# THE AGE OF THE BLACKBIRD*

BY

DAVID LACK

## INTRODUCTION.

THE potential age, the age to which birds can live, has been the subject of several papers, the earlier ones based on records in captivity, *e.g.* Gurney (1899), Mitchell (1911), Flower (1925), and the later ones on ringing returns, *e.g.* Witherby (1926), Nice (1934). A number of small Passerine birds can live ten to fifteen years, in some cases twenty years, some of the larger species of birds can live for twenty to fifty years, and a very few have been credited with living up to eighty years or more.

The average age attained by birds in a wild state is clearly very different from their potential age and has rarely been discussed. Burkitt (1926, 1936) estimated the average age of wild Robins (*Erithacus rubecula melophilus*) to be 2.8 years and of the Rook (*Corvus f. frugilegus*) to be 7-10 years. These estimates were based on assumptions as to the number of surviving young, and, as will be mentioned in a later paper, Burkitt's estimate for the age of the Robin is probably more than double what it should be. Nice (1937) showed that under favourable conditions the average age attained by wild male Song Sparrows (*Melospiza melodia*) was 2½ years and that about 40 per cent. of the adult males died each year. This was based on the returns of all the banded Song Sparrows in an area in Ohio. As Nice points out, a few of the males may have shifted and not died, so her figure for the average age is, if anything, slightly too low. Nice also provides a valuable discussion of the other data on the age of birds.

While the only way in which the average age of wild birds can be fully investigated is by ringing all the individuals in one area over a period of years, as Nice did, the ringing returns of the *British Birds* Marking Scheme provide valuable, if incomplete, information on the same subject. Only a very small percentage of the ringed birds are recovered, so that strictly all that the returns show is the average age of those birds found dead by human beings. But there is no particular reason to think that those adult birds found dead by human beings are on the average either older or younger than the adults in the population as a whole, hence the figures are probably close to those for the population as a whole, though this cannot be considered certain.

While the adults found dead are probably a fair sample

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of the whole population, this does not apply to those found dead in the first two months after leaving the nest. First, an excessively large proportion of such birds probably fall victims to predators, and so die without trace. Secondly, such birds often die close to where ringed, and hence the number found partly depends on whether the ringer revisits the places where he ringed the birds. The returns suggest that some individual ringers revisit ringing localities much more often than do others. Owing to these considerations, the main figures in this paper are calculated not from the day on which the fledgling leaves the nest, but from the first August 1st of life. However, for the sake of completeness, the figures are also calculated from the day of leaving the nest, though these must be regarded as less reliable.

### MATERIAL SELECTED.

The present investigation of Blackbirds (*Turdus m. merula*) was restricted to the returns of all those ringed as nestlings up to and including the year 1934.* Birds ringed after 1934 were omitted, as some of them are still alive. Indeed a few of those ringed before 1935 may still be alive, but the error from this source is extremely small. Birds dying before they left the nest are omitted. All those ringed on the mainland of England, Wales and Scotland are included, but the very few ringed in the Isle of Man, Ireland and the islands off Scotland are omitted.

In Tables I and II the birds are arranged in year-groups between August 1st and July 31st and the recoveries up to the first August 1st are treated separately. The mean date of ringing was the end of the third week in May, hence on August 1st the birds were on the average nine or ten weeks out of the nest.

### PROPORTION OF DEAD BIRDS FOUND.

From 1931 onwards the summaries in *British Birds* record separately the number of birds ringed as nestlings and the number trapped. In the four years 1931 to 1934 a total of 10,539 nestling Blackbirds were ringed, of which 192 have later been found dead, or 1.8 per cent. Of those trapped during the same period some 3½ per cent. have been recovered. That the latter figure is higher than the former is probably due partly to the relatively large number of fledgling Blackbirds which die without trace and partly to the fact that a trapper usually keeps special look-out for dead birds in his district.

*In addition to those ringed under the *British Birds* Marking Scheme, Dr. Landsborough Thomson kindly put at my disposal the records of the Aberdeen University scheme.

TABLE I.

*Age at death of Blackbirds.*

| | Number found dead in 1. Scotland & Borders* | 2. Northern England* | 3. Southern England* | TOTAL. |
|---|---|---|---|---|
| Before first Aug. 1st. ..... | 71 | 44 | 125 | 240 |
| *Between Aug. 1st and July 31st.* | | | | |
| 1st year ... | 94 | 29 | 69 | 192 |
| 2nd ,, ... | 28 | 12 | 20 | 60 |
| 3rd ,, ... | 26 | 7 | 17 | 50 |
| 4th ,, ... | 7 | 4 | 9 | 20 |
| 5th ,, ... | 7 | 1 | 4 | 12 |
| 6th ,, ... | 4 | — | 3 | 7 |
| 7th ,, ... | 2 | 3 | 1 | 6 |
| 8th ,, ... | 1 | — | 2 | 3 |
| 9th ,, ... | — | — | — | — |
| 10th ,, ... | 1 | — | 1 | 2 |
| TOTAL ... ... | 241 | 100 | 251 | 592 |

*NOTE.—Region 1 includes Scottish mainland, Northumb, Durham, Cumb, Westmor.
Region 2 includes Yorks, Lancs, Lincs, Notts, Derby, Cheshire and N. Wales.
Region 3 includes the remaining counties of England and Wales (roughly those south of a line through the Wash).

TABLE II.

*Survival of Blackbirds after first August 1st (all Britain).*

| | No. alive at start of year | % alive at start of year | % of those alive at start of year dying during the year. | Expectation of further life on Aug. 1st (in years). |
|---|---|---|---|---|
| 1st year ... | 352 | 100 | 55 | 1.6 |
| 2nd ,, ... | 160 | 46 | 38 | 1.9 |
| 3rd ,, ... | 100 | 28 | 50 | 1.7 |
| 4th ,, ... | 50 | 14 | 40 | 1.9 |
| 5th ,, ... | 30 | 9 | 40 | 1.8 |
| 6th ,, ... | 18 | 5 | — | — |
| 7th ,, ... | 11 | 3 | — | — |
| 8th ,, ... | 5 | — | — | — |
| 9th ,, ... | 2 | — | — | — |
| 10th ,, ... | 2 | — | — | — |

PROPORTION IN EACH AGE-GROUP.

Table I shows that out of 592 recoveries as many as 240, or 41 per cent., occurred before August 1st of the first year of life. As already noted, there is some doubt as to whether this figure represents the true mortality during this period.

The second column of Table II shows that of every 100 juvenile Blackbirds alive on August 1st only about 46 will still be alive in one year's time, 28 after two years, 14 after

three years and so on, until only three survive after six years. This also means that in a stable population the proportion of each age-group alive on August 1st is 100 juveniles to every 46 second-year birds, 28 third-year birds, 14 fourth-year birds and so on. The proportion of juveniles to adults of all ages alive on August 1st is 100 to 107.

The last is a figure which can be checked by direct field observation, by counting every wild Blackbird seen on August 1st. Unfortunately it is difficult to distinguish adult females from juveniles, but adult males are readily distinguishable. I did not think of doing such a check until September 1st, when counts round Richmond, Surrey, gave 36 adult males and 92 "others." One sees an occasional unmated male Blackbird in spring, suggesting that, as in many Passerines, there is a small excess of males over females. Suppose the sex ratio to be six males to every five females (which seems not unreasonable), then the 92 "other" Blackbirds seen at Richmond probably included some 30 adult females, leaving 62 juveniles. Hence the juvenile to adult ratio at Richmond on September 1st was 62 to 66, or 100 juveniles to 106 adults. If the sex ratio is assumed to be equal, this ratio works out at 100 juveniles to 129 adults. A calculation from the ringing returns, similar to that made for August 1st in Table II shows that on September 1st the expected proportion of juvenile to adult Blackbirds in the population is 100 to 117. Hence the figures check fairly well, suggesting that the average age as estimated from ringing returns is near to that for the whole population.*

### Proportion dying each Year.

The third column of Table II shows that the older Blackbirds survive rather better than do those in their first year, even when the period up to the first August 1st is omitted from consideration. 55 per cent. of the first-year birds die during the year, as compared with only 38 per cent. of the second-year birds. The proportion dying appears to rise again in the third year, but this is not significant and the figure remains around 40 per cent. for each of the three following years, after which too few individuals remain for the figure to be of any value.

*The data needed to make the calculation from Sept. 1st were not given in the tables. Of the 192 Blackbirds found dead in their first year 36 died during their first August. Two died in the second August, two in the third August and one in each of the fourth, fifth and eighth Augusts.

Mr. P. H. Leslie informs me that, until more is known about bird populations, it is not certain that the proportion of each age-group in the population can be derived from Table II in this way. Hence for the present the conclusions of this section should be considered somewhat doubtful.

A similar difference in the mortality of the first-year as compared with older birds is found in other species whose age is being investigated. Two reasons probably account for it. The first-year birds are less experienced, and acquire experience only at a price. Secondly the first-year birds are likely to include a greater proportion of hereditarily less fit individuals, as these will tend to be weeded out early rather than late in life. The first reason probably accounts for most of the difference.

This difference in survival would have been considerably accentuated had the period up to the first August 1st been included. Seventy per cent. of the Blackbirds found dead were reported within one year of leaving the nest. As already noted, the figures for the period up to the first August 1st are open to suspicion.

### Expectation of Life.

The fourth column of Table II shows that the expectation of further life for a juvenile Blackbird on August 1st is 1.6 years. For a second year bird on the same date, the expectation of further life is 1.9 years, and it is approximately the same for a third, fourth or fifth-year bird. After this age, too few individuals are available for the figure to have any value. (The expectation of further life on the day of leaving the nest works out at 1.08 years).

### Potential age of the Blackbird.

Gurney (1899) gives two records of captive Blackbirds living for twenty years. There is no reason to think that, given luck, a wild bird could not live as long, though the oldest wild Blackbirds recovered were ten years old, and there have been only two of these in the 568 recoveries. It is clear that hardly any wild Blackbirds ever attain to " old age " *i.e.* to an age approaching that to which they can live under favourable circumstances.

Mitchell (1911) gives the average further life of seven Blackbirds kept in captivity as just under five years, which is two and a half times as long as the average in the wild.

### Comparison of Northern with Southern Britain.

In Table I the data from Scotland (almost exclusively the lowlands of Scotland) together with the English border counties are given separately from the data for England south of the Wash. These data can be treated in the same way as were the total data in preparing Table II. Omitting the individuals dying before their first August 1st, there proves to be no significant difference in the survival of the birds in northern as compared with southern Britain. The expecta-

tion of further life on the first August 1st of life works out at 1.6 years for southern England and 1.5 years for Scotland and the Borders, and the figures for the second August 1st of life at 2.0 and 1.8 years respectively. In both regions a similar proportion of the first-year birds die during the year, the same applying to second year birds.

However there is a marked difference in the two regions as regards the proportion of those found dead before their first August 1st of life; 50 per cent. of those in southern England but only 29 per cent. of those in Scotland and the Borders were found dead during this period. About 90 per cent. of the nestlings in southern England were ringed between April 15 and June 23, and the mean date of ringing may be taken as May 19. About 90 per cent. of the nestlings in Scotland and the Borders were ringed between April 25 and June 29, and the mean date of ringing may be taken as May 26, a week later than in southern England. Hence to be strictly comparable, one should have reckoned the juvenile mortality of the Scottish birds up to August 7th. But, even if this is done, the number dying in Scotland and the Borders during this period is raised only to 32 per cent., which is still a long way below the figure of 50 per cent. for southern England.

Almost certainly this difference is due largely to the fact that ringers in southern England have revisited the ringing localities more frequently than have ringers in Scotland and the Borders. Hence a relatively greater proportion of the fledglings which die close to the nest have been reported in southern England than in Scotland and the Borders. On the other hand, though there is a similar difference as regards the finding of dead fledgling Song-Thrushes (*Turdus e. ericetorum*) in the two regions, it is not so great. Hence there may be a real difference in the mortality among juvenile Blackbirds in the two regions concerned. The latter is also suggested by another consideration. On the average Blackbirds are stated to raise more broods in the year in southern England than they do in Scotland and the Borders. This means that, if the populations of both regions are stable, there must at some period of life be a correspondingly greater mortality among the Blackbirds of southern England. The ringing records indicate that there is no such difference in mortality after the first August 1st of life, and hence the whole of the increased mortality must fall in the period before the first August 1st of life.

### Reproductive Rate.

If the Blackbird population is approximately stable, it follows that the adults dying each year must be replaced by

an approximately equal number of young which survive to breed. About 40 per cent. of the adult Blackbirds die each year, hence every 100 Blackbirds must each year produce 40 young which survive to breed.

The ringing returns suggest that of every 100 fledgling Blackbirds which leave the nest, only 30 survive to the following June 1st. Hence 40 first-year breeding birds correspond to about 133 fledglings. Probably every 100 adult Blackbirds will include a few males which fail to get mates. Assuming that there are 6 males to every 5 females, 100 adult Blackbirds correspond to 45 breeding pairs. Therefore if the Blackbird population is stable, every 45 breeding pairs must produce 133 fledglings per year, or just less than three fledglings per pair. The Blackbird normally lays four or five eggs, often three, and normally has two or three broods in a year. Nice (1937) summarises data showing that, in many Passerine species which build open nests, 40-46 per cent. of the nests are successful. Of course any nests destroyed early in the season will be quickly replaced. Hence it seems not unreasonable that the Blackbird should on the average raise just under three fledglings per pair per year; and that this reproductive rate works out at a reasonable figure suggests that the information on age supplied by the ringing returns is of the right order.

Of the 241 Blackbirds ringed as nestlings in Scotland and the Borders, 158, or 66 per cent. were found dead before the following June 1st. Of the 251 individuals ringed as nestlings in southern England, 188, or 75 per cent. were found dead before the following June 1st. Making calculations similar to those given above for the birds of Britain as a whole, this means that Blackbirds must raise on the average 3.6 young per pair per year in southern England and 2.5 young per pair per year in Scotland and the Borders. As the Blackbird is supposed to raise more broods in southern than northern Britain, this difference seems not unreasonable.

### Sex Differences.

The sex of fledgling Blackbirds is not known, and in very few of those recovered was the sex recorded. Information on age and sex is obtainable from those Blackbirds trapped as adults but it is not satisfactory, first because rather few individuals have yet been recovered, and secondly because nearly all were trapped in winter, when the Blackbirds in Britain include quite a number which nest abroad, whose mortality may be different. Also, the birds are of unknown age when ringed.

TABLE III.

*Returns of Blackbirds trapped as adults.*

| *Found between Aug. 1st and July 31st of:* | *No. found dead* | |
|---|---|---|
| | *Males* | *Females* |
| 1st year after ringing ... ... | 34 | 24 |
| 2nd ... ... | 17 | 14 |
| 3rd ... ... | 13 | 12 |
| 4th ... ... | 7 | 5 |
| 5th ... ... | 7 | 1 |
| TOTAL | 78 | 56 |

NOTES: (*i*) All those ringed up to spring 1936 are included; (those ringed only up to 1934 provide too few data).

(*ii*) The trapping year is reckoned up to Aug. 1st and those found dead before the first Aug. 1st after trapping are omitted.

(*iii*) Females trapped between July and October are omitted as inexperienced observers can confuse juvenile males with females at this period.

(*iv*) An unknown proportion of Continental Blackbirds are included; those actually recovered on the Continent are omitted.

(*v*) The birds were of unknown age when ringed.

From Table III the expectation of further life on August 1st for male Blackbirds of all ages works out at 1.7 years and for females at 1.5 years, while 43 per cent. of the males and 43 per cent. of the females die during one year after August 1st. The differences are not significant.

## SEASONAL MORTALITY.

As might be expected, more Blackbirds were found dead in winter than in summer, but the seasonal variations are not published as it is very possible that the chances of finding a dead Blackbird are greater when the ground is mostly bare than when it is covered with vegetation.

## CAUSES OF DEATH.

Out of 898 returns examined (including birds ringed after 1934), 70 per cent. of the Blackbirds were "found dead." 6.3 per cent. were killed by cats, 6 per cent. were caught in netting (usually fruit nets), 5.2 per cent. were found dead on roads and railway lines, either having hit telephone lines or been knocked over, 4.4 per cent. were shot, 3.3 per cent. were caught in traps for rats, rabbits or other animals. Hawks, owls, dogs, hitting windows, drowning and fights with other Blackbirds accounted for other deaths. One of those "found dead" died of coccidiosis.

## COMPARISON OF THE BLACKBIRD'S WITH HUMAN SURVIVAL.

In 1930 the expectation of further life for a four-year old male member of the United States of America was another

sixty years, as compared with a possible human life-span of about one hundred years; Dublin and Lotka (1936). In the Blackbird the expectation of further life for a bird two months old is another 1.6 years as compared with a possible life-span of some twenty years. Hence the human juvenile can expect to live for about 60 per cent. but the juvenile Blackbird for only about 8 per cent. of the potential life-span of the species. Among human beings elderly individuals, *i.e.* those near the end of the potential life-span, are relatively common, among Blackbirds they are exceedingly rare. Also, omitting the first three years of life, the expectation of further life for a man decreases markedly and steadily with increasing age, whereas in the Blackbird it does not appreciably decrease with increasing age up to an age by which nearly all individuals have died. (Among very old Blackbirds the expectation of further life probably does decrease with increasing age, but in the wild state there are very few old Blackbirds).

The survival of some of the populations of rats and *Drosophila* raised in laboratories follows a course very similar to that of a modern human population. Their expectation of life is a high percentage of their potential life-span, elderly individuals are or would be relatively common in a stable population, and their expectation of further life decreases markedly with increasing age; Pearl (1920). On the other hand burial records indicate that the survival of people living in ancient Rome was of a type more similar to that of wild Blackbirds. As compared with a modern human population their expectation of life was a relatively low percentage of the potential life-span, elderly individuals were relatively much less common, and the expectation of further life decreased little with increasing age during a long period between adolescence and late middle age; Macdonell (1913). It would seem that only protected species such as modern man and certain animals raised under laboratory conditions have the type of life-curve with which insurance statistics have made us familiar.

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SUMMARY.

(*i*) Except for the Song Sparrow, which lives 2½ years in favourable conditions, little previous data are available on the average length of life attained by wild birds.

(*ii*) Ringing returns reveal the age attained by the small percentage of birds found dead by human beings, but the few checks available suggest that the figures apply approximately to the population as a whole except for juveniles in their first two months.

(*iii*) About 50 per cent. of fledgling Blackbirds in southern England and about 30 per cent. of those in Scotland and the Borders are found dead between leaving the nest and their first August 1st. It is doubtful whether this represents a difference in mortality between the two regions.

(*iv*) The expectation of further life for an adult Blackbird on August 1st is about 1.9 years, and it is about the same for a second-, third-, fourth- or fifth-year bird. About 40 per cent. of the adults die each year. For a first-year bird on August 1st the corresponding figures are 1.6 years and 54 per cent. These figures are similar in southern England and Scotland. In general first-year birds survive less well than older birds.

(*v*) The average life of the Blackbird is about 8 per cent. of its potential age of twenty years.

(*vi*) The figures require that Blackbirds should on the average raise about three young per pair per year to the fledging stage.

(*vii*) There is no evidence for a difference in mortality between the two sexes, but the figures are inadequate.

(*viii*) The life-curve of wild Blackbirds is of a very different type from that of a modern human population or of a laboratory animal.

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