

At middle latitudes, small songbirds of many kinds become independent of their parents when from 25 to

35 days old, only two or three weeks after they leave the nest. Second or last broods tend to receive slightly more prolonged care then first broods, which are often neglected as their parents turn their attention to another set of eggs. Or the father may continue to give them some food while his mate builds a new nest and lays again. Permanently resident birds often care for their young substantially longer than related migratory birds, a difference that has been noticed even in a single species. In northern Washington, migratory white-crowned sparrows *(Zonotrichia leucophrys)* were fed up to the age of about 25 days, whereas in central California resident white-crowned sparrows received food from their parents about 10 days longer.

Climate affects care of young

In tropical Africa and Central America, several kinds of resident finches, wood warblers, and thrushes fed their young until they were 50 to 65 days old, or about twice as long as members of these families do in regions where a severe winter causes migration or irregular wandering. In the tropical rain forest of Sarawak, northern Borneo, a number of bulbuls, tree babblers, flycatchers, and drongos were found feeding their young for surprisingly long intervals, up to 10 or even 23 weeks after they left the nest. Conforming to the general trend in the animal kingdom, constantly resident birds of warm climates raise fewer young, and take better care of them, than do birds of higher latitudes, which in a shorter breeding season must produce numerous progency to compensate for losses on migration or during winter's dearth.

In an increasing number of birds of warm climates, bird watchers are gathering evidence that, even after they become fully self-supporting, young birds remain with their elders, profiting by their experience in finding food, selecting safe roosts, and avoiding enemies, and, when a year or more old, helping to attend the adults' brood, probably most often their younger brothers and sisters. This practice of helping at the nests of older birds, whose broods are usually small, seems still further to increase the safety of the young birds; but they may leave fewer descendants than they might do if they started to reproduce when only about a year old. In tropical regions where losses of eggs and nestlings are extremely high but the mortality of flying birds relatively low, the stability of the population will be promoted by increasing the security of the adults and sub-adults rather than by laying many eggs; whereas at higher latitudes, where nest losses are lower but the mortality of grown birds inevitably much greater, the perpetuation of the species is best promoted by rearing large broods. In *Animal Kingdom* for May-June 1954, I told about some of these "helpers at the nest" among tropical birds, but many additional examples have been discovered since that date.