

A Remarkably Designed Bird

Most humans are landlubbers at heart, and those who do spend time at sea, do so in the relative safety of a water craft. But seabirds spend most of their lives far out in the open oceans. They are able to keep themselves away from the dangers of weather and predators, locate fish, feed, rest and sleep. Puffins, for example spend about eight months at sea. In the DNA of these birds reside remarkable features of design, both in physical construction and the instinct which has been programmed to control their behaviour.

During fishing the puffin dives as deep as 200 feet. This ability alone depends on several adaptations. Unlike most birds, puffins have solid wing bones to assist submergence. Despite the resulting extra weight and their stubby body shape, they make excellent flyers - especially in a good stiff breeze. While most of us enjoy a quiet and motionless night's sleep in a cosy bed, these birds rest and sleep on heaving seas in whistling winds. Their black top and white lower part provide effective camouflage while sitting on the sea. So to a predator looking up, the white colouring blends with the light sky. To a flying predator from above, the black features blend with the dark water.

Normally the birds swallow the fish as soon as they catch them underwater, and this avoids robber species of birds from stealing their catch. But drinking some of the seawater is unavoidable while eating underwater. The salt would be detrimental to its health, but the bird has a gland which extracts the salt and removes it from its body. The gland is located just above the eyes and surrounds a capillary bed in the head which constantly strains out the salt in the saltwater that the bird takes in. It removes sodium chloride from the blood far more efficiently than the kidney and excretes it as brine through a duct into the nasal cavity. The brine is discharged from the nostrils or mouth during occasionally quick shakes of the head.

In early spring the birds leave the open sea for the breeding grounds, pairing off and mating while still off-shore. They then fly towards shore in formation with other puffins in a manner which confuses predators. On landing, the pair look for a likely nesting-place. It may be an old burrow, or a crevice among rocks and boulders. The birds have some built-in tools, using their bills as pickaxes and their feet as shovels to either clear out an old burrow or to dig a new one. Both parents develop bare hot-spots under each wing, and they take turns incubating the single egg while the other gets out for some exercise.

On the beak of the unborn chick is a little yellow tooth for breaking out of the shell. When a chick becomes too large to absorb oxygen through the pores of its eggshell, it uses its egg tooth to peck a hole in the air sac located at the flat end of the egg. This sac provides a few hours' worth of air, during which the chick breaks through the eggshell to the outside. The process of breaking open the eggshell is called pipping. Chicks have a pipping muscle on the back of their necks. It is this muscle which gives them the strength to force the egg tooth through the inner membrane of the eggshell. The egg tooth falls off several days after hatching.

The upper and lower mandibles are designed to come together in a parallel fashion to exert equal pressure along the whole length of the bill. On the roof of the mouth are some backward slanting spines, which also come into play while the bird is feeding the young. Having caught a fish, a puffin is able to clamp it to the roof of its beak with its tongue and then open its bill again to catch the next item of prey. In this way each parent need only make a couple or more trips with its beak-full of little fish to feed the chick more than its own body weight each day.

After about the fortieth day the parents leave for the sea and never return. A week later, the chick leaves its burrow under cover of darkness, quickly walks with no hesitation over the cliff. It swims away from shore, diving from time to time to avoid predators, as it moves further out. The youngster remains alone heading towards the open sea learning fishing and flying, growing towards full maturity through summer, autumn and winter.

In early spring it will find its way back to its place of birth. It hasn't learned the way from its parents who had left the week before. Scientists have been investigating bird migration for a long time, and are beginning to find undreamt of features in the physical and genetic structure of these birds. *"God made the earth by his power; he founded the world by his wisdom and stretched out the heavens by his understanding" - Jeremiah 10:12.*