

THE NESTING HABITS OF ADÉLIE  
PENGUINS (*PYGOSCELIS ADELIAE*).

WHEN they arrive at the southern rookeries in the early spring, the penguins appear to be quite unattached, and pairing takes place during the ensuing week or two. As they spend the winter on the floating pack ice, far out to the northward, they have a journey of some hundreds of miles to get to their rookeries, and are therefore much fatigued on arrival. Consequently, many are seen to spend their first day or so in resting, either on the sea ice, or on the solid ground on which the rookery is formed.

The hens betake themselves either to old nests, or else scrape little scoops in the ground, which they previously thaw by squatting on it for a

preliminary squabbling, two of the band are seen to settle down to a serious encounter (Fig. 1), in which each uses his weight, leaning his breast against his opponent, so that as one begins to outlast the other the weaker bird gets rushed out of the crowd, and the fight ends on some open patch of snow, when the victor has his enemy down, and hammers him until he cannot rise or beats a retreat.

After this the conqueror returns to the hen, and as likely as not fights another of the band. Thus hours may be spent over the winning of a single hen. At length there seems to be an agreement that one of the knights has established his right to the lady. As a rule, it is the strongest and cleverest fighter of the group; but, curiously, this is not always so, as sometimes the bird who

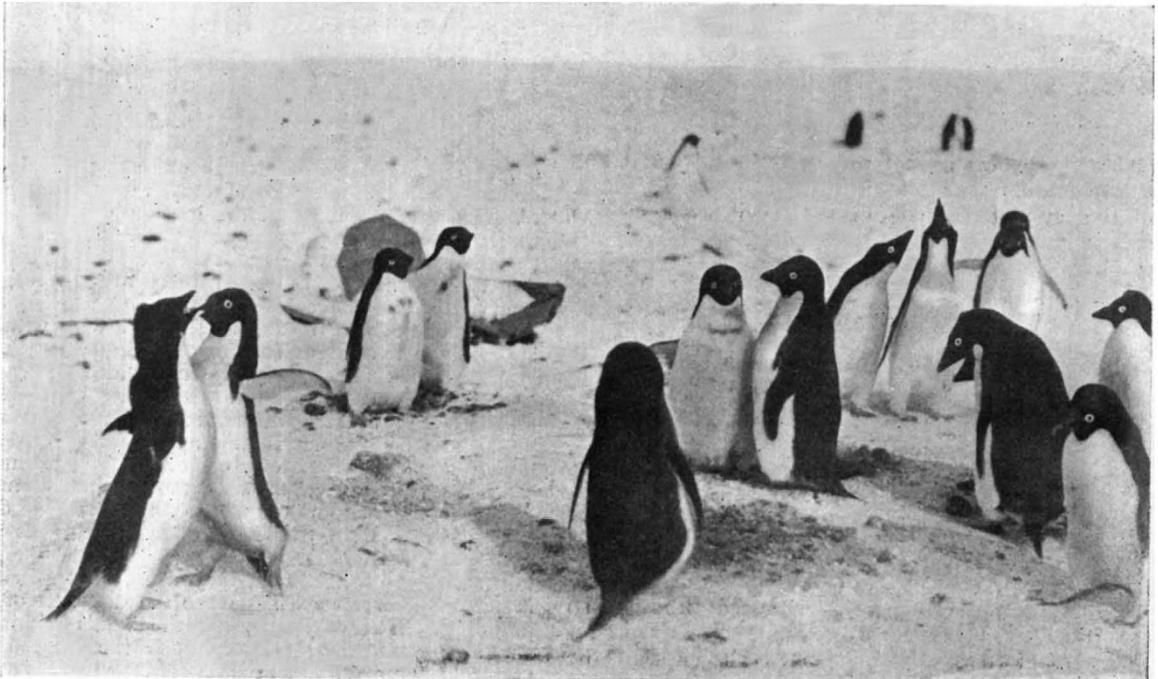


FIG. 1.—Two of the band in serious encounter.

short time. They sit in these scoops, and wait until mates come to them. Were they not very jealous of one another, the cocks might easily get mated and start domestic life without any trouble. Unfortunately, however, the jealousy which characterises the animal kingdom in general when engaged in matrimony, is ingrained in the character of the Adélie cock in its most violent form, so that bands of these little warriors are to be seen all over the rookery, watching each other's every movement, and hindering one another in their quest for wives. As soon as one of their number approaches a hen, one or more of his companions sails in at him, and a desperate battle takes place, each bird raining in blows with his powerful "flippers," and fighting with the most indomitable bravery. As a rule, after some

has undoubtedly proved himself the victor suddenly walks off, and by general consent his vanquished opponent is left in possession of the field.

His troubles are not yet ended, as the hen has yet to make up her mind that she will have him. His first overture very often takes the form of an offering in the shape of a pebble for the nest. This he lays in front of her, and it may suffice; but often it does not, and she responds by pecking him furiously, whilst he hunches himself up, with closed eyes, making not the least resistance nor any attempt to evade the onslaught.

When she desists, he rises and sidles up to her, arching his neck and looking very pretty and graceful in his efforts to ingratiate himself. Then perhaps both have some sort of argument, facing one another, their heads stretched upwards

and rocking from side to side as they appear to discuss the matter in raucous tones. Gradually they become calmer, until finally the matter is

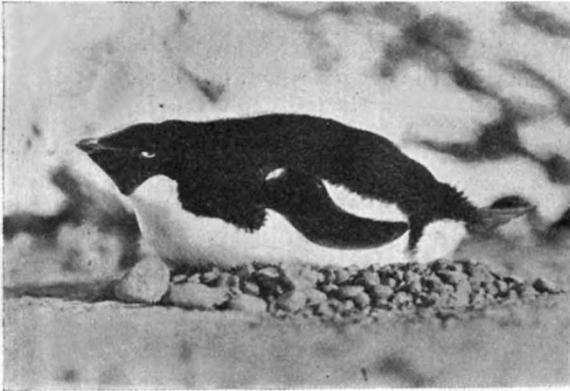


FIG. 2.—An Adélie penguin sitting on eggs.

settled and they have pledged their faith for the rest of the season.

Once made the compact is final, and though unhappily, death from misadventure breaks up many a home, those that survive remain unswervingly faithful to one another. Overtures are frequently made by unmated cocks to mated hens during the early part of the year, before the eggs have come, but the husband takes good care of his wife, and soon drives off the interloper.

The pair being wedded, the cock fetches stones for the nest, which the hen builds. A week or so elapses and the first egg is laid. In two or three days' time the second appears. Up to this time none of the birds attempt to get food, but when the eggs are both laid one of the pair goes off to the nearest open water, and may remain away a week or ten days, after which it returns and takes its turn on the eggs (Fig. 2), whilst the other goes off for a similar period to catch the little shrimp-like crustacea that abound in the Antarctic seas, and to gambol with groups of neighbours in the water and on the sea ice.

The eggs take about thirty-two days to incubate, and at the end of this time the little plush-coated chicks appear all over the rookery. These grow at a great rate, eating voraciously. Some idea of their rapid growth may be got from the photograph showing a chick twelve days old (Fig. 3).

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Now the adult birds are extremely fond of playing games, and spend whole days in playfully skirmishing with one another on the sea-ice near the rookery, and having rides on the ice floes that drift past on the tide. Consequently, the needs of the youngsters becoming greater as they grow bigger, when these are about a fortnight old an ingenious social arrangement is made by the entire rookery, resulting in a great economy of labour. Hitherto, the greatest care has been taken by the parents to prevent the chicks from straying away from the nests, because when they do so they are invariably pounced upon by the skua gulls which are always in attendance to prey upon them, and should the chicks seek the protection of neighbours the latter would only drive them away with savage pecks which might prove mortal to the tender youngsters.

Now, however, by mutual consent all this is changed, and the occupants of large groups of nests (Fig. 4) pool their chicks so as to form *crèches*, sometimes consisting of many dozens of youngsters, which are guarded by a few old birds who take turns to remain on duty whilst the rest are free to go off to get food and to play. The sentry birds take good care of the *crèches* under their

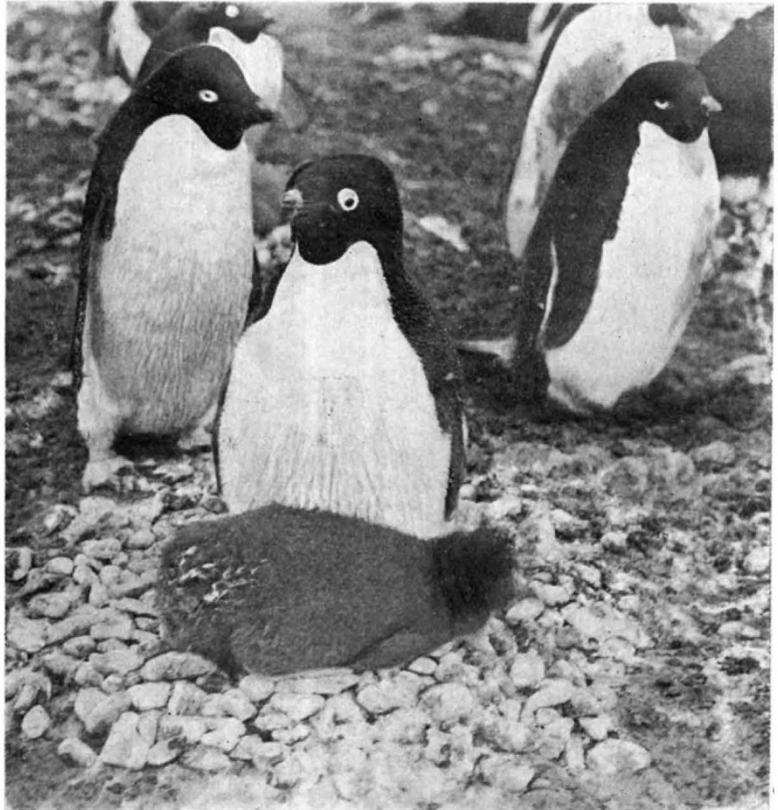


FIG. 3.—A chick twelve days old.

charge, and soon drive in any of the chicks that try to get away, so that these learn to keep in a cluster and are safe from the attacks of the skuas.

Surely this is a most wonderful development of social instinct on the part of a colony of birds.

When the chicks have changed their downy coats for a covering of feathers, it is time for both young and old to depart. The sun will soon be gone, the sea be frozen over, and the long Antarctic night begun. So the youngsters make their way to the water's edge, and here they learn to swim and to catch their own food. Some take to the water at once; others are more tardy, and these are encouraged to enter the new element by the old birds, who take pains to show them that they are as safe here as on land. Then in bands of some dozens at a time, the whole rookery takes to the sea and departs for the north, where the floating pack ice of the Antarctic seas affords

Stable aeroplanes have been built before; Lieut. Dunne, Mr. Handley Page, and others, have produced aeroplanes which are inherently stable, and yet the RE 1, from a theoretical point of view, has an importance of a different character from its predecessors. If the older machines be examined they will be found to possess marked peculiarities in their wing construction, and in some cases have been clearly produced as the result of the study of natural wing forms. In all cases, however, the design is primarily based on the requirements for stability, and the strength of construction is a matter for important but secondary consideration.

On the other hand, as was remarked in a recent number of one of the technical flight periodicals,

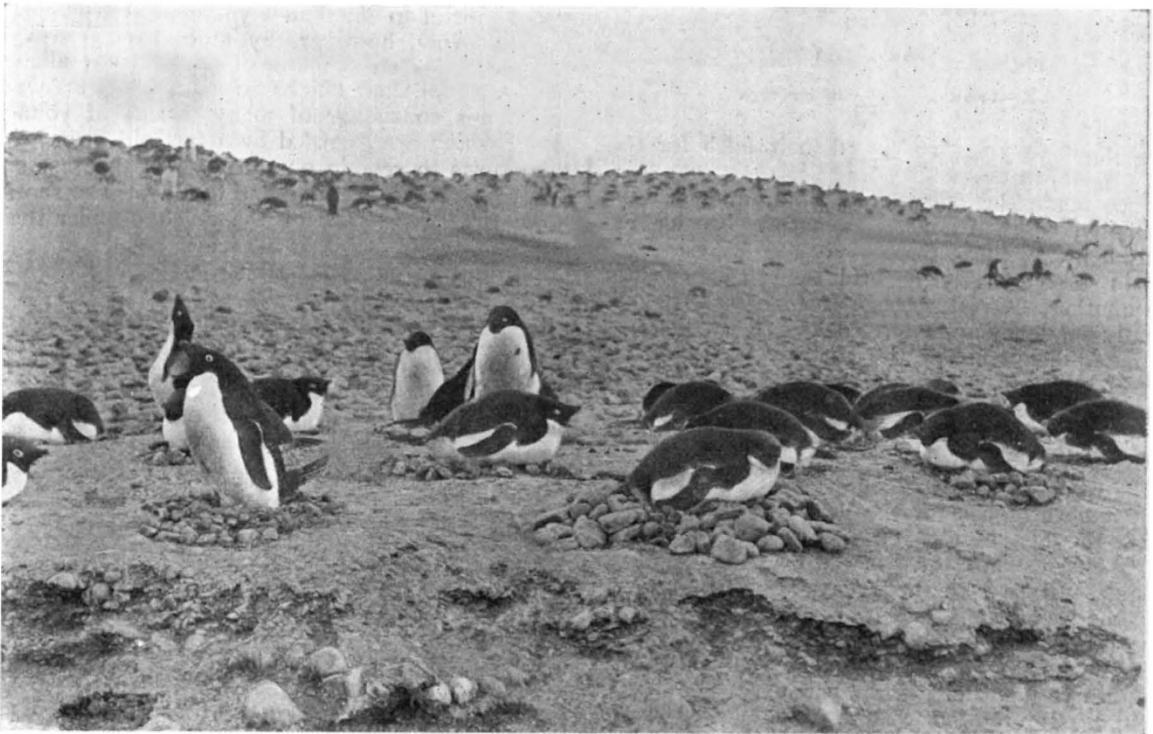


FIG. 4.—A group of nests.

them a safe home and the proximity of open water from which they must derive their food.

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#### RECENT PROGRESS IN AERONAUTICAL SCIENCE.

TWO lectures delivered recently have directed attention to striking progress in the development of aeronautical science. Simultaneously with these lectures, the "Wilbur Wright" lecture by Dr. R. T. Glazebrook, and the "James Forrest" lecture by Mr. F. W. Lanchester, results are published of experiments on an inherently stable aeroplane, the RE 1, constructed at the Royal Aircraft Factory. The two lectures and the flying machine are not wholly unconnected with each other.

the absence of special stability features in the RE 1 is striking. Superficially, the aeroplane differs little from standard biplanes designed chiefly for strength and efficiency, and the procedure followed in its production was a complete reversal of that leading to the older stable machines. It is shown clearly that neither ease nor strength of construction nor efficiency need be sacrificed in order to obtain a stable aeroplane.

Like many other achievements, the RE 1 is not the sole production of any one person. The credit for some of the earlier links in the chain must go to those early mathematicians—Lagrange, Kelvin, Routh, etc.—who put the theory of the small oscillations about a state of steady motion on to a sound and regular footing. Later, the method has been applied to the particular problem of the aeroplane by Prof. Bryan, whilst, at the same