

## The numerical distribution of some British breeding ducks

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During the six seasons between 1965 and 1970 the Wildfowl Trust initiated an investigation into the numbers of breeding and summering wildfowl in England, Scotland and Wales. Unlike the winter counts, which are designed primarily for the long term study of trends, this new venture aimed at completion within a relatively short period. Its purpose was to assess the size and importance of the breeding populations in each district, and to determine whether any of them deserved special measures of protection. It was also hoped that the survey would give some indication of important moulting areas, and of the ratio between native and immigrant birds in the autumn and winter flocks.

In the first instance the survey was envisaged as a purely national study, but with the introduction in 1967 of the International Wildfowl Censuses, it assumed a wider significance. As our knowledge of the winter distribution of wildfowl in Europe begins to improve, it becomes increasingly important, from the conservation viewpoint, to locate the main breeding areas of the various species, and to assess their contribution to the common stocks. A great deal is already known about the numbers and distribution of wildfowl breeding over a wide area of central Europe (Bauer and Glutz 1968-1969); before long, therefore, it should be possible to compile a set of summer distribution maps, similar to the January series which was published recently (Atkinson-Willes 1969).

In 1968, when the Wildfowl Trust's survey had been in progress for three years, the British Trust for Ornithology launched the ambitious plan of compiling an Atlas to show the distribution of all species of birds breeding in Britain. Although the two projects had an obvious similarity, they differed in one important detail. While the Wildfowl Trust was attempting to record the numbers of birds breeding in each district, the B.T.O. was concerned only with their presence or absence. It was nonetheless clear that the two organisations, each with their network of voluntary observers, would benefit greatly from exchanges of information. This has certainly been so in the case of the Wildfowl Trust, whose observers are concentrated around the important winter centres, and tend to be sparse elsewhere.

We are indebted, therefore, to the B.T.O. for allowing us to make use of their records, in advance of their own publication. The extent to which they have helped us is clearly shown in Figure 1. The full black circles indicate the areas from which the Wildfowl Trust has collected quantitative data, mainly during the period 1965-1970; the areas marked by open circles are those for which the B.T.O. has provided records of presence or absence in the seasons 1968-1970.

Both the B.T.O. and the Wildfowl Trust have adopted the 10 km. square of the National Grid as the standard unit of area. In the squares for which quantitative data are available, the records from the various waters have been combined to give the total numbers of each species breeding in each square. These totals are compiled from the highest numbers observed at each site, irrespective of the year in which the records were obtained; they represent, therefore, the potential, rather than the actual population of the squares concerned. For instance, a breeding pair may be found on one pool in one year but on a neighbouring pool in the next. Since both sites are known to be capable of supporting a brood, the square in which they lie has an evident capacity of at least two pairs. This procedure may occasionally lead to exaggeration, but for the most part the result is probably nearer to the truth than estimates based on annual maxima for the square, or on the addition of averages from various sites. Even in well covered areas, the observers have been able to visit only a proportion of the available breeding habitat, and the counts, however presented, must be regarded as minima.

The information on the squares covered by the B.T.O. was provided under the three headings of breeding possible, probable and proven; there was no record of the number of pairs breeding, or of the number of sites occupied. In the absence of these details, the proven records have, perforce, been placed in the category of '1-3 pairs only', although in some squares the true total could well be much higher. An absence of records is probably a true indication of the absence of breeding pairs.

The combined results of the two surveys are presented in Figures 2-6. The species reviewed here are Wigeon,

Shoveler, Tufted Duck, Pochard and Shelduck. These were chosen because they afford the best opportunity of exploiting the quantitative data assembled by the Wildfowl Trust. With other species the information has stemmed predominantly from the B.T.O., or is incomplete numerically. In both instances the B.T.O. Atlas, which is not concerned with numbers, is the obvious medium of publication.

The maps presented here are believed to reflect the current situation with reasonable accuracy, but there are doubtless many discrepancies, both large and small, which we hope will be brought to our notice. Indeed, one of the purposes of this paper is to stimulate criticism. Although the Wildfowl Trust has now closed its side of the investigation, there will be ample opportunities for revision when the European distribution maps are being compiled.

#### Wigeon *Anas penelope*

#### Figure 2

The early breeding records of Wigeon, and other wildfowl, are documented in some detail in the county bird books, and other standard works. There are also several summaries of the changes in status and distribution which have taken place over the past 150 years. The most recent of these is the work by Parslow (1967) which provides an admirably balanced review of events, mainly since 1940. The earlier account of Scottish breeding ducks by Baxter and Rintoul (1922) is another invaluable source of information, especially on Wigeon. In common with most other wildfowl, this species had increased greatly as a breeding bird during the previous 80 years, and had extended its range to many new areas. To some extent, the rapid spread of records at that time can perhaps be attributed to an increase in observers and to the greater ease of access afforded by the railways. By the 1920's, however, the accumulation of data was large enough to provide a remarkably clear impression of the general pattern of expansion and current distribution.

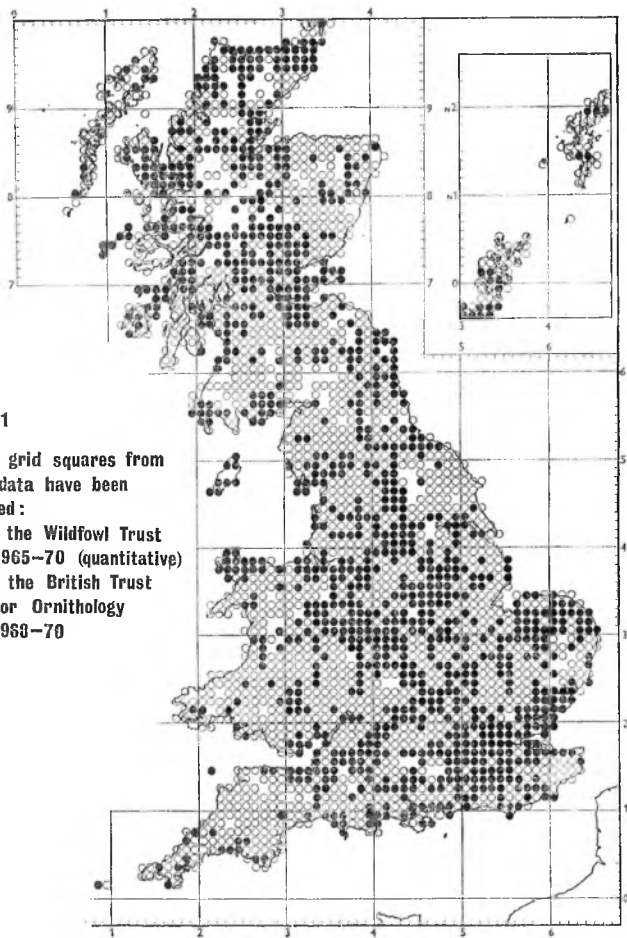
The number of Wigeon at present breeding in Britain is estimated tentatively at about 350 pairs, compared with a winter population of around 170,000 birds. The great majority of the nesting pairs are located along the upland spine of England and Scotland, from Yorkshire north to the Pentland Firth. Within this stretch there are several well defined groups, some of which have offshoots to east or west. The main centres are on the north Pennine moors, in the hills above

Selkirk, in central and eastern Perthshire, on upper Speyside, in central and eastern Sutherland, Caithness and Orkney. In several of these areas, especially in the Highlands, the size and extent of the groups may well be greater than the map suggests. Many of the squares at present marked 'probable' are almost certainly occupied by nesting birds, and some at least of the 'positive' squares almost certainly hold more pairs than the symbols indicate. In Sutherland, for instance, there are records from at least two places of parties of a dozen or more 'attendant' males, and similarly on Speyside and in Perthshire the counts of adults are well in excess of the actual records of breeding.

The situation in England is quite the reverse. Except in the north, and possibly in East Anglia, very few of the adults recorded in summer are regarded as potential breeders. The positive records, particularly in the south and west, may well refer to feral stocks.

In general, the present pattern of distribution is much the same as 50 years ago. There is, however, some indication of a shift to the east in the central highlands of Scotland. In 1895 the species was described as abundant and breeding regularly on the Moor of Rannoch and the lochs of Black Mount (Baxter and Rintoul 1922). The present survey gives no hint of breeding on this scale; indeed, even the most suitable sites are apparently deserted. This absence of records is emphasised by the frequency with which the species is found in the more cultivated districts some 50 km. to the east, and by the increases which have occurred still further to the east, in areas as far apart as Kinross and Aberdeenshire. Loch Leven has long been in regular use, but up to 1920, at any rate, the numbers appear to have been small, probably not more than 3-4 pairs. There are now some 30-35 pairs breeding annually. The spread into Aberdeenshire has apparently occurred within the last 30 years, and certainly within the last fifty (Berry 1939). The present survey has produced confirmation of breeding from two separate sites, both adjoining the coast, and another small group is almost certainly established on Deeside, on the lochs around Dinnet.

Although these local gains are evidence that the Wigeon is holding its own as a breeding species, it seems unlikely that the total number of pairs is increasing to any marked extent. The population is still largely confined to the areas which were used 50 years ago, suggesting that further expansion is restricted by the



**Figure 1**

**10 km. grid squares from which data have been collected:**

- by the Wildfowl Trust 1965-70 (quantitative)
- by the British Trust for Ornithology 1968-70

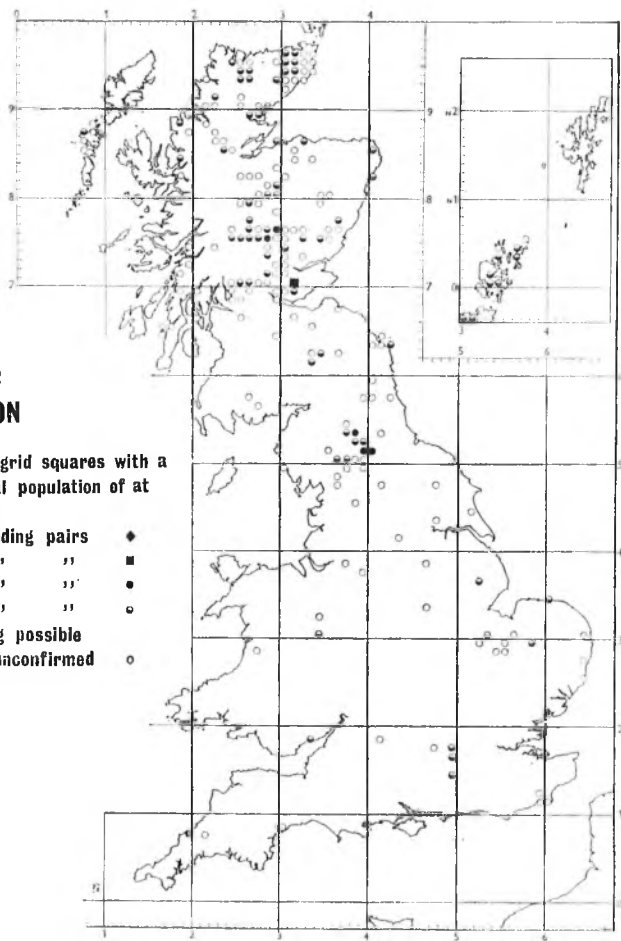
Figure 2

**WIGEON**

10 km. grid squares with a potential population of at least:

- |                   |   |
|-------------------|---|
| 50 breeding pairs | ◆ |
| 15 " "            | ■ |
| 4 " "             | ● |
| 1 " "             | ○ |

Breeding possible but unconfirmed ○



absence of some critical requirement. If this is so, the increasing disturbance from fishing and tourism may well result in a future decline.

**Shoveler** *Anas clypeata* Figure 3

At first sight the Shoveler appears to be widely distributed over much of central and eastern England, but as with the Wigeon, the bulk of the breeding population is concentrated into a series of well defined localities. This is particularly noticeable in East Anglia, north Wales and Northumberland, and in the eastern lowlands of Scotland. In the areas surrounding the main centres there are frequent records of adults occurring in early summer, but only a few of these are probably indicative of breeding.

During the late 19th and early 20th centuries the Shoveler increased remarkably as a breeding species, not only in Britain but over much of western Europe (Parslow 1967). By 1950, however, the impetus had waned, and the changes in recent years have been restricted mainly to local gains and losses within the areas already colonised. One of the few notable expansions has been the adoption of Chew Valley Lake in Somerset, where up to five pairs now breed regularly. A recent increase has also been noted on the Shropshire meres. Over the country as a whole the population seems to be more or less stable, although in many districts the distribution is being slowly curtailed by the loss of suitable habitat through drainage and other developments. In the Trent valley, for instance, the number of breeding pairs has decreased sharply following the reclamation of marshland and the modernisation of Nottingham sewage farm.

The number of Shoveler breeding in Britain is certainly less than 1,000 pairs, and probably less than 500. Many of these native birds apparently move southwards in autumn into France, Spain and Italy, and are replaced by immigrants from eastern Europe (Ogilvie 1962). By February (when the winter population reaches a peak of 8-10,000) the proportion of native birds is probably negligible. It may be, however, that the small isolated populations on Tiree and North and South Uist are largely sedentary.

**Tufted Duck** *Aythya fuligula* Figure 4

The Tufted Duck ranks as one of the most successful of British breeding wildfowl. Since the late 19th century the population has increased and expanded dramatically, and in many areas the trend

is still continuing, though much more slowly. Increases have also been noted in many districts of central and western Europe. As in other wildfowl, the initial expansion was probably stimulated by climatic change; more recently, however, the species has benefited greatly from the large areas of additional habitat provided by the new reservoirs and gravel pits. This factor, in particular, has enabled the breeding population to maintain the impetus of its expansion for much longer than would otherwise have been the case (Parslow 1967).

At the present time the Tufted Duck is widely, and in places densely, distributed over much of England and throughout the central lowlands of Scotland. There are several areas, however, from which it is virtually absent, notably in the north and west. In some cases the limiting factors are fairly easy to identify: it is found for example, that the species does not normally breed at an altitude of more than 400 m., nor does it occur on pools of less than a hectare in extent; it is also apparent from the scattered occurrences in north-west Scotland and elsewhere that the distribution is dependent upon the proximity of limestone or other non-acid formations.

The Tufted Duck is in many respects an easy subject for a survey such as this: its choice of the larger waters makes it relatively simple to find, and its habit of resting and feeding in the open makes it easy to count. On the other hand it nests much later than most other species, and broods are seldom seen much before July. Additional visits are, therefore, needed to obtain confirmation of breeding, and this may perhaps have led to an under-estimate of the number of successful pairs. Many of the squares at present marked 'probable' are doubtless supporting at least one breeding pair, and some of the symbols in the positive squares may also need up-grading.

Parslow (1967) has estimated the number of breeding pairs to the south of the Mersey and Humber at over 500; this agrees with the present finding, though a figure of over 600 is not impossible. His estimate of over 1,000 pairs in the British Isles, including Ireland, is certainly too low. The figure for England, Scotland and Wales alone is probably in the order of 1,500 and could be nearer 2,000. In several areas the species breeds colonially, notably at Loch Leven, Kinross-shire, where up to 500 pairs nest annually (though few of the young appear to survive). Chew Valley Lake, Somerset,

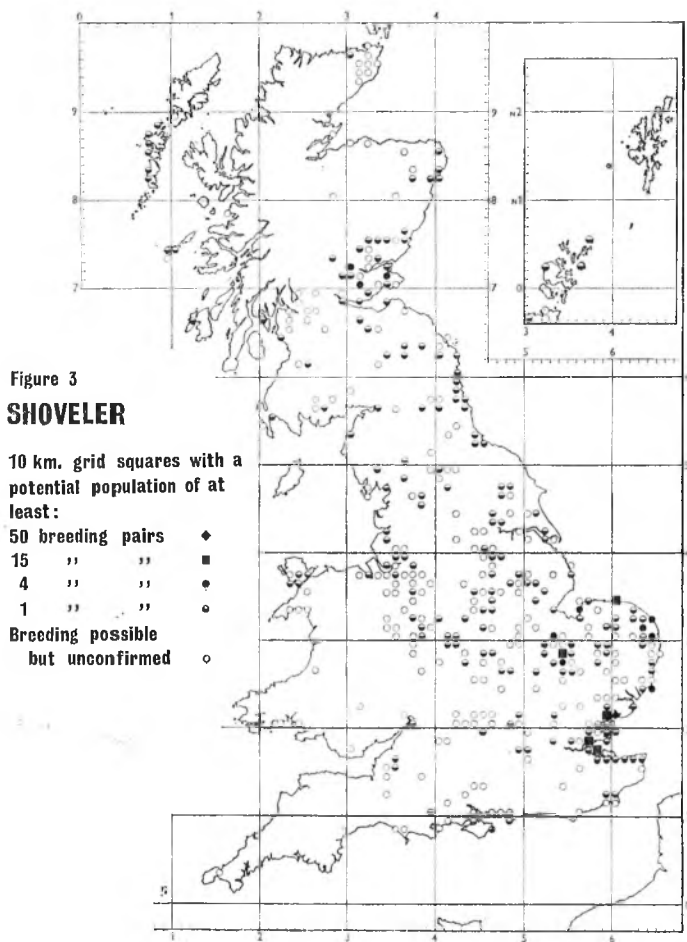


Figure 4

### TUFTED DUCK

10 km. grid squares with a potential population of at least:

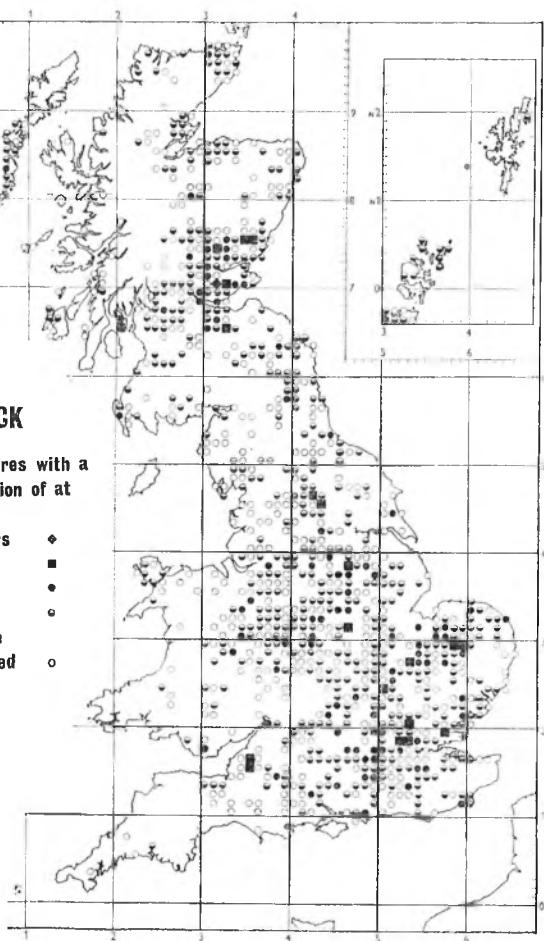
50 breeding pairs

15 " "

4 " "

1 " "

Breeding possible but unconfirmed



is another important centre where up to 60 pairs have bred in some years, and several other places in both England and Scotland hold colonies of 10-15.

The movements of the native population during autumn and winter are still obscure. Many of the birds from Loch Leven are known to move into Ireland, but apart from this there is no evidence, either positive or negative, of a major exodus. If, as seems likely, the birds in most areas are largely sedentary, the number of adults and young remaining in Britain might be as high as 5,000, or rather more than 10% of the winter population. In the international context, the British contribution is scarcely significant, comprising less than 1% of the estimated population in the north-west European flyway.

**Pochard** *Aythya ferina* Figure 5

The Pochard has a good deal in common with the Shoveler. Both species have increased and extended their range very substantially during the present century; both show a marked preference for particular types of breeding habitat, and both are still confined mainly to the eastern districts of England and Scotland.

Despite a possible decline in Scotland, the number of Pochard breeding in Britain appears to be still increasing. During the past 25 years there have been several instances of new colonies being formed, and of sporadic breeding becoming regular. On the north Kent marshes, where two or three pairs began to breed annually in the late 1940's, there are now as many as 70 pairs nesting in some years. This increase has been accompanied by a marked spread from the original site, notably to the Isle of Sheppey, which was colonised in 1955. An account of the development of this colony, and its breeding biology, is provided by Hori (1966a). In Hampshire a similar expansion has taken place since breeding was first recorded in 1961. At the present time the species is firmly established along the lower Test, and is spreading eastwards into the valley of the Itchen. Chew Valley Lake, in Somerset, is also providing a new local centre, and in London a sizeable population is now ensconced on a number of park ponds and reservoirs. In the latter instance, and also in Hampshire, the breeding tradition may perhaps have been started by feral stock (London N.H.S. 1957).

Parslow (1967) has estimated the British breeding population of the Pochard at about 200 pairs, a figure which

is confirmed by the present survey. There is also a very considerable summering population, especially in East Anglia. At Abberton Reservoir more than 3,000 Pochard are normally present in July, the great majority of which are males. This is quite a recent development, and is one of the very few examples in this country of an inland water providing a major moulting ground for wildfowl of any species. The status and origin of the birds assembling here (and at similar moulting areas in the Netherlands and southern Germany) is not yet known; obviously they are far too numerous to be related to the local breeding population. In winter the British population reaches a peak of around 40,000.

**Shelduck** *Tadorna tadorna* Figure 6

The Shelduck is probably the only species of wildfowl in which the British breeding population makes a vital contribution to the European stocks. Unlike most other wildfowl, the Shelducks in northern and western Europe are wholly discrete from the neighbouring populations in Asia and the eastern Mediterranean, and are confined throughout the year to a relatively small range along the Baltic, North Sea and Atlantic coast. The total number of birds within this area has been estimated, from both summer and winter censuses, at just over 100,000. Of these about half are concentrated in the British Isles from January until July, and can thus be described as native stock. Observations in Kent and Lancashire suggest that the proportion of breeding birds is rather less than half (Hori 1966b). This implies a total of about 12,000 nesting pairs in the British Isles as a whole. If this is correct, the total for England, Scotland and Wales is probably in excess of 10,000.

Not more than one-third of this number of pairs has been recorded in the present survey. Nevertheless, Figure 6 seems to provide a reasonable indication of the relative importance of the various districts. The largest errors are likely to be the areas where the species is most common. This is certainly so in parts of East Anglia, and more especially in west Sussex, where the number of pairs is said to exceed 500 (Parslow 1967). The population in districts other than those marked by symbols is probably negligible. Most of the squares concerned contain long stretches of cliff coast, or are otherwise unsuitable. The distribution map in fact reflects the availability of habitat with remarkable accuracy; except possibly in



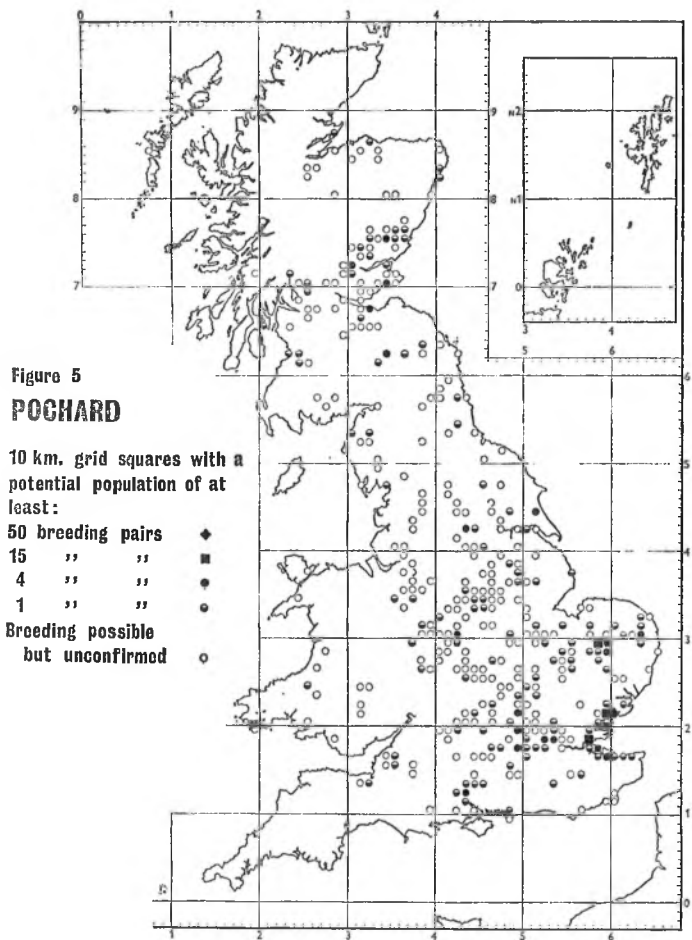


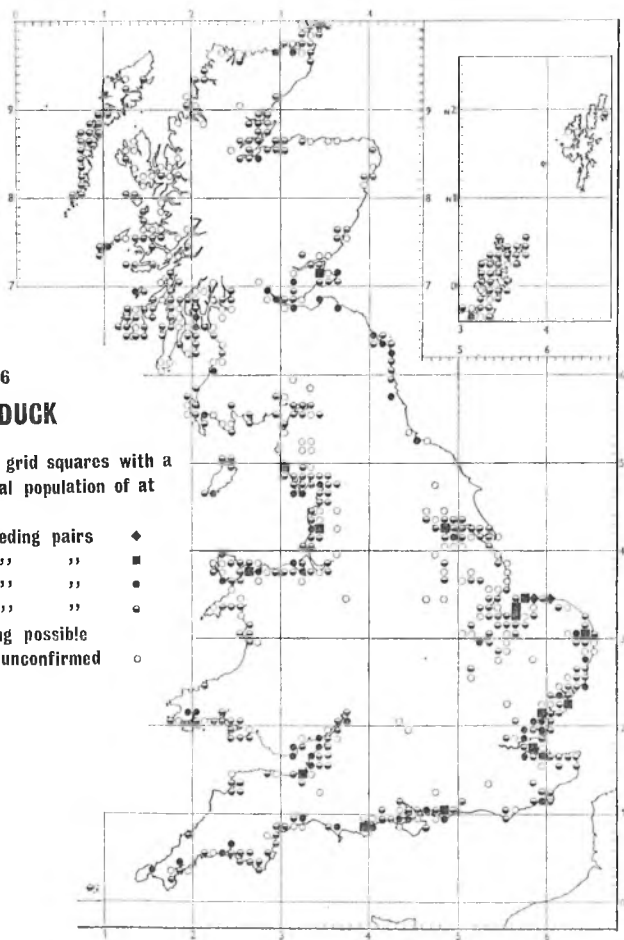
Figure 6

**SHELDUCK**

10 km. grid squares with a potential population of at least:

- 50 breeding pairs     ◆
- 15    "    "     ■
- 4    "    "     ●
- 1    "    "     ○

Breeding possible  
but unconfirmed     ○



the more remote districts of Scotland, there are scarcely any likely areas which have failed to produce at least an unconfirmed record of breeding. This in itself is a reflection of the marked success of the species over the past 50 years. Big increases have been reported in many areas, and despite some local decline, the level of population is apparently still rising. An interesting facet of this expansion, which shows up well on the distribution map, is the growing tendency for pairs to nest inland (Parslow 1967).

#### Acknowledgements

The data on which this survey is based

have been collected with considerable effort, and we hope also with enjoyment, by a very large number of amateur ornithologists. To them we extend our warmest thanks. In particular we would like to thank the members and staff of the British Trust for Ornithology for allowing us to include their data in our survey, thereby enabling us to provide a much more complete review than would otherwise have been possible.

The research and the writing of this paper was undertaken while both of the joint authors were holding posts granted by the Natural Environment Research Council.

#### Summary

Between 1965 and 1970 the Wildfowl Trust organised an investigation into the numbers and distribution of wildfowl breeding in Britain. During part of this period the British Trust for Ornithology has also been conducting a survey of the breeding distribution of British birds, though not on a quantitative basis. Although the latter is unfinished, the data obtained up to 15th March 1971 have been made available for inclusion in the present paper.

Maps to show the number of pairs breeding in each 10 km. square of the National Grid have been compiled for Wigeon *Anas penelope*, Shoveler *A. clypeata*, Tufted Duck *Aythya fuligula*, Pochard *A. ferina* and Shelduck *Tadorna tadorna*. These are accompanied by estimates of total population, and a résumé of recent changes.

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