



Part of a column of Gannets circling in a standing wave. Birds marked with circles are gliding back from the column to the rock.

Gulls which, having a lower wing-loading, get higher than the Gannets, Fulmars also use it.

I watched many individual birds, following them all the way up. I saw one bird glide in to the Rock when it could get no higher, it then slope-soared along the edge of the cliff and glided out again to the base of the column. It spiralled to the top with five circles and then glided in again. Unfortunately I lost sight of it as it was entering the column for the fifth time, so I was unable to see how long it continued.

Later on I saw a party of seven birds flying-in low over the water, returning from a fishing trip. Three broke away from the others when they were about a mile away and flew to the column. I followed one, which mounted effortlessly to the top and then glided in and landed at its nest.

In fact the Gannets use the standing wave as a convenient lift, and their flying in and out of it shows that they definitely fly for pleasure.

We see therefore that the Gannet is an expert at slope-soaring, dynamic soaring and soaring in standing waves. The only other method open to it is soaring in thermals, and if there were thermals at sea they would use them too, no doubt. A careful watch late on a clear evening after a hot summer day might well reveal Gannets soaring in this way too.

Diving

I have left to the last the Gannet's dive, its most amazing aerobic feat. It flies at a height of up to 100

feet, or even more, circling and looking downwards. As soon as it sees a fish it dives head long and enters the water head-first like an arrow. A few second later it bobs up to the surface, the fish having been swallowed under water, and resumes its patrol.

The dive normally starts with a half-roll and the bird may continue to rotate on the way down. During the dive the wings are spread, although they may be angled back a bit. The bird uses them for steering especially if the dive is not quite vertical. The speed attained is very great, for measurements of the positions of diving birds on consecutive frames of a cine film have shown me that the bird is travelling at more than 60 mph when it hits the water. Slow-motion photography has shown that the wings are brought back, fully stretched at the last instant before the bird hits the water so that the wing-tips, beyond the tail, are the last part to submerge.

The force of the impact of the water on the bird must be considerable and there are various anatomical modifications which may lessen its effect. Large air-sacs cover the bird's breast, just below the skin, and may help to cushion the blow. The Gannet has no nostrils and so water cannot be forced-in that way. The eyes are protected by a nictitating membrane or 'third eyelid' which is quite transparent. If you catch a Gannet and duck its head below water this eyelid moves across just before the eye meets the water. Then while in this position a mark may be made on it with an indelible pencil, and it can be seen to move back when the eye emerges again. It is reasonable to suppose that the membrane protects