Bird-Ringing in Southern Africa

BY M. K. ROWAN

This article was written at the request of the Council of the South African Ornithological Society and the Editor of BOKMAKIERIE, *but the views expressed are those of the author.*

Adult birds of many species are able to identify their own mates and often others of their kind; but any one swallow (or sparrow, or barbet, etc.) is so like another to the human eye that we cannot distinguish between them without artificial aids. Men have probably been using such aids — tags and labels of various sorts — ever since the falconers developed their art; and probably the earliest authentic records of marking birds for individual recognition date back to the days of Marco Polo in the 13th century. However, large-scale systematic marking for study purposes is only about 70 years old. The "father" of the modern method, which uses serially numbered metal bands fitted to the legs of birds, was Christian Mortensen of Denmark, who began his experiments in 1899. Other investigators in Europe were quick to follow his lead, and by the outbreak of the First World War seven states besides Denmark had active bird-ringing schemes: Germany, Hungary, Britain, Yugoslavia, Holland, Sweden and Norway, in that chronological order.

Elsewhere, however, ornithologists were slower to adopt Mortensen's idea. Nothing was done in North America, for instance, until the 1920's; and nothing this side of the equator until 1947/8, when Tasmania, New Zealand and South Africa became the first territories in the southern hemisphere to initiate ringing schemes. The organization responsible for the innovation in our country was the S.A.O.S., and the first mention of the matter that I can find in our records is a memorandum on ringing prepared by Dr. Austin Roberts for consideration at the 16th Annual General Meeting (*Ostrich,* June 1946). During 1948 the Society started distributing rings, and at the end of June 1950, two years after the scheme was fairly launched, Dr. Hugh Ashton, the Ringing Organiser, prepared his first report on progress.

It is an interesting document, recalling for me personally one of the more exciting chapters of my life, since Dr. Ashton writes of his rings that "their geographical distribution has been wide and fairly even, from the Cape to Uganda, not forgetting Mrs. Rowan away on Tristan da Cunha". In those early years, when many members of present ringing teams were still in swaddling clothes (or, at most, in school uniforms), we still thought of ringing in much the same terms as its originator had done. Our main purpose was to trace the migratory or nomadic movements of the species we banded; and this remains an important object today. In fact, for many amateur workers it is the sole one. They are prepared to spend endless hours marking *hundreds* of birds in the hope that just *one* may be recovered on passage or at its ultimate destination.

In fact, experience has shown that work on any lesser scale is unlikely to have useful results, for the recovery rate is very low. For instance, we must ring over 300 European Swallows before we can expect a single return. For a species like the Little Stint, with remote breeding grounds in Siberia, the figure rises to 2,000. Return rates vary partly with size and conspicuousness of the bird, but only amongst the larger species like ducks, geese and vultures, which are regularly hunted and shot, can we hope for as many as three or four recoveries for every 100 ringed. (For further figures, see McLachlan, Proc. 2nd P.A.O.C., *Ostrich,* Suppl. 6, 1966.)

For those who may think this disappointing, let me hasten to add that the South African ringing scheme is not unique. The denser the human population and the higher the general level of education, the greater the number of returns that may normally be expected. But, even in Europe, the ringing of many species is remarkably unrewarding. As an example, Vogelwarte Heligoland in Germany announced a few years ago that, out of 16,200 Garden Warblers ringed by them up to 1959, only 16 had ever been recovered. Nevertheless, for the dedicated bird-bander, the thrill of a single long-distance return is ample reward for long, hard hours in the field.

THE OBJECTS OF RINGING

To the scientist, however, the tracing movements is no longer the only (or even the most important) object of ringing. In the last few decades it has dawned on biologists that the marking of animals for individual recognition opens up new worlds to explore. Unfortunately, many vertebrates are difficult to mark at all, much less in adequate numbers. Fish, for instance, are handicapped by external labels, liable to interfere with their natural streamlining. Many small mammals are unrewarding because they are purely noctural, while the big-game animals of Africa present problems in catching and handling that are enormous in more senses than one.

Birds, on the other hand, are well suited to carrying our tags. Most are diurnal creatures like ourselves, and they wear our rings conspicuously, so that their marked status is readily perceived. They are more easily caught in large numbers than most other wild animals, and can be handled, banded and released without harm to themselves. Thus, it is up to ornithology to develop the potential of this young technique, and to use it to uncover new biological truths.

Perhaps the most obvious development of marking animals is that life cycles can now be studied in greater depth than ever before. We can see whether avian marriages endure from year to year. We can detect divorce, adultery, bigamy and allied sins within the world of birds (all occur!). We can determine whether the same individuals use the same nests or roosts in successive seasons. We can discover how many broods a single pair is likely to bring off in one year. And we can study the homing ability of both nomadic and sedentary species.

All this can be achieved by the use of numbered aluminium bands alone, but the work is much simplified if the worker adds a few plastic rings, using a different combination or arrangement of colours for each bird. In this way he ensures recognition of every member of his marked community *on sight,* and avoids the need for intermittent recapturing of the birds to read their serial numbers.

LIFESPANS OF BIRDS

Another valuable contribution that ringing makes to biological research is in the information it provides on lifespans in the wild. The data are of two sorts. Firstly, when birds ringed as nestlings or juveniles are found dead (or recaptured alive), we have a direct measure of the length of time they have survived. The maximum periods recorded for some species are quite astonishing. The little Cliff Swallow, as an instance, may live as long as the average pet dog or cat, since the Witwatersrand Bird Club has discovered banded individuals still breeding in their eleventh and twelfth years. Probably the record is held by a European Oystercatcher that was recently "controlled" while nesting on the island of its birth (Mellum, North Germany) at the age of 36 years.

However, these grandfathers are exceptional, and their data of limited value. Although they reveal the *potential* longevity of a species in nature, they tell us nothing of the *mean* survival rate, which is the more important figure, as it is known that few wild animals ever live as long as they might. Average life expectancy is thus the second and most significant variable that we wish to measure. Fortunately, ringing can help us once again, though not immediately or directly. To derive the figure, we need many thousands of ringed birds, many hundreds of returns, and an assurance that the recovery rate has not altered substantially during the years that the records have accumulated. Thereafter, life tables can be constructed, and from them mean survival and mortality rates for the species can be determined.

NUMERICAL INDEX

Another important figure that can be obtained indirectly from ringing results is a measurement of total numbers. This depends on something known as the "Lincoln Index" or "capture-recapture" technique, and again requires consistent methods of marking and recapture. In its simplest form, it involves counting the birds caught and marked at one time, and then noting the ratio of marked to unmarked individuals captured at the same place at a later date. Various refinements, mathematical or otherwise, may be introduced, and a formula is then applied to the results to compute the total numbers present. The method has several shortcomings, but there are a good many species whose density cannot be satisfactorily measured in any other way.

POPULATION DYNAMICS

The special uses of ringing, discussed above, have made it an invaluable technique in the study of population dynamics. This branch of biology is concerned with what Dr. Lack has described as "the natural regulation of animal numbers". It is clear that such regulation must exist, because undisturbed populations of wild animals remain remarkably stable, fluctuating narrowly about a mean value; and they do not multiply as their natural rates of increase would theoretically allow.

Every so often, however, a population or a whole species "escapes" these natural restraints, and its numbers build up. This may result simply in an extension of range, as has occurred with the Cattle Egret in this century; or it may produce greater densities in agricultural areas, in which case the "exploding" species may emerge as a pest. The Mossie in Cape vineyards provides an example. Conversely, numbers may steadily decline until the animal reaches the verge of extinction. Something of the sort may be happening to the Bald Ibis and Ground Hornbill in South Africa.

Little is known of the factors involved, either in maintaining the stability of most undisturbed communities, or in the occasional population explosion or extinction. Clearly, however, the vital factors must have to do with the variables discussed above. In particular, the birth rate (most accurately measured in colour-marked populations) and the death rate (as derived from ringing returns) are important. So also is an assessment of total numbers per unit area, while the extent to which density may be modified by local movements is best studied by observation of ringed birds. In fact, to grasp the answers to population problems, we need an understanding of how animals disperse, breed and die in the sort of detail that can only be obtained by marking them individually.

The study is not only of great interest to academic biologists; it also has far-reaching practical implications. For instance, if we would formulate sound nature conservation policies, we need some knowledge of the population dynamics of the species to be conserved. Or, if we would develop the harvesting of undomesticated mammals and birds for human food ("game-farming"), we must have sufficient information on birth and death rates and the age structure of the population to determine what fraction can safely be culled, without depleting the stock.

In pest control an understanding of the natural factors regulating numbers is essential. Formerly agriculturalists aimed at total extermination of troublesome animals, and many hoped that the powerful new organic pesticides, developed in such quantity and variety since the war, might help to achieve it. However, we now realize that we set our sights too high. Despite extensive, expensive and apparently lethal measures employed against pests for the past three decades and more, none have been annihilated. On the contrary, many have developed a remarkable degree of resistance to the poisons designed to destroy them; and thus the older approach to pest control merely commits us to increasing expenditure on costly chemicals and increasing intoxication of our own environment.

The alternative is to learn to work with Nature, instead of against her. In general, animals become pests only in areas changed by the hand of man. Thus, our aim should be to discover the factors that limit their numbers in the wild, and apply our knowledge in farmland, village and town. Perhaps we will never be able to do without poisons altogether, but we could hope to restrict the extent to

which they contaminate the countryside. With closer understanding of the population dynamics of pest species, we could use chemicals only at those points in the life cycle where the animal is most vulnerable to attack. Then, once the pest population is reduced to tolerable densities, we can hope to exploit — and perhaps rely on — natural mechanisms for holding its numbers in check.

FINANCE AND ADMINISTRATION

There is thus a vast field for research, for human betterment and for improved nature conservation in which ringing has become an invaluable technique. Because of its importance, the S.A.O.S. is anxious to encourage and extend the work; and, to this end, we try to finance it so that the cost of rings and record-keeping need not be a charge on the pockets of the private individuals who participate. However, most of the people ringing birds in South Africa today are amateurs, whose chief interest is in the returns they get. They want to discover where the ringed bird went. On the other hand, the money which supports their hobby comes from scientific sources, specifically the S.A. Council for Scientific and Industrial Research. This body, in its turn, has no special interest in bird movements as such, but makes its annual award on the basis of the great potential ringing holds for the wider spheres of biological research.

There is thus a difference in approach between field workers and sponsor, and a diversity of objects which the S.A.O.S. Council must try to reconcile. The task is not an easy one, but fortunately the C.S.I.R. has proved patient and understanding, and they have recently made a most substantial increase in the size of their annual grant, which indicates that they are satisfied with the way the scheme is developing.

THE RINGING ADDRESS

Field workers, on the other hand, tend to be highly critical of the administration of ringing, and the S.A.O.S. Council receives scant sympathy at their hands! Their complaints are many and varied, but perhaps the most typical (certainly the most persistent) is the argument about the ringing address.

Ever since the inception of the scheme, our rings have been inscribed "Notify Zoo Pretoria", and the Society is much indebted to this institution for 19 years of voluntary service in receiving and forwarding recoveries. However, from time to time the suitability of the Zoo address has been questioned. At first it was an academic problem, because no other institution was willing to serve, but recently "CSIR" has been strongly advocated as an alternative. The main argument against the Zoo is that many members of the public feel reluctant to report a recovery, especially when they have caused the ringed bird's death, because they believe it to have *escaped from* the Zoo and fear to be held responsible. This is said to apply particularly to game birds, such as ducks and geese, and especially if a hunter has been shooting out of season.

The complainants allege that this factor severely depresses the number of returns; and, if they are correct, the recovery rates for wildfowl should be exceptionally low. However, the returns for ducks and geese are amongst the best we have. We can, for instance, expect to recover 50 Egyptian Geese for every 1,000 ringed, and 27 Redbilled Teal. By contrast, the Cattle Egret, large and conspicuous though it is, has produced only 7 returns for 1,000, probably because it is not normally a target for sportsmen.

Thus, although some farmers have confessed to being afraid to notify the Zoo of shooting a ringed bird, it is almost certainly to hunters that we owe the substantial number of wildfowl recoveries, and the great majority of them must be pretty faithful in making their returns. With time and patience, we may hope to educate the few fearful ones to a more co-operative approach — and education is surely the key factor, since anyone who is scared of the Zoo authorities is likely to be no less alarmed at killing a bird that "belongs" to the C.S.I.R.

There is another type of psychological reaction involved in this controversy, as many people who send in rings say that they have done so specifically because they were intrigued by the address. The Ringing Organizer considers that the gains resulting from this reaction more than offset any losses to persons suffering from feelings of guilt. Also, it must not be forgotten that many of our most interesting recoveries come from abroad, and it would be absurd to suggest that peasants in Siberia or Africans in the Sudan failed to return our rings for fear of reprisals from the Zoo. On the contrary, the address is a simple one, easily comprehended by simple people, and thus seems more likely to evoke a response than the mysterious letters "CSIR".

However, a matter as important as this should not be argued solely on subjective interpretations of the way the public reacts. What we need is good hard evidence, one way or another, and it should not be difficult to get. From time to time I have pointed out to advocates of a new address that millions of queleas are slaughtered annually in the Transvaal, the Orange Free State and Rhodesia; and I have suggested that, say, 2,000 of these corpses might be collected and marked: half with the Zoo address, and half with any other address that appeals. The dead birds should then be scattered at random in suitable areas and the number of recoveries for the two addresses statistically compared.

Thus challenged, some of the "new-addressers" have beaten a retreat, saying that they cannot muster the manpower and facilities that would be required. Yet I notice that they can mobilize the resources to ring, not 2,000 but tens of 1,000's of living swallows in a single season — a far more difficult feat! Other proponents of a new address have greeted my suggestion with limited interest, but there seems to be no real enthusiasm for trying to prove their point.

Lately another criticism of the Zoo has been advanced. There is some evidence, it appears, indicating that sometimes recovered rings are delayed in the Zoo offices, or not forwarded to the Ringing Organizer at all, perhaps because a junior official has been careless or ignorant of the requirements. Unfortunately, this sort of thing seems bound to happen from time to time. No system can be any better than the people working it and, whatever our address, we would always have to contend with human fallibility.

In fact, human fallibility within our *own* ranks constitutes what is probably the greatest single problem in the South African ringing scheme today. By far the greatest number of "lost returns" are lost, not at the Zoo, but through shortcomings in S.A.O.S. operations. The cycle starts with the field worker. His first duty on fitting a ring to a bird is to prepare an original ringing record in duplicate. He must state his own name, the bird's, its sex and age (if possible), the ring number, the date and the place. The completed forms are then forwarded to the branch organizer, who keeps one copy and sends the other to the Society's ringing office.

Theoretically, this provides us with full information on every bird that is ringed, but unfortunately, in practice, there are all too often weak links along the chain. Maybe the ringer fails to complete his forms as he should, or simply forgets to send them in. Perhaps the branch organizer mislays data submitted to him, or losses may occur in the central ringing office. It is equally possible that batches of forms miscarry in the post. Through one or more of these factors many entries fail to reach the central files, which are lamentably incomplete.

Thus, year after year, the Zoo forwards numbers of recoveries which are valueless, because no original ringing data exists. The scale on which this occurs is not generally appreciated; but, as we know what the average return rate is (one bird for every 125 ringed), we can calculate the extent of our losses through human fallibility. For instance, Dr. McLachlan recently reported (Proc. 2nd P.A.O.C.) that during the first ten years of ringing in this country there were approximately 100 untraceable recoveries, representing 12,500 ringed birds for which he had no prime entries.

One might expect improvement with experience, but unfortunately the same errors and difficulties still bedevil our work. At the moment there are about 60 "lost returns" on file, and an intensive effort is being made to trace the missing entries, but it is a difficult and time-consuming task. Virtually every ringing centre in the country has its "lost returns", and from one branch alone there are eleven currently untraceable recoveries from rings issued to them since 1962. This means that, during the past five years, that branch must have banded something like 1,400 birds for which no original entries are available on the central files.

Thus, while ringers complain that the Zoo address depresses the recovery rate, evidence accumulates that the adverse effects of deficiencies in our own work are as bad or worse, leaving us with one recovery out of every 15 that is valueless for want of the original data. Thus, if we want more returns, our first step should surely be to set our own house in order, for no change of address will correct shortcomings within the S.A.O.S. system.

However, the main argument against a change of address has still to be stated. It lies in the importance, emphasized earlier, of maintaining a reasonably consistent ratio between birds ringed and recovered if the results are to be used to elucidate population problems. At the moment, without any experimental evidence of the sort that might be obtained from the suggested test with queleas, all we can say is that a new address COULD alter the recovery rate, either up or down; but, if we have to rely on the results of ordinary ringing operations, it will be several years before we can judge what effect a new address has had.

Meanwhile, examination of the ringing data available today suggests that returns for a few species

(Continued on page 50, column 2)

English Names

(See also enclosure with this issue)

After considerable preliminary work by the Society's Vernacular Names Committee (Mr. C. J. Skead, Professor G. J. Broekhuysen and Mr. P. le S. Milstein) all names which were not the same in all of their recommendations, the revised *Roberts Birds of South Africa;* Smithers, Irwin and Paterson's *Check List of the Birds of Southern Rhodesia;* and Mackworth-Praed and Grant's *Birds of East and North East Africa* were submitted to that Committee (Mr. Skead, who had resigned, excepted), the S.A.O.S. List Committee, the R.O.S. English Names Committee and the revisers of *Roberts.* The names in the revised *Roberts* have now been accepted as the official English names by the Council of the South African Ornithological Society with the exceptions contained in Lists A and B..

LIST A contains names which the majority of the referees considered should be used in place of the names currently used in *Roberts.*

LIST B printed on a loose sheet included with this issue of the journal. It comprises alternative names for species on which the referees were so divided as to provide no clear directive. YOU are invited to indicate your choice in each case by underlining the preferred name and sending the completed list to the Society's Honorary Secretary, Percy FitzPatrick Institute of African Ornithology, University of Cape Town, Rondebosch, C.P., before 31 August, 1967.

LIST A

Changed from "Roberts":

6. DABCHICK, not Cape Dabchick.
15. ANTARCTIC FULMAR, not Silver-grey Fulmar.
21. BROAD-BILLED PRION, not Whale-Bird.
32. WILSON'S STORM PETREL, not Wilson's Petrel.
58. GREAT WHITE EGRET, not Great White Heron.
65. RUFOUS-BELLIED HERON, not Rufus Heron.
85. AFRICAN SPOONBILL, not Spoonbill.
90. SOUTH AFRICAN SHELDUCK, not African Shelduck.
96. YELLOW-BILLED DUCK, not Yellowbill.
102. SOUTHERN POCHARD, not South African Pochard.
108. LAPPET-FACED VULTURE, not Black Vulture.
113. PEREGRINE, not Peregrine Falcon.
114. LANNER, not Lanner Falcon.
140. AYRES' EAGLE, not Ayres' Hawk Eagle.