HOW TO ATTRACT AND PROTECT WILD BIRDS.

A FULL DESCRIPTION OF SUCCESSFUL METHODS.

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HOW TO

ATTRACT AND PROTECT WILD BIRDS

BY

MARTIN HIESEMANN

TRANSLATED BY

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WITH AN INTRODUCTION BY

HER GRACE THE DUCHESS OF BEDFORD

WITH MANY ILLUSTRATIONS

LONDON
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1908

INTRODUCTORY NOTE.

THE following pages form an admirable treatise, not only on bird protection, but more than that, on bird preservation. Game birds have long been carefully preserved by means of a close season, by the destruction of their enemies, the provision of plantations and coverts for nesting and shelter, and by feeding.

The Baron von Berlepsch has applied the system of game preservation to all useful birds, and his methods, as recorded in this book, are convincing by reason of their very thoroughness, and have proved most successful.

The essential part of the plan is the provision of suitable nesting places, special attention having been given to birds which nest in holes.

Detailed description is given of the method of growing and pruning bushes in such a manner as to provide suitable nesting sites for warblers, etc.

Directions are also given as to feeding in winter, and it will be noticed that the birds which benefit most by Baron von Berlepsch's system are those which are most useful to Agriculture and Forestry.

M. BEDFORD.

PREFACE TO THE FIRST GERMAN EDITION.

THE "Kommission zur Beförderung des Vogelschutzes,"* appointed at the instigation of the President of the "Verband der Tierschutzvereine des deutschen Reiches," conferred on me the honourable task of writing a book which should give a clear account of the principles and of the measures which Baron von Berlepsch advocates for the exercise of a rational protection of birds, and which have not only been tested, but have also been recommended by the State.

Although I felt honoured and gratified on receiving this commission, I thought it right to ascertain what were Baron von Berlepsch's views on the subject, especially as it would be necessary for me to obtain information from him personally, and to make a thorough study of the experimental station at Seebach. His answer to my letter of enquiry was as follows :—

"I can only say that I am delighted to find that others carry out my ideas and employ their own experiences and studies in the good cause in order to complete my teaching. Those who, like you, are influenced by interest in the cause, can always count on my assistance."

I therefore undertook the task with pleasure, and thought I could not carry it out better than by closely describing the experimental station at Seebach. Again and again I went to see it at all times of the year, and now, on completing my book, I have again spent four weeks there.

The illustrations are all made, from original drawings and photographs, by the artist E. Hermle.

Baron von Berlepsch, to whom I showed my book when it was finished, declared that my work carried out his ideas in every respect, and that I had introduced correctly the most recent results which had not previously been published.

The purpose of this book is to provide the general public with a guide which shall be easy to understand, and above all things cheap, and thus supply a long-felt want in the literature on this subject.

May this book make its way in the world. May the hopes be fulfilled with which it is sent forth.

MARTIN HIESEMANN.

Heiligenstadt,
January, 1907.

* The "Commission" at the present time consists of Dr. Falke, Professor of Agriculture at the University of Leipsic (president); Herr Max Rabe, Leipsic (secretary); Pfastor Otto Kleinschmidt, Volkmaritz, near Dederstedt, District Halle-a.-S.; Major z. D. Henrici, Cassel. Baron von Berlepsch was, of course, chosen on the "Commission." He declined the honour, as he has done in all similar cases, but he assists the "Commission" as a friend and adviser.

PREFACE TO THE SECOND GERMAN EDITION.

After a comparatively short time—barely four months since its first appearance—a new edition of this book has become necessary: surely the best proof that it was issued opportunely, and that it satisfied a long-felt want. This is proved by the fact that it will shortly appear in an English, a French, and a Polish translation.

I should like to thank, in the name of the good cause, the Commission for whom I undertook the task, and to whose unwearied energy and efforts the quick spread of the work has been due. I feel that I owe a special debt of gratitude to Baron von Berlepsch, who, most generously gave me full information on all questions which I referred to him. I think I may say I talked over every point with him before writing.

May the second edition, which has undergone many changes and additions—the most recent ornithological observations are given—find a kindly welcome everywhere, and help to preserve our birds, so that they may prove a blessing to agriculture and forestry, and a joy to every friend of Nature. This will always be the best reward for my work.

Martin Hiesemann.

Heiligenstadt,
June, 1907.

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SECTION I.

GENERAL REMARKS ON BIRD-PROTECTION.

I.—THE PRESENT POSITION OF AFFAIRS REGARDING THE PROTECTION OF BIRDS.

Most people have been struck by the increased attention that has recently been paid to the protection of birds, and they must have hailed this movement with delight. In newspapers, journals, books, and pamphlets we come across articles and essays dealing with the various attempts to promote this object; while societies and communities, as well as individuals, exert themselves on all sides in the good cause.

The energetic fashion in which Government authorities have taken up the question of the protection of birds on a rational basis deserves special mention. We need only refer here to the Paris Convention of June, 1895, which was signed by most of the European States, to the "Guide for carrying out the Protection of our Native Birds," issued by the Prussian Board of Agriculture, Crown Lands, and Forests, and to the far-reaching and practical measures which have been introduced into the Kingdom of Bavaria, the Grand Duchies of Hesse and Baden, the State of Hamburg, and other German States.*

The same activity is to be found in England, France, Austria-

* Hamburg has had a "Keeper of Birds," appointed by the State, since April 1st, 1906—Otto Theil, who was trained for three years by Baron von Berlepsch and his old bird-keeper, Jakob Mey, at Cassel, and at the experimental station at Seebach. He is not appointed merely for State service, but is at the disposal of private individuals who request his help

Hungary, Italy,* Sweden, Russia, Finland, Holland, America, Japan, and other countries, all of which take the greatest interest in the protection of birds.

It is significant that the measures taken by the respective States for the protection of birds are based on the principles of Baron von Berlepsch, a fact which is sufficiently proved by the numerous translations of his work.†

The Hungarian Board of Agriculture, at the instigation of Herr Otto Herman, the well-known head of the Hungarian Ornithological Central Bureau, actually sent a University man, Herr Titus Csörgey, to Seebach, in order that he might study thoroughly the experimental station there. Recently the representatives of various German States have repeatedly stayed at Seebach for this purpose. It is to be hoped that this example will be followed elsewhere. Observations made on the spot are far more effective than books. There can be no doubt that those who have seen the arrangements at Seebach, and the marvellous results which they have produced, will be convinced, once for all, of the correctness of the methods employed.

The active interest which is taken on all sides in the protection of birds is undoubtedly a plain proof of its great importance; but it may not be out of place to bring forward a few reasons to justify it.

II.—REASONS FOR THE PROTECTION OF BIRDS.

THE protection of birds is first of all of importance from the point of view of the political economist. This has been sufficiently demonstrated by the thorough investigations which were carried out at an earlier period as well as recently. A few of the newest and most irrefutable proofs will be found on pp. 46 and 47; for the rest the reader is referred

* It may cause some surprise that Italy is mentioned here, as, unfortunately, bird-catching still flourishes in that country. But a change for the better has already taken place there; the educated classes are quite aware of the injury it causes, and are trying to instruct the people by lectures and writings. Many nesting-boxes have been hung up on private property, especially near vineyards; and shelter-woods for birds, in accordance with the principles laid down by Baron von Berlepsch, have been planted. There are also four journals which advocate the cause of the protection of birds.

† "Der gesammte Vogelschutz, seine Begründung und Ausführung."

to the books dealing with this subject, especially those mentioned in the note.*

The principle of utilitarianism has taken such a strong hold on all classes of society nowadays, that many intelligent people have found that, much to their regret, they must begin, in many cases, by dwelling on the usefulness of birds. A one-sided view of the matter should be avoided, however, and I would point out the following fact:—We do not protect birds solely because they are useful, but chiefly from ethical and æsthetical reasons, as birds give beauty and animation to nature. We also wish to preserve their species, and hence the protection of birds signifies the preservation of the monuments of Nature.

Special attention should therefore be paid to what the above-mentioned official guide says in reference to this point:—"The native birds are not only very useful to agriculture, and woods and forests, but they add to the charm of nature." These are the motives which should serve as the motto of a really rational protection of birds, the motives which induced Baron von Berlepsch to take up his far-reaching and successful work in this field.

III.—HISTORY OF THE PROTECTION OF BIRDS.

THE efforts to protect birds date from the time when a marked decrease in their number was noted to the detriment of agriculture and forestry, and of the general harmony and beauty of Nature. We can accordingly trace back the history of the protection of birds to the 18th century. Oken, Gloger, Lenz, Brehm, Russ and Liebe are the ornithologists with whom the history of the subject is connected.

With all due respect for those pioneers in the solution of the problem of bird-protection, we cannot conceal the fact that their efforts frequently ended in bitter disappointment. The matter was still in its infancy.

* The publications of the U.S. Board of Agriculture. The publications of the National Committee of Audubon Societies in North America. The publications of the Royal Society for the Protection of Birds in England. "Studien über die wirtschaftliche Bedeutung der insektenfressenden Vögel," "Magenuntersuchungen land-und forstwirtschaftlich wichtiger Vögel," "Tierwelt und Landwirtschaft," by Prof. Dr. Rörig. "Nutzen und Schaden der Vögel," by Otto Herman. Older works are those by Oken, Gloger, Lenz, Baldamus, Brehm, etc.

There could be no question of any success worthy of the name, simply because the measures introduced were not in accordance with nature, but were for the most part fanciful inventions.

This was quite enough to prove fatal to a matter of such great importance. The want of success extinguished all interest. The protection of birds was regarded as an idle amusement at the close of the period in question. Then Baron von Berlepsch appeared, just in the nick of time. He recommended really useful measures, which guaranteed certain success from the first; whereas the ornithologists already named had for years tried experiments which were more or less failures. From this time onwards we can prove that the protection of birds throve and prospered.

Dr. Hartert is, therefore, right when he says in his excellent work* :—"The questions dealing with the protection of birds have now been directed into a regular channel, and take their course quietly, but with increased strength, under the *ægis* of Baron Hans von Berlepsch." We are not saying too much if we designate Baron von Berlepsch as the mainspring of all efforts made in these days for the protection of birds. The whole matter, in its present shape and extent, is based on his ideas, and it can be built up only on this foundation.

Readers will be interested to learn how he was able to discover a solution of the problem of bird-protection. He owes his success to the fact that he carries on his experiments from a purely scientific point of view, without sentimentality or exaggeration.

He carried out Liebe's words :—"Learn to know the life of birds thoroughly if you wish to be sure of success in protecting them," and devoted himself from his earliest youth to studying the world of birds, and to observing them carefully. Hence twenty years of quiet, incessant work lay behind him when he first made known his experiences. He still considers it the aim of his life to continue seeking the best ways of successfully protecting birds.

His long journeys abroad were very useful in assisting him to solve the problem. He spent fifteen months in 1883–84 in Africa, Italy, and the islands of the Mediterranean; in 1886 he was nine months in South America, in the virgin forests of Paraguay and Western Brazil. He spent three months in 1888 in Italy, where he has since paid frequent

* "Einige Worte der Wahrheit über den Vögelschutz."

short visits in order to study the migration of birds, and the catching of birds practised in that country.

The result of all his studies and observations was the conclusion that it is only by correcting Nature where man has marred her that the protection of birds can be properly dealt with, and that this can only be attained through Nature herself, or through an exact imitation of Nature. All so-called inventions for the protection of birds he considers absurd from the very outset, and the chief cause of former failures. And it is just because he always based his experiments upon Nature that they were crowned with entire success.

Baron von Berlepsch has, therefore, made it possible for us to carry out the protection of birds on a basis which is rational, and entirely in accordance with Nature.

He is no mere theorist, for all that he has published on the subject of bird-protection has been thoroughly tested by him for many years at his extensive experimental station at Seebach. As the following account is based on a study of the grounds at Seebach, it would, perhaps, be as well to give a description of them.

IV.—THE EXPERIMENTAL STATION AT SEEBACH.

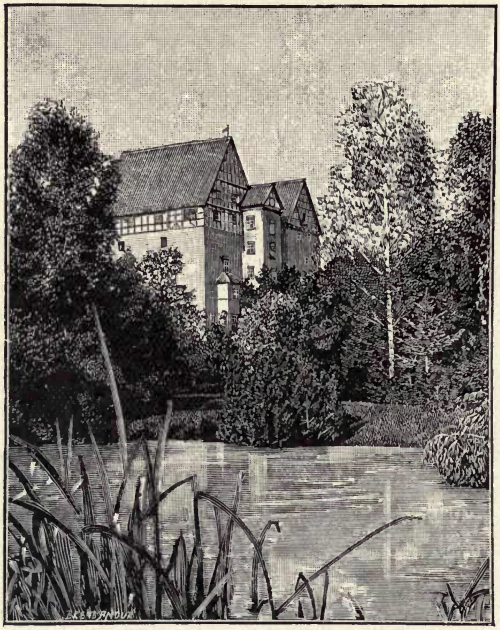
THE ancestral castle of the Berlepsch family, dating from the 12th century, stands on the estate of Seebach, in the district of Langensalza, in Thuringia. On the same spot where one of his uncles did excellent work for agriculture, by means of his world-renowned experiments in bee-keeping, the present Baron won a similar success by means of his efforts for the protection of birds, which were of such importance from an agricultural point of view.

The area which has been used for the experiments comprises about 500 acres, of which 19 acres are park, 60 acres are thickets (poplar and willow plantations) for the birds, and 400 acres are wood.

The park which surrounds the old castle is of great interest to botanists, especially those interested in trees, because it contains examples of all the trees of Central Europe. Its special value, however, lies in the fact that the protection and encouragement of birds have received attention everywhere, but without undue preponderance, in the laying out of the grounds. No one can fail to be struck by the

luxuriant undergrowth which thrives even where the wood is densest. The owner has devoted special attention to the question of how the undergrowth, which is so important for bird-protection, is to be obtained under trees with dense foliage, and to finding out which trees are most suitable for the purpose. Bushes specially pruned for the purpose, and bushes or small branches specially tied together, serve as breeding-places for numerous birds that build in the open.

The two accompanying illustrations show how the protection of



A VIEW OF THE CASTLE AND LAKE.

birds and of plants are carried out simultaneously on the estate, without losing sight of the æsthetic point of view.

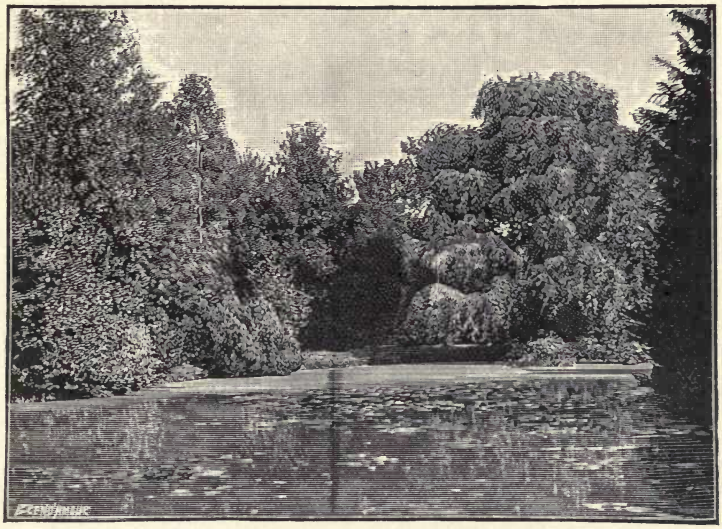
The lake is inhabited by various species of water-birds, such as wild ducks, moorhens, dabchicks, kingfishers, etc.

About 300 nesting-boxes hung up in the park are inhabited, without exception, by various birds that build in holes. Hidden in the bushes, unnoticed by those not in the secret, are traps for vermin, especially for poaching cats, and in various spots are food-houses, and "food-bells"

for winter feeding. The shelter-woods for the birds are in the neighbourhood of the brook which runs through the estate, or else near a ditch. Some of them are over thirty years old ; others have only been recently planted, so that their development can be plainly observed.

The copses in the fields show how existing plantations of mature growth may serve to attract birds—*i.e.*, may be altered without suffering damage into woods suitable for sheltering birds.

In the avenue the best way of treating tall trees and willows for the same purpose is demonstrated, and the wood, which is fully six



THE LAKE.

miles distant from the plantations just described, contains over 2,000 nesting-boxes. As there is no open water within reach for a very great distance, drinking places for the birds have been planned, which will doubtless lead to a great increase in the species which are already present in numbers.

Whoever, like the author, has been able to observe the birds at Seebach at all seasons of the year must acknowledge that the experimental station there serves as a pattern and a model for all similar places. The success attained in every part of the experimental station is, to say the least, extraordinary.

In the home park alone, which is 12 or 13 acres in extent, there breed annually at least—

200 pairs of linnets.
100 ,, greenfinches.
30 ,, icterine warblers (*Hippolais hippolais*).
30 ,, garden warblers, whitethroats, and lesser whitethroats.
20 ,, fieldfares (otherwise found as a breeding species in Germany in the northern and eastern parts only).
5 ,, song thrushes.
5 ,, blackbirds.
2 ,, golden orioles.
10 ,, goldfinches.
5 ,, chaffinches.
Several pairs of hawfinches.
,, ,, yellow-hammers.
,, ,, hedge-sparrows.
,, ,, wrens.
,, ,, golden-crested wrens.
,, ,, chiff-chaffs and wood-warblers.
,, ,, red-backed shrikes (though many are shot).
,, ,, nuthatches.
,, ,, tree-creepers.
,, ,, spotted fly-catchers and pied fly-catchers.
,, ,, black redstarts and common redstarts.
,, ,, sedge-warblers.
One pair of white wagtails.
,, ,, kingfishers.
,, ,, moorhens.
,, ,, little grebes.
2 pairs of wild ducks.
30 ,, tits (great tits, blue tits, and marsh-tits).
30 ,, starlings (see note, p. 43).
Several pairs of wrynecks.

The holes in the walls of the old castle provide shelter for swifts, and other birds. Above, in the roof, dwell jackdaws, barn-owls, little owls (*Athene noctua*), and kestrels (*Falco tinnunculus*).

In a neighbouring barn is a colony of about forty nests of house-martins.

In the "shelter-woods" and in the poplar and willow avenues we find the same kind of birds as in the park, and in addition :—

Green woodpeckers.
Great and lesser spotted woodpeckers.
Woodchat shrikes (*Lanius senator*).
Blue-headed wagtails (*Motacilla flava*).
Wheatears.
Whinchats and stonechats.
Tree-pipits.
Corn-buntings and reed-buntings.
Blue-throats (*Erithacus cyaneculus*), and also nightingales (*Erithacus luscinia*).

In the woods, on an average, 90 per cent. of the 2,000 nesting-boxes are inhabited by the five species of tits—great tit, blue tit, marsh-tit, coal-tit, crested tit—green woodpecker, grey woodpecker (*Picus viridicanus*), greater and middle spotted woodpecker (*Dendrocopus medius*), nuthatches, tree-creepers, pied fly-catchers, redstarts, and starlings. The boxes for the birds building in open cavities are inhabited by robins and wrens, and in the neighbourhood of the game-keeper's house by wagtails, black redstarts, and spotted fly-catchers.

With such results we are forced to acknowledge that the measures which have produced them are the only right ones, and we must agree with the remark that "these are conditions that undoubtedly remind us more of an aviary than of nature."

Baron von Berlepsch, as was stated above, looks on these extensive grounds as an experimental station in the first place, but he has also laid them out as a pattern station which is at all times open to the inspection of those who come to see it, and it is in this light that he wishes it to be regarded. The owner, therefore, not only permits, but desires, for the sake of the good cause, that visitors, besides making enquiries as to the nature and utility of the measures taken at Seebach, should also convince themselves of their successful working. The best time for a visit is the second half of November, after the fall of the leaf.

If the owner is not at home, then Jakob Mey, the bird-keeper, is thoroughly competent to give all information, and is prepared to act as a guide to those interested in the matter.

We would urge all governments, local authorities, societies, and private individuals who wish to carry out successfully the protection of birds to make full use of this opportunity. In the interest of the good cause we ought to be grateful for the opportunity afforded us of seeing with our own eyes what has been done, in addition to using the excellent books on this subject, so that time and money need no longer be wasted in useless experiments.*

This account of the experimental station at Seebach will be followed by a description of the measures taken by Baron von Berlepsch to introduce a rational system of protecting birds. They are as follows :—

1. Creating opportunities for breeding (*a*) for birds that build in holes ; (*b*) for birds that build in the open.
2. Winter feeding.
3. Fighting the enemies of birds.

Actual success can only be attained by carrying out these measures in close connection with each other. One measure may perhaps be of greater importance than the other. None of them must be neglected, or the result of our efforts will be incomplete.

* The author considers it advisable, in view of various incidents, to draw immediate attention to the necessity for close observation of the Berlepsch measures. No good is effected by superficial treatment, which does not make clear the actual nature of these arrangements, of which the smallest detail is important. This superficiality leads to very serious mistakes in descriptions of the Berlepsch system for the protection of birds. Success in protecting birds is the result of close study of what seem to be the veriest trifles, such as Nature herself prescribes.

SECTION II.

THE PROTECTION OF BIRDS IN PRACTICE.

THE CREATION AND MAINTENANCE OF OPPORTUNITIES FOR NESTING AS THE CHIEF REQUIREMENT.

ALL experts are fully agreed that the most important step for bringing about the successful protection of birds consists in establishing suitable conditions of life, and, above all, opportunities for building nests. Without suitable breeding-places the healthy development of bird life is arrested at the very outset, in spite of laws for the protection of birds and all other efforts. It is an established fact that birds will not breed at all, if they cannot find a suitable place for their nests.

Baron von Berlepsch says the same thing when he writes :—" We can only preserve and increase our birds in the long run by restoring to them the necessary conditions of life—above all, the opportunities for nesting of which we have robbed them."

The truth of these words and their practical application have been clearly and conclusively proved by him at his experimental station at Seebach. He has succeeded by means of untiring investigations and observation in establishing the most suitable conditions of life for our birds, especially opportunities for nesting for those which build in holes, as well as for those that breed in the open.

CHAPTER I.

THE PROVISION OF NESTING-PLACES FOR BIRDS BREEDING IN HOLES.

(A) *Nesting Difficulties.*

BIRDS building in holes are those birds that breed and spend the night in holes in trees, or more rarely in holes in rocks or other cavities. According to a list of European birds breeding in holes, drawn up by Baron von Berlepsch, we distinguish between those that do not build their nests in regular holes in trees with a narrow opening, but rather in niches and in narrow, half-open cavities, and those which breed in deep cavities with a narrow opening corresponding to the size of their bodies. In the first category are (1) black redstart; (2) spotted fly-catcher; (3) pied and white wagtails; and occasionally (4) the robin. Of large birds (5) kestrels; (6) jackdaws; (7) various species of owls. Nos. 5, 6 and 7 also frequently nest in regular holes.

In the second category we have: (1) tits—(*a*) great tit, (*b*) blue tit, (*c*) coal-tit, (*d*) marsh-tit, (*e*) crested tit; (2) nuthatch; (3) tree-creeper; (4) woodpeckers—(*a*) lesser spotted, (*b*) middle spotted (*Dendrocopus medius*), (*c*) great spotted, (*d*) Syrian (*Dendrocopus leuconotus*), (*e*) three-toed (*Dendrocopus tridactylus*), (*f*) grey (*Picus viridicanus*), (*g*) green, and (*h*) black woodpecker (*Picus martius*); (5) wryneck; (6) starling; (7) common redstart; (8) pied fly-catcher; (9) hoopoe; (10) swift; (11) roller; (12) stock-dove; (13) various species of owls; (14) kestrel; (15) jackdaw [Nos. 13, 14, and 15 are also in the first category]; (16) merganser (*Mergus merganser*).

The difficulty experienced by these birds, which are so important to agriculture and forestry, in finding nesting-places, has greatly increased since by the rules of modern forestry nearly every old tree is

felled without regard to the fact that the holes it contains serve as shelters and nesting-places for the most faithful friend of the agriculturist and the forester. Man, who nowadays cares only for what is of practical use, is short-sighted enough to grudge the old, decayed trees the little space on which they stand. In the woods, as well as in the orchards, he frequently lays too much stress on the utilitarian principle, but unfortunately in the wrong direction.*

As, in consequence, the natural nesting-places of the breeders in holes became more and more rare, it had long been a problem how the deficiency could be supplied, but unfortunately the problem was not very successfully solved. We have no space to describe in detail the many experiments and failures which took place in the course of time in the matter of nesting-boxes. There could be no question of genuine success, simply because the boxes were not in accordance with nature, but were mere inventions. The well-known naturalist, Alfred Brehm, was perfectly right when, twenty years ago, he maintained that the nesting-boxes then in use were totally unsuitable.

(B) *Origin of the Berlepsch Nesting-boxes.*

As a boy of fifteen, Baron von Berlepsch had already noted in his diary that the nesting-boxes then in use served no purpose, and that the only chance of success lay in the boxes being made to imitate Nature, so that the birds should settle in them as they would in natural cavities.

Twenty years later he succeeded in his attempt. After years of observation he established the fact that the nesting-holes which the birds preferred were deserted or uninhabited woodpecker holes. This led him to conceive the idea of continuing the work of the woodpecker by the hand of man, that is to say, of making close imitations of the woodpecker holes which, unlike the existing nesting-boxes, should be no mere inventions, but exact copies of Nature.

He made use of every opportunity of carefully examining woodpecker holes, though his work was often attended with considerable difficulty,

* Fortunately, a change for the better has lately taken place in Germany in this respect. The Government officials have already recognised the fact, and have ordered that the old trees shall be left standing in the crown woods. It is to be hoped that the good example of the State may be followed by local authorities as well as by private proprietors. A very beneficial influence can be exercised by the ranger in this matter.

because the tree in question had to be felled and cut up so that its interior might be thoroughly examined. Without in the least anticipating the true state of affairs, he was actuated simply by the wish that his investigations might lead to the discovery of principles which he could follow in the construction of a nesting-box which should be generally useful—a box, in short, which would take the place of the natural woodpecker's hole in every respect.

To his surprise he discovered after examining several hundreds of woodpecker holes, that they were all formed on a uniform plan. All the holes of the black, green, and grey woodpeckers, as well as those of the various spotted woodpeckers, in spite of difference in size, were constructed on exactly the same principles. The problem of a satisfactory nesting-box was brought very much nearer its solution by this important discovery. It was now merely a question of producing an imitation of these woodpecker holes, which should be true to Nature and serve the generality of birds, and the problem was satisfactorily solved after many failures.

(c) *Manufacture of the Nesting-boxes.*

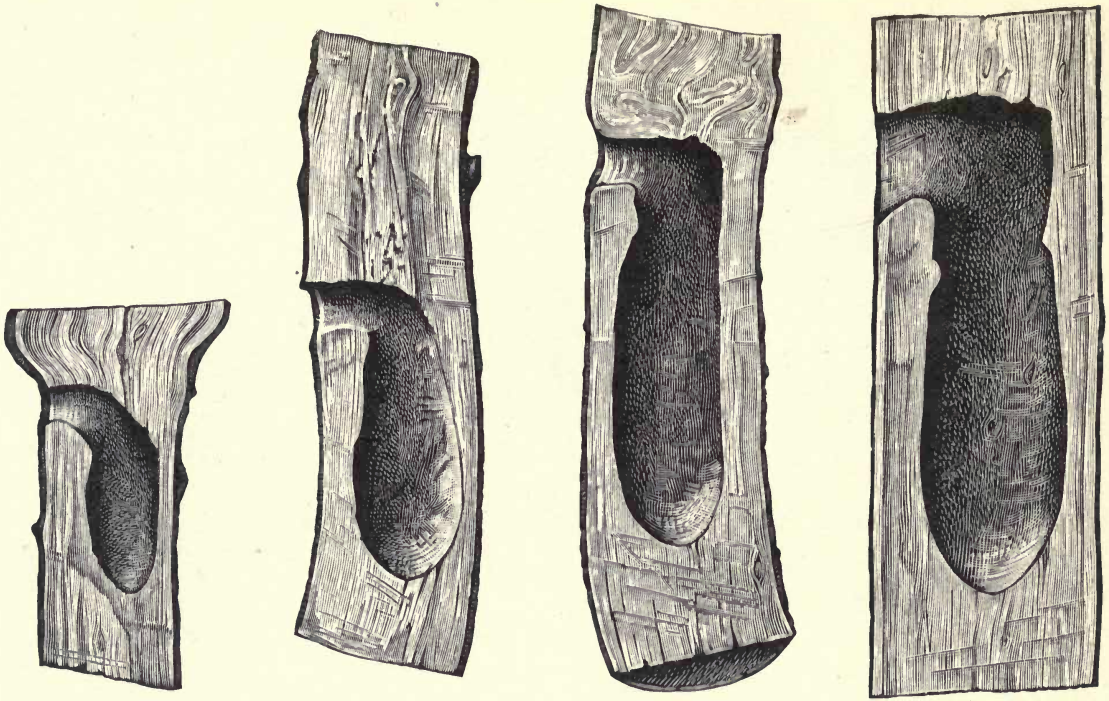
There were many difficulties connected with the imitation of the peculiarly-shaped woodpecker holes, as they were to be faithfully copied, down to the smallest details. The accompanying illustrations, taken from photographs of the longitudinal sections of natural woodpecker holes, show clearly the method of their construction.

The opening is always circular, and is of unvarying size with each species, *i.e.*, with the lesser spotted woodpecker, $1\frac{1}{4}$ inch; the greater spotted woodpecker, $1\frac{3}{4}$ inch; the green woodpecker, $2\frac{3}{8}$ inches; the black woodpecker, $3\frac{3}{8}$ inches.*

A very important point has been observed, namely, that by a wise provision of Nature the opening of all the holes is inclined upwards to a certain angle (4 deg.) in the interior, so that the rain cannot penetrate.

The lower part of the breeding cavity itself is enlarged bottle-shaped, and ends in a pointed trough at the bottom. The inner walls are some-

* The measurements of the holes of the black woodpecker are correct when the openings are round. When they are more or less oval, as is often the case, especially in eastern Europe, the horizontal diameter is smaller, and the vertical diameter is longer than is stated above.



A. B. C. D

LONGITUDINAL SECTIONS OF WOODPECKER HOLES.

A.—Lesser Spotted Woodpecker. B.—Greater Spotted Woodpecker.
C.—Green Woodpecker. D.—Black Woodpecker.

(*One-eighth natural size.*)

what uneven, so that the birds can cling to them more easily. In the extreme point of the nest trough a little mould or fine shavings that have been chiselled off serve for the eggs to rest on.

The walls of the cavities are in every instance so strong that atmospheric changes have no effect on the interior. The Berlepsch nesting-boxes are exact reproductions of these woodpecker holes. At first they were made by hand, with special instruments. But this method of reproduction was so troublesome, and therefore so expensive, that the general public derived little benefit from it. Matters were not simplified till an experienced and practical manufacturer became interested in reproducing the artificial woodpecker holes wholesale, and not till then could the problem of nesting-boxes be considered solved.

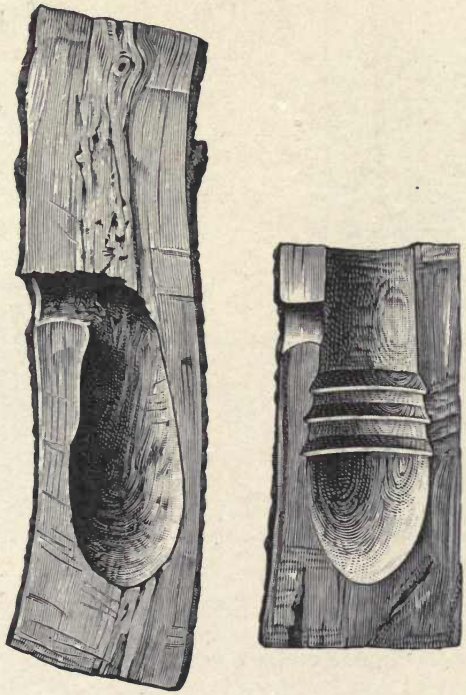
Mr. Hermann Scheid, in Büren (Westphalia), is the man whom Baron von Berlepsch induced to help in his plans for the production of nesting-boxes, as well as of the other articles connected with the protection of birds. Mr. Scheid who, from childhood, had loved and studied birds, devoted himself exclusively and with great energy to the undertaking, which at first seemed somewhat risky. I am quite justified in calling the undertaking risky for a manufacturer, for everyone who knows Baron von Berlepsch will agree that it is not exactly easy to satisfy him, and only those can claim to have satisfied him who have carried out his demands and wishes to the veriest detail. True to Nature, durable and cheap at the same time, was the watchword for the manufacturer.

Complicated machinery made this possible, and as the success which resulted everywhere from the use of the boxes was their best recommendation, they achieved their present reputation much more quickly than was anticipated. The great and steady increase in their use obliged Herr Scheid, to provide in addition to his factory at Büren, similar factories at Mühlhausen, in East Prussia, and at Dobrilugk, Prov. Brandenburg. A fourth has been planned for South Germany. The factory which he built at Lenzburg, in Switzerland, has for the last two years been in the hands of Herr Frank Bertschinger.

We must not omit to mention that at the instigation of the Hungarian Ornithological Bureau these boxes are manufactured faultlessly in Austro-Hungary, in special factories under State management.

(D) *Description of the Nesting-boxes.*

Whoever has had an opportunity, like the author, of comparing the sections of woodpecker holes with these artificial boxes will be astonished at their similarity. He will almost be inclined to think that the woodpeckers modelled their holes on those of Baron von Berlepsch. Compare the accompanying illustrations of longitudinal sections of



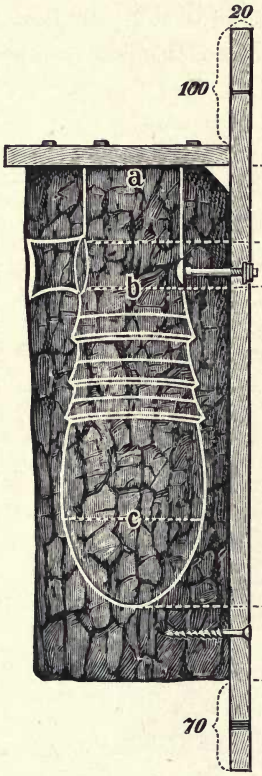
A. B.

LONGITUDINAL SECTIONS OF

A.—Great Spotted Woodpecker's hole.
B.—Berlepsch's Nesting-Box, size B.
(*One-eighth natural size.*)

natural and artificial holes. A closer description of the boxes, the different measurements, the position of the opening, the boring and arrangement of the interior, can be given more clearly by the following diagram accompanied by a scale than would be possible by a verbal

description. The figures of the first division denote the space between the lid and the opening; those of the second the diameter of the opening; those of the third the depth of the boxes from the lower edge of the opening to the deepest point of the nest trough; and those of the fourth the thickness of the bottom.



A.	A¹.	B.	C.	D.	
50	50	60	60	60	mm.
32	27	46	60	85	"
150	150	230	300	275	"
60	60	70	70	70	"
292	292	406	490	490	*Total Heights of the Nesting-boxes in millimètres.*

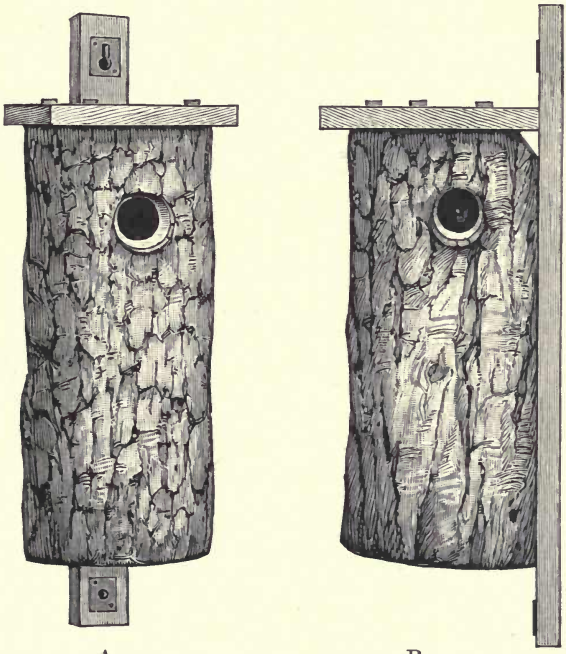
The following are the measurements in millimètres of the diameters of the inside of the nesting-cavities at the various points as indicated in the above diagram :—

Nesting-Boxes—

Size	A.	A1.	B.	C.	D.
At A.	60–65	60–65	80–85		
,, B.	70–80	70–80	85–95		
,, C.	85–95	85–95	115–125	160–180	160–180

These boxes are made of alder, birch, pine, and other woods which do not split easily.

The most important thing next to the characteristic slope of the opening at an angle of 4 degrees is undoubtedly the pointed form of the trough. Strange to say, this most important circumstance is frequently misunderstood. A mistake of this kind, such as speaking of a flat trough, can only be the result of insufficient acquaintance with the Berlepsch nesting-boxes.* (*See* p. 30.)



A. B.

EXTERIORS OF BERLEPSCH'S NESTING-BOXES.

A.—With entrance hole opposite batten.
B.—With entrance hole at the side.

The cover and the batten consist of oak $\frac{3}{4}$ inch thick, and, as the illustration shows, the former is fastened to the box by screw bolts. The batten is provided with a hole for a nail above and below the box,

* In one of the first editions of the "Gesammte Vogelschutz" the word "flat" was wrongly printed for "pointed" trough. We must assume that this mistake was copied by those who were not acquainted with woodpecker holes, and that the error was thus spread.

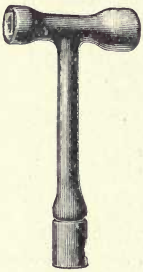
and each is protected by a strong iron plate. These iron plates are a very great improvement, because they prevent the batten from splitting, or the nail from sinking in, accidents which were formerly of frequent occurrence owing to the growth of the trees. The upper hole has the shape shown in the accompanying illustration, to make the hanging of the boxes more convenient.

A very great improvement was recently effected by the slope introduced in the angle between the cover and the batten. In spite of all the advantages it was found impossible to prevent rainwater from occasionally entering the interior. This unfortunate state of affairs was especially inevitable when the boxes hung just where the tree formed a gutter—a thing that cannot always be avoided, because it is not noticed beforehand. The slope, however, conducts the water that flows down the batten, directly away from the interior of the box.*

The opening is sometimes opposite the batten, sometimes at its side.

The "screw-nails" which are used to fasten the boxes, are better than ordinary nails, because they need not be driven in so far, and yet are very firm, owing to their peculiar twists. (*See* illustration.)

Screw-nail.



Key.

A key is necessary to tighten the screw-bolts of the cover and the batten, which are often loosened in transit, or to enable one to remove the cover in order to see the interior of the box when it is hanging up. (*See* illustration.)

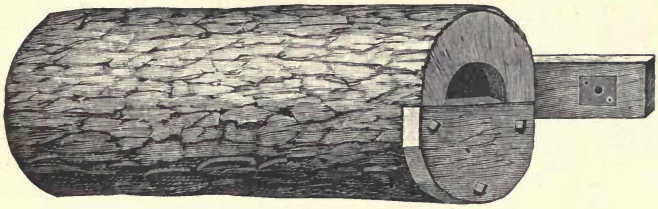
(E) *Kinds of Boxes.*

Five different kinds of Berlepsch's nesting-boxes, resembling each other in construction, but differing in size to correspond with woodpecker holes, are manufactured.†

* Baron von Berlepsch, much to our satisfaction, has at last consented to patent this improvement at all events. It will be found only in the nesting-boxes of the manufacturers Scheid and Bertschinger—in those only, that is to say, that also bear the trade mark. (See p. 40.)

† For prices and particulars as to where these and the other appliances recommended can be obtained, see advertisement pages at the end of this book.

Box A is suitable for the great tit, blue tit, marsh-tit, coal-tit, crested tit, nuthatch, tree-creeper, wryneck, pied fly-catcher, redstart, or lesser spotted woodpecker. In accordance with the wish of many who are interested in the matter, and suffer greatly from the plague of sparrows, a box called A1 has lately been made with a narrower opening—1 1-16 inch. It is designed for blue tits, marsh-tits, coal-



NESTING-BOX E.

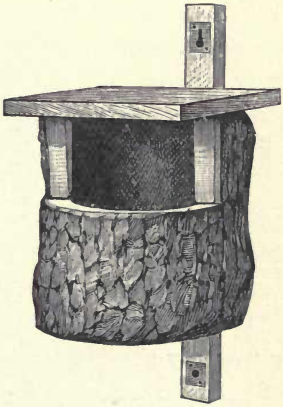
tits, and crested tits; sparrows cannot enter it, but neither can other birds, except the small tits, not even the great tit.

Box B is for starlings, greater spotted woodpeckers, wrynecks, nuthatches, pied fly-catchers, redstarts, great tits. The last five species settle in box A as well as in B. The former suffices as a rule.

Box C is for green woodpeckers; and Box D for stock-doves,* kestrels, jackdaws, and owls.

For the sake of completeness we have box E for swifts, with the boring of box B, and a semi-circular opening. (*See* illustration.)

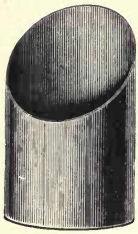
The open box F has a diameter of about 4¼ inches, and a depth of about 2¼ inches. It is made for such birds as redstarts, spotted fly-catchers, and pied wagtails.



NESTING BOX F.

* I should like to awaken interest in pigeon preserves, such as were common in Germany in the seventeenth and eighteenth centuries, when these birds afforded a pleasant addition to the menu. It would be a good plan to hang a number of boxes in close proximity to each other in suitable districts where the stock-dove is already found. The most suitable places, it seems to me, would be preserves for game where the necessary protection from interference and poaching is already to be found.

The following are also to be had for use with the boxes: key, screws, bag with mixture of earth and sawdust for putting into the box (everyone can make this mixture for himself), and a measure for putting in the right quantity.



MEASURE FOR THE EARTH AND SAW-DUST MIXTURE.

The prices of the nesting-boxes are certainly very moderate when we consider how difficult they are to make and how lasting they are. These prices are only possible because they are produced in large quantities. But this is the fundamental principle of the undertaking, namely, that everyone may be able to obtain them.

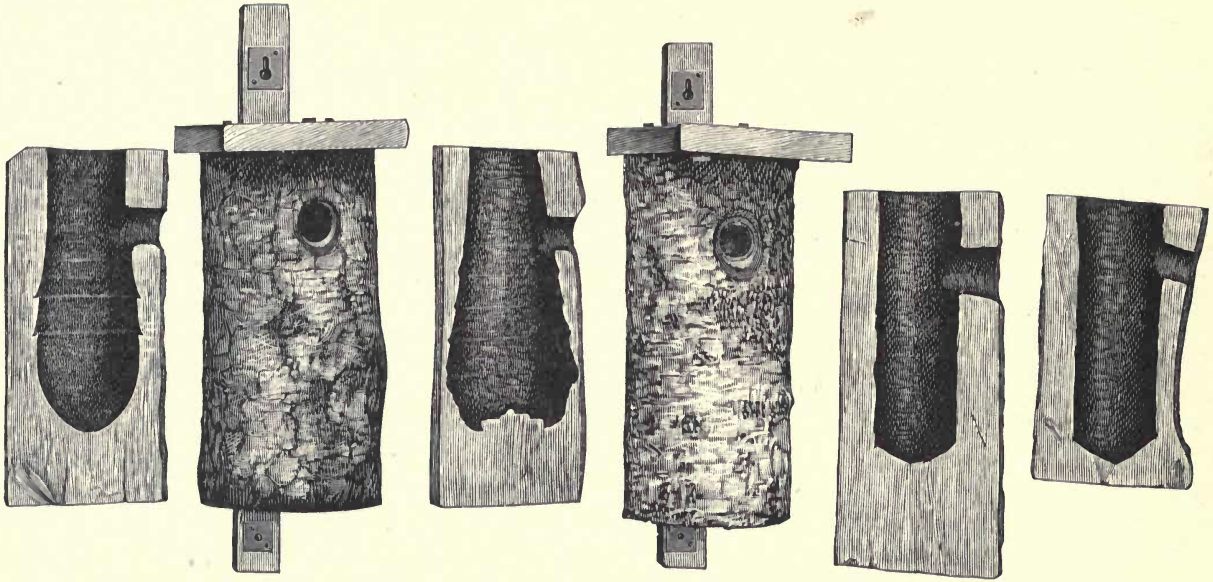
(F) *Advice regarding Nesting-boxes.*

Unfortunately, Baron von Berlepsch refused to obtain legal protection for his nesting-boxes, by means of either patent or trademark. He treated the matter from an ideal, but mistaken, point of view, and thought he was serving the good cause, and that he would soon see nesting-boxes made and used everywhere, in accordance with his directions, but he was thoroughly deceived. It is true that Berlepsch's nesting-boxes (so-called) appeared everywhere, but the imitations have nothing in common with the originals except the name, and they can be described for the most part as entirely worthless.

The name and the illustrations which are intended to mislead are printed in circulars without hesitation. Generally the fraud has been carried out so skilfully, that only in very few cases has it been possible to reach these unscrupulous tradesmen by means of the law.

It is exceedingly easy to cheat in regard to nesting-boxes, because outwardly they all bear a fair resemblance to each other, and they can only be properly tested if they are opened and sawn asunder lengthwise. Compare the figures in the accompanying illustration made from photographs.

On the left are complete nesting-boxes, and a section of one by Scheid; on the right are boxes made by other manufacturers. The exterior of the boxes is much the same, but what do we find when we compare the interior, the boring, position of the opening, etc.? At the bottom of one box there is such a lump that it could not possibly be inhabited by any bird. The box is very carelessly wrought in other



A. B. C.

A.—CORRECT NESTING BOXES. B. AND C.—WORTHLESS IMITATIONS.

respects. It is hollowed out, as the illustration shows, to the outer shell, so that the wall could be pressed in by the finger, and the boxes on the right show distinct signs of dishonest workmanship. They also seem correct from the outside: size, opening, everything coincides. Here is box B for starlings, but pierced with the same borer as A—the box for tits. It is simply a fraud, for the birds for which it is intended cannot get in at all. The Commission sent for three specimens of each of these boxes. Those shown here are the worst, it is true, but the others were not much better. It is very plain that the unfortunate owner of such a box has little to hope for from its use.

These are only two instances out of many, so that we need not be astonished that there are still so many failures. Fortunately, we are still in a position to attack this dishonest way of doing business by a step which will protect every purchaser directly from being cheated, and hence from injury. Baron von Berlepsch has had the trademark here shown duly registered, and up till now has allowed only the manufacturers, Scheid and Bertschinger, to make use of it, and in addition, these two firms are the only ones who are allowed to introduce the improvement described on p. 36.

REGISTERED TRADEMARK.

It is therefore to the interest of every purchaser to make use of only such nesting-boxes and other appliances for the protection of birds as bear this trademark. The "Commission for Encouraging the Protection of Birds" urgently requests all who are interested to act accordingly.

It is time that people realised that it is not a question of hanging up any sort of nesting-box, but one that carries out the established principles in every detail, *i.e.*, which corresponds in the minutest detail with a natural woodpecker's hole. If this were not so it would seem strange that before Baron von Berlepsch took up the matter we did not obtain similar results to his. Success in protecting birds depends on apparent trifles, such as Nature prescribes for us. Only the two firms of Scheid and Bertschinger work under the immediate and direct supervision of Baron von Berlepsch (Bertschinger, as we said before, makes the boxes only, and we especially draw attention to the fact that

we neither recommend nor guarantee his other articles). After an experience of almost ten years we can give a final opinion about the articles manufactured by these two firms, and we must describe their work as excellent.

But it is by no means impossible, seeing that the articles are turned out in this wholesale fashion, that occasionally an imperfect specimen may be found, and we therefore beg that purchasers will occasionally test the goods with the help of this book. Both firms have pledged themselves to take back, within eight days (carriage not paid by sender), any article that is in the least faulty, and to send back another free of charge.

When large quantities of nesting-boxes are required, they should be carefully selected. The following chapters will show that in most cases boxes A and B should be chosen, because the birds which inhabit them are those whose presence is most desired.

(G) *Hanging up of Nesting-boxes.*

Even if these nesting-boxes are perfect in construction, success still depends on the way they are hung up ; some important rules concerning this point will therefore be given here.

Before hanging them, tighten the screws of the lid and the batten which may have been loosened in transit, by means of the key (p. 36), and give a few blows with a hammer to the nail which connects the batten with the box.

Then, in place of the tree-mould found in natural holes, put into every box a mixture of sawdust and earth in equal parts, which can either be obtained from the manufacturers at the same time as the boxes or can be made by the purchaser himself.

Unfortunately, people are often misled by the saying, which is true enough of other things—"The more the better"—but if too much is used the pointed trough loses its value for birds that use little or no material for their nests, such as the wryneck, woodpecker, and stock-dove, because it is no longer true to Nature.*

The quantity of earth and sawdust to be put in has been exactly

* The advantage of the pointed trough lies in its keeping together the eggs of those birds that do not build nests. If the trough is filled too full this advantage is lost, and the box is as useless as one with a flat bottom. (*See* p. 35.)

ascertained. In box A put $\frac{1}{40}$ litre (= about 1 oz., or a tablespoonful) in B, $\frac{1}{20}$ litre (= about 2 oz., or two tablespoonsful); in C and D $\frac{1}{4}$ litre (= about $8\frac{3}{4}$ oz., or $1\frac{3}{4}$ gills).

As it is so important to put in the right quantity, it is better to make use of the measure, which can be obtained from the manufacturers, and is well adapted for filling in the mixture. For box A fill it once, for B twice, and for C and D ten times.

On the whole, in consideration of what we have said above, it is wiser to follow the rule: "Better too little than too much."

The boxes should only be cleaned in order to remove sparrows' broods, eggs and *larvæ* of insects, squirrels, dormice, dead birds, etc.; otherwise it is unnecessary to clean the boxes; as a rule, it would have a disturbing effect, besides which it is often impossible to carry it out—*e.g.*, in cases where the boxes are hung high up and in great numbers.

With regard to hanging up the boxes we must consider (1) the season; (2) the position; (3) the method of hanging them up.

1. The late autumn is the most favourable TIME for hanging them up, so that the birds that winter with us may find shelter there. But these nesting-boxes can be put up during the whole winter, till March, with a good chance of success. Boxes put up later are very rarely inhabited in the same year.

2. With regard to the POSITION, the most useful are as follows: Boxes A and A1 should be from 6 to 13 feet from the ground, on trees, props, walls, etc., in orchards, woods, and plantations, especially in young plantations, in a quiet spot protected somewhat by bushes, and if possible hidden by overhanging branches.*

Box A is for great tit, blue tit, marsh-tit, crested tit, coal-tit, tree-creeper, pied fly-catcher, wryneck, common redstart, lesser spotted woodpecker. Box A1 is for blue tit, marsh-tit, coal-tit, crested tit, and for these only, and they are perfectly safe from sparrows, and should therefore be used everywhere where sparrows are troublesome.

* If there is any fear of injuring young trees by knocking in nails, the boxes should be fastened to posts. In young plantations where there are no nesting-holes, it is both easy and desirable to bring about a settlement of very useful birds in this fashion. Boxes fixed at a distance of about 3 feet from the ground are inhabited by tits, as may be seen at Seebach. These low-hung boxes have this advantage, that they are neglected by the sparrows. This method can only be recommended where there are no vermin.

Box B must be fixed 12 to 16 feet from the ground, on trees, buildings, etc. It is mostly inhabited by starlings,* and also by the greater spotted woodpecker, in woods, plantations, avenues, and gardens, and the birds named for A.†

Box C should be placed from 6 to 50 feet above the ground, near cattle pastures and marshy lowlands, in plantations of fruit trees, in avenues, and in woods. It will be used chiefly by the green woodpecker.

Box D must be put high up on trees in woods, parks, etc., for stock-doves, kestrels, jackdaws, and owls.

Box E, half-filled with a little nesting material, such as small feathers (best of all torn sparrows' nests), should be fastened on towers and high buildings, for swifts.

The open box F may be fixed at a height of from 6 to 13 feet above the ground, on isolated trees, verandahs and walls of houses, for the spotted fly-catcher, at a greater distance from the ground, on gables if possible, for pied wagtails.

As some birds have strictly defined breeding-places, while others breed in immediate proximity to each other, the following suggestions

* People are often afraid of encouraging starlings to settle for fear that they may later on injure the fruit, especially cherries. This is quite a misconception. It is perfectly true that the starlings do a great deal of damage when united in large flocks, but it has been proved that those are not the starlings that breed in the neighbourhood.

There is one phenomenon that has been observed in starlings and other birds: they only stay for one or one-and-a-half days in their breeding-place *after the young are fledged.* Then they go many miles away in great numbers and form the large flocks which are so dreaded. It is not, therefore, the starlings bred in the neighbourhood, but strange starlings which do so much damage to the fruit growers. The following two observations will confirm this statement:—

Kammerforst (Langensalza) possesses extensive cherry orchards, which immediately adjoin the wood of Baron von Berlepsch, where at least 1,000 starlings annually breed in the nesting-boxes. In spite of this, no complaints have ever arisen concerning the cherry orchards, as the local authorities will bear witness. The birds have left long before the cherries are ripe.

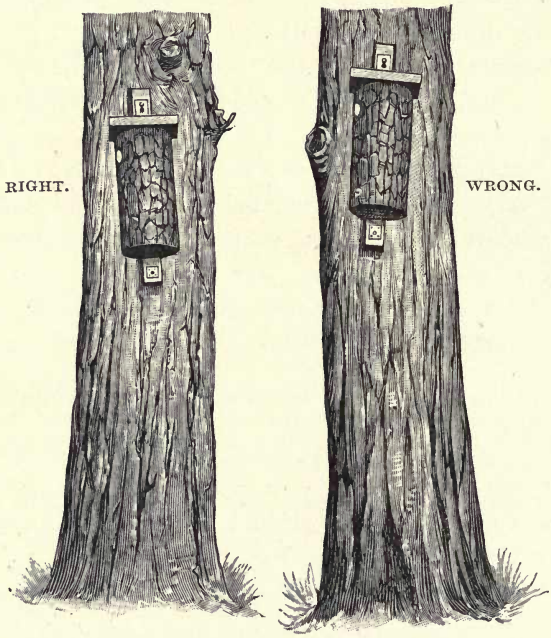
This confirms the Baron's observation that starlings have only *one* brood. All so-called second broods of starlings according to him are the result of unsuccessful first broods, and this is confirmed by the fact that these second broods are only found in isolated cases.

The opposite may be seen in the district of Lake Mansfeld. All efforts to make the starlings settle there have failed. No young starlings have been seen there in spite of apparently favourable conditions. After the breeding season and during the whole of the summer very large flocks are to be found there; during the day they besiege the cherry avenues and in the evening they settle in great clouds in the reed plantations of Lake Mansfeld.

† It is a very common error that tits prefer boxes with small openings. Experience has repeatedly proved that where boxes A and B are placed side by side at the same distance from the ground, box B is preferred by the tits.

should be noted: Boxes A must not be placed less than 20—30 paces apart; the same holds good of the open box F.

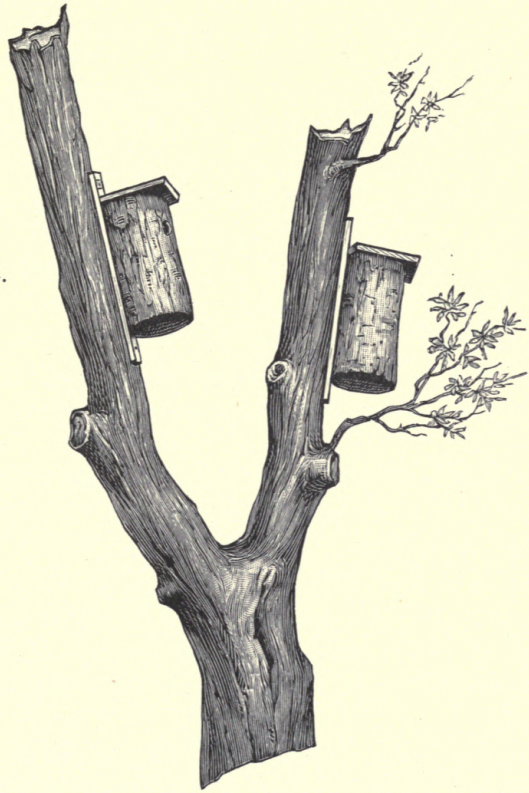
Boxes B and E and, under certain circumstances, C and D, can be placed very close together; if they are intended for starlings, several can be put on each tree; otherwise it is advisable to put only one on each tree. On the whole it is better to distribute the boxes at one's disposal equally over the district. If they hang rather far apart at first, others can be added later on.



3. The METHOD of hanging the boxes will be best seen in the accompanying illustrations. The boxes are rightly fixed if they are hung vertically, or with the upper part projecting a little in the direction of the opening, and the opening facing the east or south-east.

The boxes are badly hung if inclined towards the side away from the opening, or if the opening faces the weather-side. No harm results if the box is inclined a little less to the right or left side. The side with the opening must always be considered as the front. It must be understood clearly that by inclining the box backwards—that is to say, in a direction opposite to the opening—the direction of

the slope of the opening is neutralised, and rain can penetrate. (*See* p. 30.) They must be so fastened that they cannot shake, as otherwise the birds will not readily settle in them. The best means of fastening them is with the screw-nails (p. 36), and the easiest manner of doing this, especially with the bigger and heavier ones is as follows: A screw-nail must be knocked in at the chosen spot, just so far that its



head projects over the batten of the box, which is to be hung up—the screw-nail must therefore project more than $\frac{3}{4}$ inch out of the tree; the box must then be hung up on it (*see* p. 36), and the screw-nail finally hammered in.

(H) *Successful results of the Berlepsch Nesting-boxes.*

Wherever these nesting-boxes have been hung up a great success has been the result. All the breeders in holes (*see* p. 28), and last year

the black woodpecker even, have inhabited them ; while the boxes of earlier days were only used by a few species, and very rarely at that. The author was able to convince himself that 90 per cent. of the 2,000 boxes in the wood at Kammerforst (part of the Seebach experimental station), and nearly all of the 500 at Seebach, and of the 2,100 near Cassel,* were occupied by various species (*see* pp. 25 and 28 for exact list of birds). The Prussian Board of Agriculture has caused extensive experiments to be made with these boxes, with excellent results, as published documents affirm.

Of the 9,300 boxes hung up by the Government in the State and Communal woods of the Grand Duchy of Hesse, 70–80 per cent. were used the first year, and all have been inhabited this year (1907). The value of this nesting-box compared with those of other makes is proved, among other things, by a letter sent me from Wilmersdorf, near Berlin, in which I am informed that for five or six years unsuccessful experiments were made with other boxes, but that the von Berlepsch kind, which were hung up last year, were all occupied at once. The same favourable results are reported by numerous official departments, societies, and private individuals. It would take too long to enumerate them all here.

A few proofs must be adduced of the indirect results, that is to say, of the benefits derived from the use of nesting-boxes. It is not necessary to refer to the old problem regarding the number of caterpillars, chrysalides, etc., a tit eats daily, and how many pounds of caterpillars are in consequence eaten in a year by a whole family of tits, but I will give a few actual, recent examples of the benefits resulting from a judicious protection of birds, which I have taken from the material nearest at hand.†

The Hainich wood, south of Eisenach, which covers several square miles, was stripped entirely bare in the spring of 1905 by *larvæ* of a little moth (*Tortrix viridana*). The wood of Baron von Berlepsch, in which there had long been nesting-boxes, of which there are now

* In Cassel a station for the protection of birds was established seven years ago on the model of that at Seebach, and it may now be considered complete. It is under the direction of the section "Vogelschutz," of the Hessian Society for the Protection of Animals. Major Henrici, Cassel, Weinbergstrasse, is ready to give any information and assistance that may be required.

† From a lecture read by Baron von Berlepsch last winter to the German Society of Agriculture, Berlin.

more than 2,000, was untouched. It actually stood out among the remaining woods like a green oasis. At a distance of a little more than a quarter of a mile farther the first traces of the plague were apparent, and at the same distance farther on still it was in full force. It was a plain proof of the distance the tits and their companions had gone during the winter, and after their breeding time.

The case was so plain that Baron von Berlepsch considered it of sufficient importance to send a report to the Prussian Board of Agriculture in order that it might be placed on record. Similar observations were made during a plague of *Tortrix viridana* last spring in the Crown wood Harras, in the Grand Duchy of Hesse, where the protection of birds has been carried on in a sensible and energetic fashion for the last six years. The abundant use of nesting-boxes in the Prussian woods has, during the last two years, brought about a sensible decrease in cockchafers and *Tortrix viridana* in some places, by means of starlings.

If we turn from woods to agriculture and fruit-growing, the experimental station at Seebach again affords an eloquent and well-authenticated testimony.

The same good fruit crops have been obtained for many years in those places which have been longest and most abundantly provided with nesting-boxes, and where most of the trees have grown up with the protection of birds. Although the whole neighbourhood frequently suffered from caterpillars, these trees, inhabited by tits and other birds nesting in the boxes, always escaped.

The inhabitants of the neighbouring village soon noticed this, and also began to hang up boxes. Now all the gardens are full of them, and the people maintain that since then the caterpillar plague has considerably decreased in their neighbourhood. It is worth noting that the inhabitants of that village are by no means specially fond of birds, but that the protection of birds is due solely to utilitarian purposes, the people having recognised the fact that the outlay for boxes was a very good investment.

These instances are established, irrefutable facts, and these actual experiences are undoubtedly more eloquent than all the learning displayed at the council board.

These nesting-boxes do not require any special recommendation; the facts speak for themselves.

I have heard frequent complaints that Berlepsch's nesting-boxes are

frequently attacked by woodpeckers. It certainly happens very often, but at the same time it is the best proof of the naturalness of these boxes. The natural holes of the woodpecker, the holes, that is to say, which the woodpeckers have themselves made in the tree, are treated in the same way, as may easily be seen in every old wood. The nesting-boxes formerly used were never attacked by woodpeckers, but—they were never inhabited by them.

The enlarging of the openings by squirrels, which has often been noticed, is also to be seen in natural woodpeckers' holes. But these injuries do not render useless either the real or the artificial holes which serve as dwelling-places for other birds, such as tree-creepers, spotted fly-catchers, redstarts, wagtails, robins, wrens, according to the degree of injury and the place where the box is hung. This has been frequently proved at the Seebach experimental station.

The lining of the openings with tin is in every way objectionable, as the natural appearance of the boxes—their chief merit—is destroyed, and such boxes are never inhabited by birds.

(1) *Cavities in Walls.*

Numerous birds build in holes in the walls of the old castle at Seebach. These opportunities for building nests, which are so eagerly made use of, are to be increased shortly by the formation of artificial holes in the thick walls, and extensive experiments are to be tried elsewhere. Nesting-places of this description can be made on the principle of the nesting-boxes by means of cement or other mortar.*

The nesting-places of clay and similar material which were formerly so often sold, and which are unfortunately still to be had, must be distinguished from the holes made in the walls themselves. The latter are not affected by the changes of the weather, owing to the thickness of the walls; whereas broods that chanced to be hatched in the artificial stone or clay nesting-holes, with their thin walls, were exposed to abrupt changes of temperature, extremes of heat and cold, and were thus destroyed.

Many birds will not settle in clay holes: woodpeckers, for instance, never do so.

* Nesting-places of this description have proved very valuable near Cassel. They were occupied by blue tits, crested tits, wrynecks, black and common redstarts, and all the broods were successful.

CHAPTER II.

PROVISION OF NESTING-PLACES FOR BIRDS BREEDING IN THE OPEN.

Birds breeding in the open are those that make their nests in bushes and trees, on the ground, on banks, among reeds, etc.

The want of opportunities for nesting is becoming more and more apparent as far as these birds are concerned, which include our best songsters, since there has been a perfect mania for destroying hedges and fences everywhere, for cutting down the undergrowth in woods and on the outskirts of woods, and for dividing fields, drying up swamps and ponds, and altering river beds.

Successful methods of providing nesting-places for such birds are also to be seen at the experimental station of Seebach, where extensive plantations have been laid out and treated suitably for the purpose. Special attention must be drawn to the fact that in these plantations the most important points are the correct choice of shrubs and their suitable pruning.

In the choice of the shrubs, those are specially considered which can bear pruning, and which branch out in consequence of being cut, which keep away vermin by means of thorns, thrive well in the shade, and are especially favoured by individual species of birds, as, for instance, the gooseberry, which is liked by the warblers. These bushes include especially white thorn (*Crataegus oxyacantha*), hornbeam (*Carpinus betulus*), common beech* (*Fagus silvatica*), dog rose (*Rosa canina*), wild gooseberry (*Ribes grossularia*), tall American gooseberry (*Ribes grossularia arboreum*)—a species of wild currant (*Ribes pumilum*) [*Ribes alpinum* has not proved satisfactory], privet (*Ligutrum vulgare*), the two varieties of *Lonicera* (*Lonicera xylosteum* and *Lonicera tatarica*), and of conifers, the red cedar and pollarded firs.†

* A lopped beech is specially liked for an early brood, because the nest can often be built in the old dry foliage.

† The Norway spruce (*Picea excelsa remonti*) is used at Seebach instead of pollarded firs ; it possesses the necessary shape without lopping.

In describing the nesting-places provided for birds breeding in the open at Seebach, the shelter-wood for birds must first be considered, and then a number of similar plantations.

(A) *Shelter-woods for Birds.*

The idea of planting shelter-woods for birds is a very obvious one, and was carried out formerly, though in a very simple fashion, by planting all kinds of brushwood, more particularly shrubs like hazel, osier, and sallow, which are of little use for protecting birds, and by letting them grow in a wild tangle.

True, these plantations are better than none, and they improve the beauty of the landscape, but they are of no use for encouraging birds to settle. It is the merest chance if a bird ever builds in such a plantation, which is wanting in every requirement for the building of nests. The bird shelter-woods at Seebach, on the other hand, provide the most favourable opportunities for nesting, because, like the nesting-boxes, they are close copies from Nature.

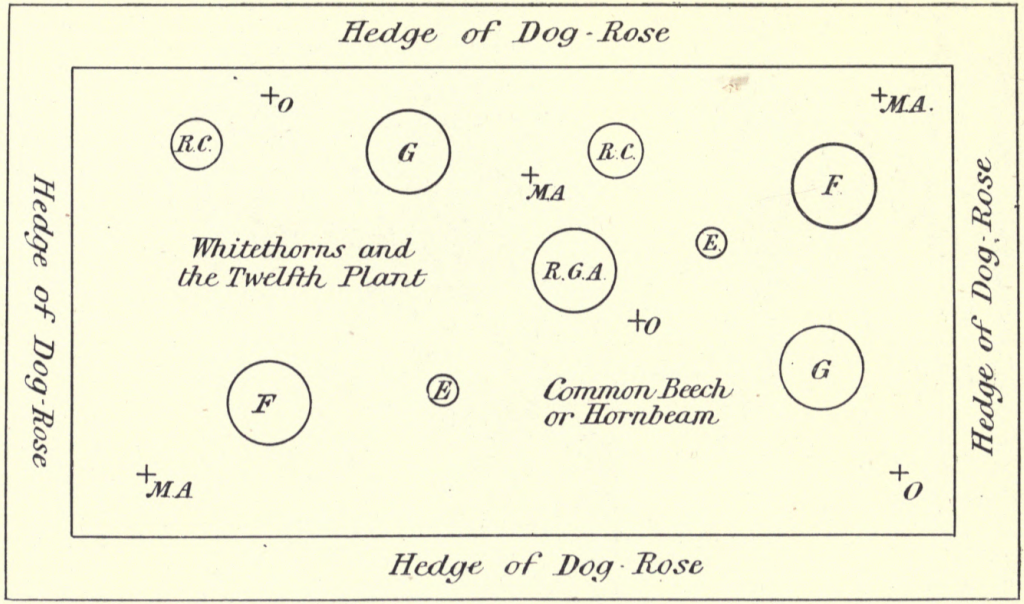
They are based on close observation of primitive nature in the primæval forests of Africa and America, where the eternal growth and decay, as well as the luxurious growth of the creepers which penetrate everywhere, provide the birds with the best possible opportunities for building. The falling trees, the pieces of trees and large branches, which were held up by creepers, break up the branches of the underwood. The dormant eyes sprout beneath the fractures, and form whorl-shaped ramifications in which innumerable nests will be built.

The present shelter-woods are the result of these observations made by Baron von Berlepsch in the course of his travels. We will describe the development of one of these bird shelter-woods by means of the following diagram and illustrations made from photographs.

First of all the piece of ground intended for the shelter-wood must be thoroughly prepared. It must be dug deep in the autumn, and during the winter must be left in rough clods, so that the frost penetrates deep, especially if it was formerly turf.

PLAN OF SHELTER-WOOD.

In the spring the ground thus prepared—the whole of the inside of the plan—must be planted with whitethorn ; the twelfth plant must always be a beech or a hornbeam. The distance between the rows and the plants must be from 2 feet 6



PLAN OF A SHELTER-WOOD FOR BIRDS.

O.—Oak. M.A.—Mountain Ash. G.—Wild Goosebery. R.G.A.—*Ribes grossularia arboreum.*
R.C.—Red Cedar. F.—Fir. E.—Elder.

inches to 3 feet, according to the goodness of the ground. Here and there a few tall trees are planted that do not give too much shade, but which are to rise above the rest. Mountain ash (*m.a.*) and oak (*o.*) are best for this purpose. If there are other trees already growing on the spot they may be left if useful for the purpose, instead of others being planted.

This plantation is surrounded by a hedge of dog-roses (*see* plan, p. 51). Two, or better still, three rows of roses are planted about 2 feet apart, and with the same distance between each plant.

In the first year the copse therefore consists of the wild roses that

Fig. 1.—SHELTER-WOOD BEFORE CUTTING.

surround it, the whitethorns and hornbeams in the interior, and the trees that stand here and there.

It is absolutely necessary that the plantation should be frequently watered, weeded, and hoed if it is to thrive. If there is much game in the neighbourhood the plantation must be fenced in with a wire fencing, at least a yard in height, during the first year, or, better still, until the second cutting.

In the second year groups of the bushes recommended on pp. 49 and 50 should be planted in the copse, as indicated by circles in the diagram,

especially gooseberries, tall gooseberries, and the dwarf variety of the wild currant, privet, both varieties of *lonicera*, single red cedars* and firs, especially Norway spruce, kept low by pollarding. If possible a space of 1–1½ yards should be kept clear round the firs to prevent them withering at the side.

The whitethorn must, of course, be removed from the places which these groups are to occupy. They can generally be made use of elsewhere.

Of course the copse can be properly planted in the first year, *i.e.*, the groups mentioned can be put in. It is merely a matter of con-

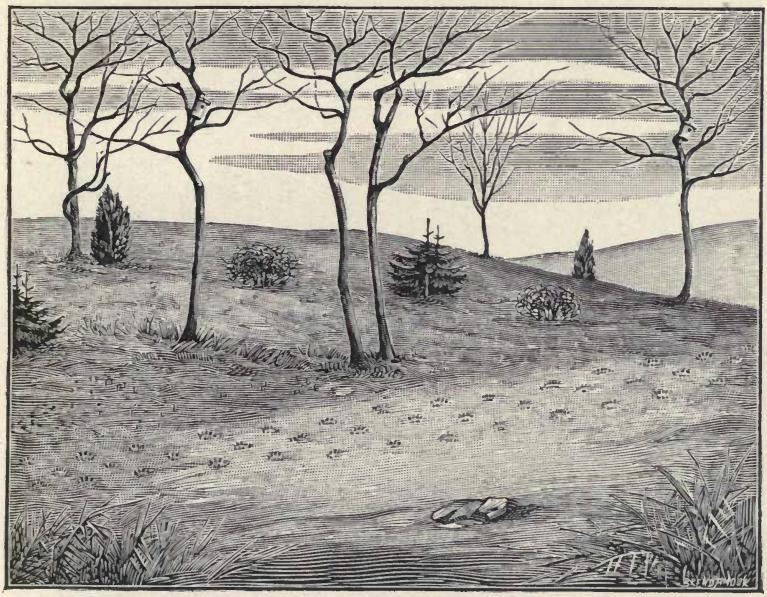


Fig. 2.—SHELTER-WOOD AFTER THE FIRST CUTTING.

venience if they are not put in till the second year, since very often when the plantation is begun the necessary plants are not all at hand.

The bird-shelter wood has now been planted. At first it must be left entirely to itself until in the third or fourth year, or, if the soil is very bad, in the fifth year, it somewhat resembles Fig. 1.

* The common juniper was used till recently at Seebach. Most breeders in the open readily build in it; but it was found that it unfortunately dropped its dry sharp needles into the nests with eggs, which were then deserted by the birds.

In the third, fourth, or fifth year, according to their growth, all the plants, except those joined in groups and the isolated tall trees, are cut down to the ground in order that they may grow up as spreading bushes instead of single stems. Nothing is left of the whole plantation therefore, but the groups and tall trees marked by circles and crosses on the diagram. The former only require simple pruning in order to produce a dense growth. The copse now resembles Fig. 2.

During the following years the copse develops by means of the new

Fig. 3.—SHELTER-WOOD AFTER THE SECOND CUTTING.

shoots to an impenetrable thicket, fenced in by a very thick hedge of wild roses. It, therefore, once more resembles Fig. 1.

Many people think enough has been done, and that the copse, in which, perhaps, a few nests are already to be found, is finished. They think the plants may now grow in wild confusion. But the contrary is the case. The copse derives its full value from correct pruning. In the sixth, seventh, or, if the soil is very poor, in the eighth year, the dense copse must again be cut down, but now isolated bushes, which may be called stock-bushes, are left at intervals of five or six paces, and their numerous sprouts are lopped at varying heights—

$\frac{1}{2}$, 1, $1\frac{1}{2}$, and 2 yards above the ground (*see* Figs. 3 and 4). They should be cut close above the dormant eyes, so that the new growth forms whorl-shaped ramifications, which serve the birds as a foundation for their nests.

Fig. 4.—FRESHLY PRUNED BUSHES.

These whorl-shaped sprouts must be cut back next year, as in Fig. 5, and this must be done annually as in Fig. 6, for this causes them to ramify, and the birds settle in them all the more readily. In older

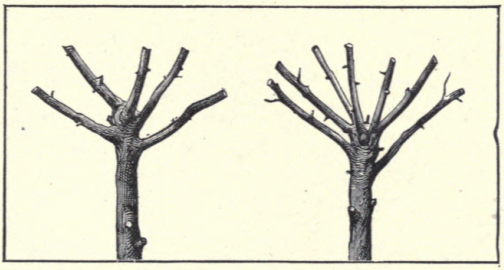


Fig. 5.—ONE-YEAR-OLD WHORLS RECENTLY PRUNED.

shelter-woods, where the bushes are provided with old, thick whorls (*see* Fig. 6), the whorls of each separate stock-bush are cut back only

every two years, in consideration of the early nesters, which often begin before the wood has come into leaf. The lopping should be carried out in such a way that a newly-lopped stock-bush alternates with one that is untouched for the time being. The uncut bushes are treated in the same way the next year, while those cut the previous year are not touched.

By this means there are an equal number of stock-bushes with freshly-cut whorls, and of those with last year's whorls alternating with each other.

Fig. 6.—OLD WHORLS RECENTLY PRUNED.

Between the stock-bushes the hedge grows up, serving as a protection to the bushes which have been cut to the ground. The bushes will have developed greatly in a few years, so that there will be little difference between them and the stock-bushes, and the whole will resemble an impenetrable thicket. The whole wood must, therefore, be cut to the ground every five or six years, with the exception of the stock-bushes, the tall trees, and the plants forming the groups. In order not to interfere with the settling of the birds, the copse may be divided into several parts, which are alternately cut down in different years.

A bird shelter-wood of this kind thus requires six to eight years before it is complete, as generally three-year-old plants are used. Our object may be attained quicker if we use older plants.

Abundant proof is found every year at Seebach of the remarkable fondness shown by birds for the whorl-shaped ramifications. According to the *Ornithological Journal*, 1904, p. 490, no fewer than 85 nests were found in the autumn of 1904 in the oldest shelter-wood, which is about 8 yards wide and about 230 yards long; that is to say, one nest for less than every three yards. In the autumn of 1906, the forester Kullmann, who was sent by the Government of the Grand

Duchy of Hesse, and the well-known ornithologist, Pastor Kleinschmidt, who was there at the time, were able to verify the fact that there were 73 nests in the same wood in a distance of 110 yards—one nest, that is to say, to about every one-and-a-half yards. It is certainly worth noticing that, with two exceptions, these nests were built in the artificially-produced whorls.

Where no good land can be obtained for shelter-woods, ground that cannot be used for agricultural purposes, quarries, clay pits, and sand pits, steep slopes, dead angles in fields, in farmyards and gardens, ditches, sloping banks, outskirts of meadows, pastures and commons, etc., should be laid out on the same principle.

Every copse already in existence, every bush, park, even separate hedges and groups of trees, may be used more or less as shelter-places if the directions given above are carried out as far as possible. It has been sufficiently proved by practice that these shelter-woods will lead to very good results if introduced into districts where birds are scarce. For this reason the authorities encourage the planting of shelter-woods for birds in vine-growing districts as the best means of encouraging the settlement of birds which prove so useful a remedy against the *Eudemis botrana* and the *Tortrix pilleriana*, and as the best protection for the woods.*

(B) *Plantations in general.*

Shelter-woods must serve more or less as a model wherever growing fences or hedges are planted, where roadsides, streets, railway embankments, banks of rivers and ponds are planted, and where undergrowth is planted in the woods, if they are to be useful for protecting birds.

In proof of this, we find at Seebach a number of devices which serve, first of all, to attract birds to settle, and also to connect the shelter-woods with one another and with the park.

A hedge of firs, growing for about 547 yards at the side of a ditch, deserves special mention. It is planted on one side with pollards, on the other with mountain ash (*see* illustration). This fir hedge, now thirty years old, was planted in three rows with a space between the

* The largest of these plantations, laid out strictly in accordance with the preceding directions, is at present growing up between Eltville, Steinberg, and Kloster Eberbach. The bird shelter-woods lie between the valuable vineyards, and comprise about five acres.

rows and the plants of one yard, and was kept low by lopping. When the branches spread too much the centre row was entirely removed, and in the remaining rows every other fir was taken out. All the branches, even the lowest, have been well preserved by this method, and also for the reason that the hedge was never clipped at the sides; and this hedge now forms a thicket about seven yards in width, in which innumerable nests are found every year. The space which has been formed between the two rows of lopped trees, under the thick branches, serves in the winter as a shelter and feeding place for game.

HEDGE OF FIRS.

The left-hand side represents the portion cut four years before the right-hand side, which has been recently cut.

The hedge is now cut only every four to six years, and for this purpose is divided into six parts.

An avenue of Canadian poplars, which stretches along the brook for some way, serves not only as a passage for the birds between the park and the field-copses, but is used by a colony of over a hundred fieldfares and many other birds, including a few kestrels.

The trees of this avenue (which might consist of other kinds of poplars) are lopped every five years in the manner shown in the accompanying illustration. The birds build their nests on the knotty excrescences produced by the lopping, particularly when there are young branches. Other trees in the park and the avenues, such as limes, maples, etc.—fruit trees, of course, are out of the question—are prepared for the birds without their growth or their appearance being injured. The branches and twigs of the trees, which are for the

most part grown pyramid-shaped, are pruned so that the same whorl-shaped ramifications are formed as in the stock-bushes of the shelter-woods.

The home park at Seebach deserves special attention. There, as

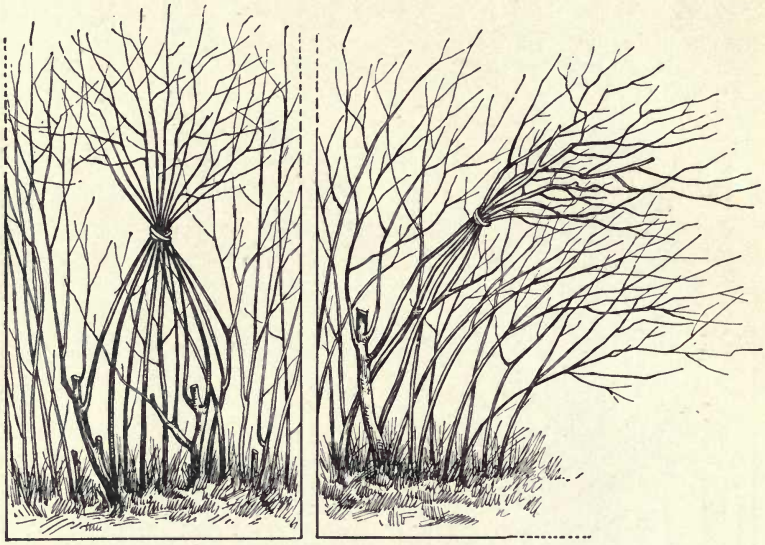
POPLARS.

With four-year-old shoots. Freshly cut.

we said before, all the trees of Central Europe are represented. The undergrowth, consisting chiefly of whitethorn, different varieties of

gooseberry (latterly especially *Ribes grossularia arboreum*, and *Ribes pumilum*, yew, privet, etc., which grows under the dense foliage of trees), has been treated like the shelter-wood without in any way producing a displeasing effect.*

A peculiar place for nests, which has proved very successful, was recently provided by tying several branches of a bush together, as may be seen in the accompanying illustration, and in this simple fashion forming the whorl-shaped foundation for nests.



BUSHES TIED UP TO PROVIDE NESTING-PLACES.

The success which has attended this mode of procedure is extraordinary. Out of 50 bushes thus tied together, 47 were occupied the first year. But, in spite of this, Baron von Berlepsch would only have this done as a makeshift; it serves merely as a temporary equivalent for the whorls which are not yet ready.

Mention has yet to be made of stacks of brushwood. These arrangements for nests were made use of by birds elsewhere, but were less

* Special stress is to be laid on the importance of producing undergrowth, particularly on the outskirts of woods. All the plants recommended above for the shelter-woods may be used. The varieties of *Ribes*, *Lonicera*, and privet are the best able to bear shade.

successful at Seebach, probably because there were sufficient and more desirable places for nests to be found there.

Excellent provision has also been made, by means of plantations in the pond of the home park and on its banks, for water-fowl, some species of which have lately decreased so noticeably that great stress should be laid on their preservation. Water-plants, such as reeds, flags, and sedges, and bushes hanging over the water, provide ample shelter and places for nesting.

Wild duck breed on the shore, the nest of the moorhen is found under the branches of a bush of dogwood, on the surface of the water floats the nest of the little grebe, and that of the kingfisher is on the bank. It is very interesting to see these birds diving and swimming in the water with their young.

Baron von Berlepsch intends to pay particular attention in future to experiments dealing with protection of water-fowl. The pond is a very suitable place, because it is directly connected, by means of a ditch, with the neighbouring brook, which serves as a good means of attracting the birds that pass that way.

Owners of parks and similar grounds, and especially those persons to whom the care of these places is entrusted, such as gardeners and others, should bear in mind the hints given above; or, better still, they should seek instruction by a visit to Seebach itself.

Who would not like to attract as many of our feathered favourites as possible to his own garden, park, etc., where they not only enliven Nature by their song and their bright ways, but act as watchful guardians, attacking all kinds of harmful insects ?

(c) *Special Measures.*

A few measures taken at Seebach must be mentioned in order to complete the directions given above :—

1. The fallen leaves in the shrubberies, park and wood, must be left on the ground as far as this is compatible with other considerations. The birds find their food under the leaves, and are warned of the approach of their enemies by the rustling of the leaves. Experiments carried out in the shelter-woods have proved how important this is, for those parts of the wood where the ground had been cleared of dry leaves were avoided by birds in a striking manner.

2. The removal of stacks of faggots and wood, as well as grazing in the wood, must be avoided as far as possible in the nesting season.

3. Hedges must be cut, not in the breeding season, but early in spring and autumn, as has been ordered in Germany by various Government Departments. The custom of pruning at midsummer, which is unfortunately still practised in many districts, destroys many second broods, and this is prejudicial to the increase of birds, as second broods mostly consist of females.

4. If a plantation is to serve as a shelter-wood for birds, in addition to other purposes, the hints on the choice, the planting, and pruning of shrubs and trees must be attended to.

5. It should be remembered that a well-cared-for hedge is to be preferred to any wooden or iron fence round gardens and similar places for weighty reasons. A living hedge (*a*) serves as a nesting-place for birds ; (*b*) is far more beautiful in the spring ; (*c*) does not let the carbon, which is so necessary for the growth of plants and which lies on the ground, be wafted away with every breath of wind ; and (*d*) is to be recommended on the score of cheapness.

CHAPTER III.

FEEDING OF BIRDS IN WINTER.

SPACE will not permit us to discuss in detail the necessity for feeding birds in winter. It is sufficiently proved by the fact that in every severe winter a number of birds perish from want of food, and not from cold, as so many people believe.

If we are to carry out this winter feeding in a rational manner, our chief object must be to preserve the birds that remain with us during the winter and those that return from the south early in spring, accustoming them to certain districts.

Birds only require feeding during and after certain changes in the weather, especially during blizzards and intense frost. Careful observation shows that our smaller birds digest their food so quickly that a very few hours of want suffice to destroy great numbers of tits, tree-creepers, nuthatches, woodpeckers, golden-crested wrens, etc.

The best refutation of the argument that birds become spoiled by artificial feeding and no longer do their work in Nature's household is to be found in Dr. Liebe's words: "All food provided for insectivorous birds is merely a makeshift, as every bird protector can confirm. The birds find but a poor substitute, even in those arrangements which are fitted up with every luxury in the shape of mealworms and ants' eggs, for their natural food in woods and fields and gardens, which they always prefer. This fact explains what the astonished bird-lover often regards as black ingratitude, the sudden desertion, that is to say, of the feeding-places when the thaw sets in."

I would like to add that the swarms of tits, nuthatches, tree-creepers, woodpeckers, etc., only come at certain hours, generally twice a day, to the same feeding-place, when the weather is normal. The reason is

that, as a rule, they visit a certain district by the same route and at fairly regular hours, and on their way visit the feeding-places just as they visit trees, as long as they can find their natural food there.

It is only when the weather prevents access to their natural storerooms that they stop all day near the feeding-places, and it is then that artificial feeding must come to their rescue.

It is a different matter in the case of those birds which inhabit a small area, such as a garden. They may be called tame to a certain extent, and have given up wandering over large districts, but it by no means follows that they eat nothing but artificial food, and have given up their work in Nature's household.

Kind-hearted people have always taken pity on our feathered winter guests. Feeding-places of the most varied description have been and still are arranged for birds, and all manner of feeding appliances, often very cleverly contrived, were and are still used.

But often, when neither money nor trouble have been spared, the results have been out of proportion to the means employed. I know cases where food was used by the hundredweight, and was simply scattered in the street or on feeding-places in mud and snow, where, of course, the greater part was wasted, as far as its original purpose was concerned. But people feel satisfied and proudly conscious of having done a "good deed" simply because they have spent a considerable sum of money; they do not pay any attention to the fact that they have in no way relieved the birds.

Again it was Baron von Berlepsch who introduced a satisfactory solution of the difficult question of winter feeding. After experimenting for eleven years, he drew up three conditions necessary for the effective and sensible feeding of birds in winter, which, according to him, has for its main object their preservation. "The sensible and effective method of feeding birds must (1) be readily accepted by those for whom it is intended; (2) be carried out in all weathers—that is to say, the food must always be accessible to all birds, especially in sudden changes of weather, blizzards, wind, rain and frost, and must always be in the best condition; (3) it must be comparatively cheap—*i.e.*, the money spent on the food must really serve its purpose. The food must not be wasted or spoilt, but must be used by the birds to the last crumb."*

* "Ornithologische Monatsschrift," 1904, p. 374.

These three essential conditions cannot be carried out by any of the old methods of feeding, and the only modern ones which fulfil these conditions are those which make use of the appliances which Baron von Berlepsch has constructed—namely, the "Food-tree," the "Food-house" (called the Hessian Food-house, because it was first used in Cassel), and the "Food-bell." All who know anything about the matter must agree with this statement.

(A) *The "Food-tree."*

This is the most natural of the appliances. I mention it first therefore, in order to point out once more that all Berlepsch arrangements are based on careful observation of Nature.

The "food-tree" imitates a coniferous tree closely covered with insects' eggs and *larvæ*, so that the hand of man has fashioned what Nature fortunately provides only in exceptional cases when there is a plague of insects.

All kinds of coniferous trees, especially firs, or else separate branches, can be used to form these "food-trees." Attention must be drawn to the fact that living trees lose their leaves when hot fluids are poured on them, look ugly, and easily become diseased. They should therefore be chiefly used in woods, while in other places—in parks, plantations, farmyards, gardens, etc.—felled trees should be used, which can be purchased at a low price.

On one of these trees a mixture of food is poured, which, as it is to serve for insectivorous as well as graminivorous birds, should be prepared from the following recipe :—

	oz.
White bread (dried and ground)	4½
Meat (dried and ground)	3
Hemp	6
Crushed hemp	3
Maw	3
Poppy flour	1½
Millet (white)	3
Oats	1½
Dried elder-berries	1½
Sunflower seeds	1½
Ants' eggs	1½

To the total quantity of the dry food as above add about one-and-a-half times as much fat, beef or mutton suet. As the fat easily evaporates in a fluid condition, more suet must be added after the mixture has been warmed several times. Food made from this recipe is sold by the firm of Hermann Scheid, at Büren, in Westphalia, under the name of "Food-stones."

It is by no means necessary to keep closely to the recipe; it is only to serve as a guide, and can be altered. The chief part of the mixture must, however, always consist of hemp, whole or crushed.

This mixture is heated on the fire—if prepared at home the fat must be melted and then the dry foodstuff put in—well stirred, and, when

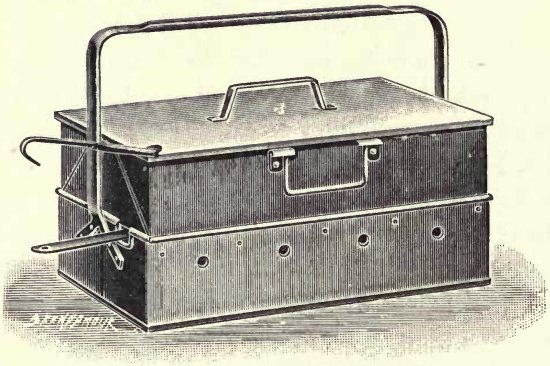


FIG. 1.—HEATING APPARATUS (CLOSED).

boiling, poured on the branches of the tree. It is essential that the liquid mass should penetrate through the leaves to the branch itself, and this can only be done when it is very hot. It is a mistake to spread the mass on the branches when it is beginning to cool, for this brings about the very thing we want to avoid—a greater surface of food is exposed; it is covered by ice, hoar frost, and snow, and is rendered naccessible to the birds.

At the Seebach experimental station, and in many other places, a special warming apparatus is used to prepare the "food-tree." Not only are the separate parts very useful for pouring on the food, but it has this very great advantage, that the hot food can be kept warm for a long time.

Fig. 1 shows the apparatus closed, while Fig. 2 shows clearly its constituent parts—two receptacles, one on the top of the other, of the

same shape, and made of galvanized iron. The upper division (18 inches long, 10 inches wide, and 4 inches deep) is used to melt the food, the lower is heated by fuel, and serves to keep the upper part warm; there is also a round pan with a long handle which is placed between the upper and lower receptacle over the fuel when the apparatus is closed, and a tin ladle. Any ironmonger can easily make one of these apparatuses from the illustrations.

Figure 3 shows clearly how the food is to be poured on when the warming apparatus is used. The pan, held in the left hand, contains the food taken from the upper iron receptacle, and serves at the same time to catch the fat that drips from the branches.

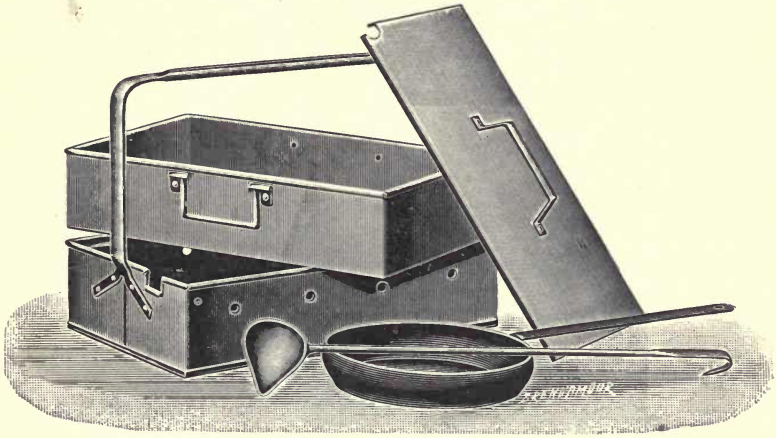


FIG. 2.—HEATING APPARATUS (OPEN).

If the food is poured on by two people, the upper receptacle can be used instead of the pan. One person holds the receptacle with both hands, while the other ladles out the mixture with the spoon and pours it on.

As the solid substances sink to the bottom of the boiling fat, the mixture should be frequently stirred.

All species of birds visit the "food-tree"—even the long-tailed tit, which, as it dislikes coming down to the ground, rarely seeks any other kind of feeding-place.

For this reason, and because the birds are plainly visible, the "food-tree" affords a very interesting opportunity for observing them

in the neighbourhood of houses, near windows, in gardens, or in farmyards.

For this reason, also, this method of feeding is best for playgrounds and school gardens, and is preferred by many teachers. The children soon recognise how useful and true to Nature it is, and take a great

FIG. 3.—POURING THE FOOD ON TO THE "FOOD-TREE."

delight in noticing the successful results achieved with the help of their teacher. They also become acquainted with many birds which they would not otherwise know.

(B) *The "Food-stick."*

The "food-stick" is similar in character to the "food-tree." It is a portion of a branch, 8 inches long by about 2 inches wide, provided on one side with six holes, $\frac{3}{4}$ inch in diameter and $\frac{3}{4}$ inch deep, while on the other side there is a French nail.

After the holes have been filled with the food-mixture described above, the piece of wood is fixed to a tree or post in a sheltered place by means of the nail. It is best to turn the holes half or entirely downwards, to protect them from frost.

These "food-sticks" are chiefly visited by tits, and serve not so much for feeding as for accustoming birds to come to a particular spot, so that they should be used near where there are nesting-boxes.

The "food-stick" can be obtained from Scheid by those who do not care for the slight trouble of making them.

FIG. 4—THE "FOOD-STICK."

Experience, however, showed that, though the "food-tree" and "food-stick" fulfilled all conditions, they were not convenient enough for some people, so that the birds were not fed at all in winter as long as a simpler and equally useful way of feeding was not known.

This circumstance induced Baron von Berlepsch to invent a way of feeding which not only fulfilled the conditions already mentioned, but which could be easily carried out by a child or an unskilful workman.

The Hessian "food-house" and the "food-bell" were the result. Both are based on the same principle—the food-table in the one, and the self-filling food-dish of the other are protected from the weather, so that the food is always in good condition, and easily accessible for the birds.

(c) *The Hessian "Food-house."*

The arrangement of this can be plainly seen in Figs. 5, 6, and 7. It is to be preferred to all other ways of feeding. It consists mainly of a roof resting on four corner-posts, and a centre-post with the upper, actual food-table, and below it a smaller food-table. The food is placed on the latter only until the birds have discovered the upper, proper table. Below the roof, right round the house, a strip of glass is fixed from post to post. It is of the greatest importance, and must not be omitted or replaced by a board, as has sometimes been done.

It not only protects the food from the weather, but also throws the necessary light on to the table.

The chief point in the "food-house," which makes it the best arrangement of the kind, is that the upper edge of the table is on a level with the ledge supporting the glass. The result is that the food is protected from every change of weather, is easily taken by the birds, and is accessible to them under all circumstances.

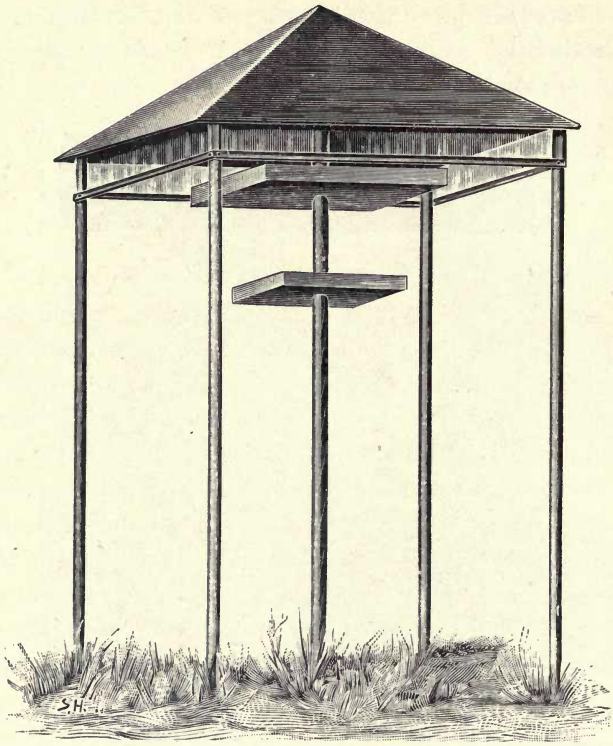


FIG. 5.—A "FOOD-HOUSE" WHICH CAN BE EASILY MADE.

The measurements which are used in the factories, and which have been proved by experience to be the best for the "food-house," are :—Width from post to post, 4 feet 3 inches ; height from ground to glass strip and upper edge of food-table, 4 feet 7 inches ; width of upper food-table, 2 feet ; the space between the food-table and the glass strip, 14 inches.

Anyone can easily make a similar "food-house" for himself, with the help of this description and Fig. 5.

Fig. 6 represents a complete house, which can be obtained from Scheid. The front glass has been omitted in the illustration, so that the interior may be more clearly seen. These houses are very durable; they should stand on five slabs of concrete to protect them from decay, and can easily be erected according to the directions given with each house.

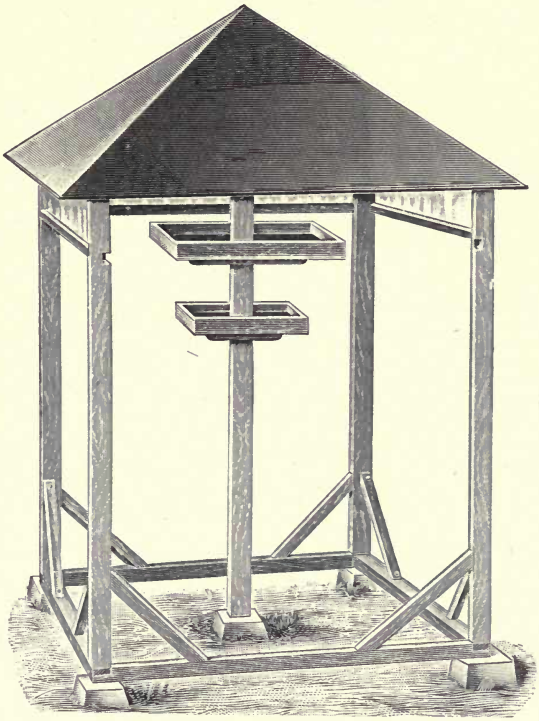


FIG. 6.—"FOOD-HOUSE" AS MADE BY H. SCHEID OF BÜREN.

A fir tree is placed against three of the corner-posts, as is shown in Figure 7, in order to make the "food-house" look more natural, and thus prevent the birds from feeling afraid of it. A few branches may also be placed under the roof: they are in great request as sleeping-places, and in the summer they are occasionally used by the wren as a nesting-place.

Any kind of food can be put in the "food-houses" as well as seeds (hemp is best: never rape seed, which is scorned by all birds living

in the open), especially fat, suet and scraps of meat. The "food-stones" are also most suitable here: they are laid on the table whole

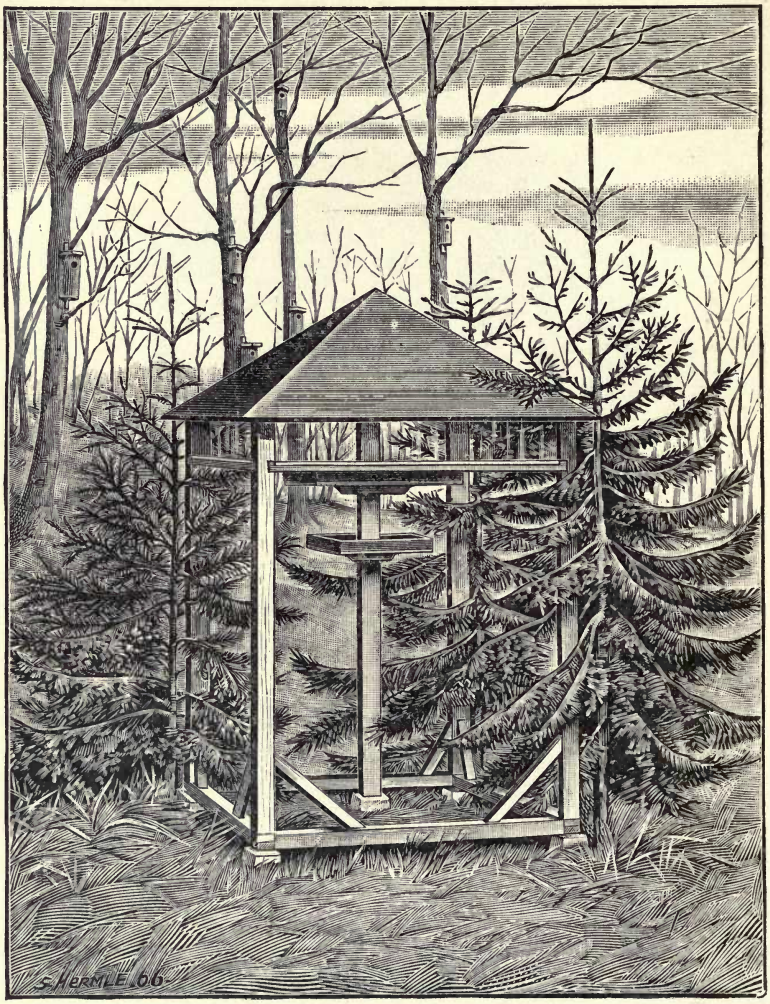


FIG 7.—"FOOD-HOUSE" READY FOR USE.

or broken. Similar mixtures, which are not meant for pouring out, and are therefore made with less suet, are often called "food-cakes."

The "food-house" is soon visited by all species of birds: blackbirds, song-thrushes, finches, tits, wrens, and golden-crested wrens are its constant visitors.*

(D) *The "Food-bell."*

This is also covered in such a fashion that the hemp seed it contains —only hemp should be put in the "food-bell"—is protected from the weather, and yet is always within easy reach of the birds. The "food-bell" (*see* Fig. 8) consists of the food-dish A (diameter 2¼ inches, depth ½ inch), the tube B (width 1¼ inch), the food receptacle C (contents 3½ pints), and the metal bell D (diameter 1 foot). In constructing the apparatus the most important matter is that the lower edge of the tube is 1-16 inch below the upper edge of the "food-dish" A, and the upper edge of the dish 1-16 inch higher than the lower edge of the bell. The apparatus only works well if this condition is exactly observed, and only then is a wasting of the food prevented.

The "bell" works automatically, as soon as the receptacle—the lid of which can be unscrewed—is filled with hemp seed. In consequence of the peculiar, yet simple, construction of the apparatus, exactly the same number of seeds fall through the tube on to the dish as have been taken by the birds.

The "food-bell," like the "food-house," is a very economical apparatus, and as the receptacle is of glass, it is easy to see when it requires refilling. It is very popular, because, as a rule, it is avoided by sparrows. The apparatus is to be had of Scheid, as well as "food-nets."†

The "food-bell" can be fixed on trees as well as on buildings, posts, windows, etc., in the way shown in Figure 9. The hooked rods sent with the bell are screwed in firmly at a suitable distance. The apparatus is hooked on to the ring of the upper rod, while the

* In Seebach the "food-house" is used to feed game as well as small birds. I think I cannot describe this arrangement better than in Baron von Berlepsch's own words:—"The 'food-house,' in addition to feeding our small birds, can be advantageously used as a feeding-place for partridges and pheasants. For this purpose I made the coverings of fir as dense as possible, leaving two entrance holes. I either had bushy firs put between the posts and pruned on the inner side, or I nailed a horizontal lath halfway between the ground and the strip of glass, and fastened fir branches to them, in addition to the firs at the corner-posts. In the space thus protected on all sides, another feeding-place is put under the food-table for the pheasants and partridges, and, as a rule, it is promptly used by them."

† Small fir twigs, covered with food, can be used instead of the "food-nets."

ring under the dish is fastened with a wire to the lower rod, to prevent the bell from swaying too violently. Instead of the upper rod, a sloping branch can also be used, and instead of the lower one, a post fixed vertically beneath it, to which the apparatus is fastened with

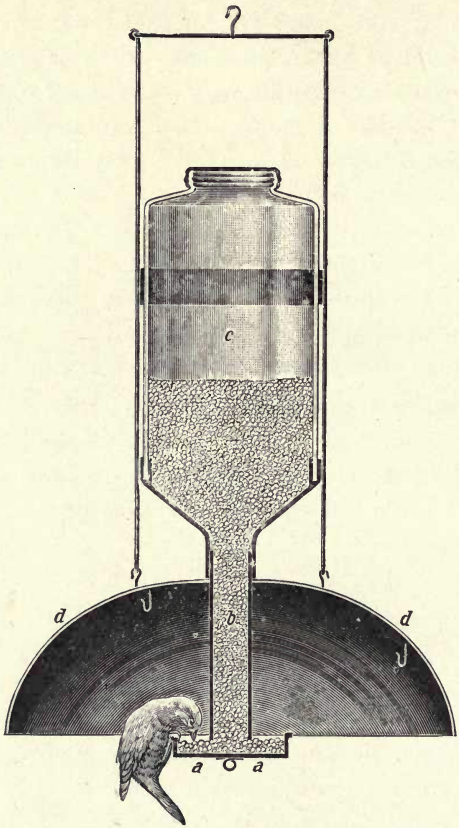


FIG. 8.—SECTION OF "FOOD-BELL."

a.—Food-dish. *c.*—Food reservoir.
b.—Tube. *d.*—Metal bell.

wire. Two small nets filled with nut kernels, or two small fir twigs covered with food, are hung on the hooks inside the "food-bell" to tempt the tits at first; one must be placed so that it projects well beyond the edge of the bell—the other is short, and is placed a little over and beside the food-dish. This bait need only be used once,

while the apparatus is unknown in the neighbourhood; afterwards the "food-bell" is regularly visited by the birds.

In the district round Seebach and the wood at Kammerforst, there are seven "food-houses," and twelve "food-bells," which are distributed over the grounds, and feed hundreds of birds. The food used costs

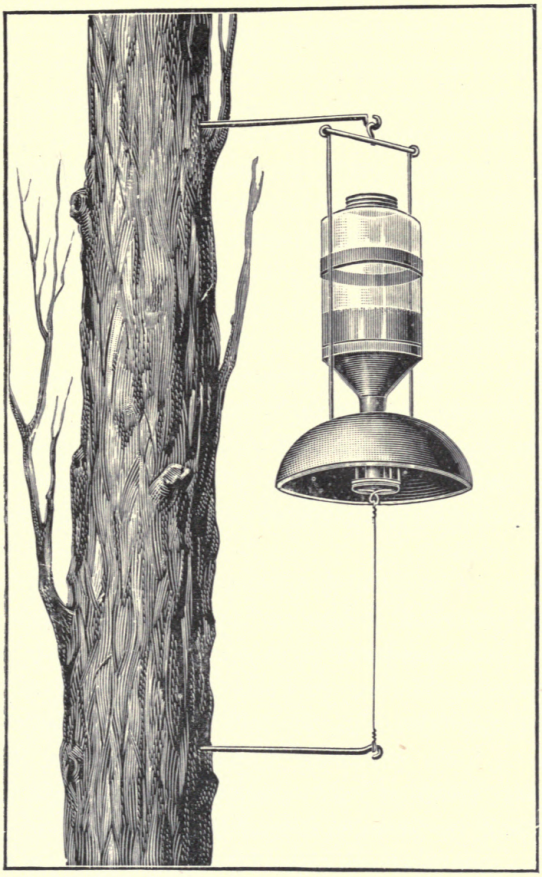


FIG. 9.—"FOOD-BELL" HUNG UP BY MEANS OF HOOKED RODS.

on an average five pounds a year—a small expense when we consider the great extent of ground, and the successful result which is only possible because of these excellent and economical appliances. These facts should cause reflection, and put an end to the unmethodical and useless feeding which is still practised. Unfortunately, false economy

leads to the avoidance of spending a considerable lump sum on the "food-house" and "food-bell," although two or three times as much money will be spent on food given without method, and without serving much purpose.

In conclusion, we may say that, in addition to the feeding appliances described here, very useful feeding-places can be made on balconies and verandahs, in sheds, summer-houses, and refuge huts in woods, which fulfil the requirements mentioned on page 64. It is essential that, in accordance with condition 2, the food should in no way be affected by the weather. A feeding-place of this kind has been arranged in a stable in the wood near the ranger's hut at Seebach, where a long flat manger has been put under a projecting building like a verandah. The popular method of feeding birds at the window is also very useful, if the food is put out quite early before dawn in wet weather, and is frequently inspected during the day, so that the spoiled food can be replaced by a fresh supply.

Appropriate food-stuffs for winter feeding have already been frequently mentioned. I will recapitulate the most important:—With the exception of rape seed, hated by all birds living in the open, all seeds can be used. The seeds that contain oil are most to be recommended, especially hemp, whole or broken; it should form at least half of all the foods.

Great care must be taken with regard to the mixture sold in shops (a mixture of seeds of all sorts); at least half must consist of unbroken hemp seed, and there must be no rape seed.

The berries of mountain ash and elder make a very good food; if they are picked at the right time they will keep almost the whole winter. Of other foods, those containing fat should be used in the first place, fat, suet, bacon, scraps of roast meat, etc. During cold weather fat is specially suitable for birds, as it produces warmth.

Great care must be exercised in the use of bread and similar foods, which easily decay, turn sour in damp places, and do harm to birds.

For all birds, insectivorous or graminivorous, "food-stones" or "food-cakes" (*see* pp. 65, 66, and 72) are the best. They can be given entire or broken up, and the colder the weather the smaller should be the pieces into which they are broken; they contain all the necessary material, and are very economical and lasting. The wisest plan is to give broken "food-stones," or "food-cakes" mixed with hemp seed.

CHAPTER IV.

SUPPRESSION OF THE ENEMIES OF BIRDS.

THERE is a danger that the success due to the provision of nesting-places and of food in winter may be seriously diminished, wherever the numerous enemies, to which birds are exposed, are not kept down. It is, therefore, not sufficient to create the necessary conditions of life for birds, their enemies must also be suppressed.

Unfortunately, man is still the worst enemy of birds. His love of destruction, selfishness, or unconscious indifference or ignorance, are in direct opposition to the aims of a rational protection of birds, hinder its progress, or do not assist it when the opportunity or the occasion arises.

The injurious effects caused by mankind will be dealt with in the following chapter. We will first discuss the suppression of harmful animals.

Only in very rare cases is it desirable entirely to exterminate an animal. On the other hand, the progress of civilization, which is the work of man, gives him the right, or rather obliges him, to use those means which are at his command to restore the balance of Nature, destroyed by him, and to interfere with the natural development of animal life.

Of course, we are taking for granted that moderation and reflection are his guides, and not the blind love of destruction. The birds of prey must not be treated alike. A few species are very useful to us ; others, again, have become so rare that we must cease destroying them to preserve them from extermination.

I consider Baron von Berlepsch's views on this matter of such importance that I will reproduce his actual words, as I heard them at a lecture :—" Therefore I should not wish a reward to be offered by the State for any animal which might possibly be exterminated by energetic persecution ; but I would always maintain the right of the

individual to self-help—*i.e.*, if an animal is troublesome to anyone, he must be able to obtain permission to get rid of it. In this way the lives of our birds, especially the rarer kinds, are respected, as well as the reasonable wishes of individuals."

These words seem to show us a golden mean, and they give food for reflection both to those who love to destroy as well as to those who wish to restore Nature to its primitive condition by leaving animals and plants to thrive at will.

I will confine myself to the measures taken at Seebach in discussing this subject.

The following animals are considered at Seebach as thoroughly harmful, and they are treated as such, rewards being offered for their capture and death: cats, weasels, martens, polecats, house and tree sparrows, sparrowhawks, goshawks, jays, and magpies. At certain times in certain places we must add squirrels, crows, and shrikes.

Certain birds, which are useful enough in themselves, may become harmful if they increase too rapidly—*e.g.*, blackbirds—and interfere with the settling of other birds: of the nightingale, for instance, according to what is reported from many districts.*

Sparrows, though they do not directly injure other birds, interfere very much with their settling. Their wild behaviour and continual noise make other birds take a dislike to a place, and drive them away from feeding and nesting-places. Where success with nesting-boxes is aimed at, the fight against sparrows must not be overlooked.

The war of extermination against sparrows has been waged for fifty years in Seebach with great energy, and they are now to be found there in small numbers only. The other species of birds, on the other hand, are represented all the more numerously, so that Baron von Berlepsch's assertion "that the increase of other birds is in inverse ratio to the decrease of the sparrows," appears to be confirmed.

* The struggle for existence is to be found everywhere in Nature. If two creatures, such as the nightingale and the blackbird, enjoy the same conditions of existence, the weaker of the two must succumb if occasion for a struggle arises in consequence of insufficient food, scarcity of nesting-places, etc. This state of things has led to those observations which at first sound contradictory, on the relations between the blackbird and nightingale. In one place the former is said to drive away the latter, in another they live peacefully side by side. Both statements are correct. It all depends whether there is sufficient to satisfy the two species in a district, or whether anything occurs to cause a struggle for existence. In the latter case the weaker of the two—*i.e.*, the nightingale—must, of course, succumb.

Winter is the best time to carry on the war against sparrows, which are as sly as they are insolent. They can easily be enticed to a spot free from snow where food is scattered, and can be killed in large numbers by a shot, or caught in a large sweep net. Quantities of them can be caught in barns, stables, and hen-houses, where they go for the sake of the scattered food.

There are many other ways of destroying these rascals; the most effective is to set a price on them. At Seebach one penny is paid for an old female house-sparrow, one-fifth or one-tenth of a penny for the young or eggs. Nothing is paid for the old male, in order to increase further his preponderance which already exists in Nature. His destruction is not desired, as the numerical superiority of the male over the female materially assists the extinction of the species.

The weasel is the most harmful of vermin, and the sparrow-hawk of the predatory birds, for he carries on his trade as robber with great boldness and skill.

The buzzard and the kestrel are quite harmless. The latter breeds in the midst of the shelter-woods at Seebach, the former in a wood which is full of nesting-boxes.

The jay is particularly harmful because it is thoroughly conscientious in searching every bush and tree for birds and their broods. Unfortunately, the amusing squirrel does the same, and unfortunately also, he likes to attack the larger nesting-boxes. In order to prevent mistaken ideas, I think it advisable to refer once more to what was said on pp. 77-78. Neither Baron von Berlepsch nor I desire to exterminate any animal; but everybody must acknowledge that certain creatures, such as squirrels and jays, can increase to such an extent under favourable circumstances that they fully control a district, and scarcely any singing bird can escape them. Man must interfere and regulate matters. Unfortunately, the influence of civilization is so strong, that Nature is not always able to right matters everywhere. Therefore we must assert that, in order to restore the balance of Nature destroyed by man, we must to a certain extent interfere with the life of animals, always keeping within well-considered and moderate limits.

As the enemies of birds differ in various localities, in number and species, and hence in importance, the hints given here can merely serve as a guide, and everyone must be governed by the conditions existing in his particular neighbourhood.

SECTION III.

CO-OPERATION IS NECESSARY FOR A RATIONAL PROTECTION OF BIRDS.

To promote and spread the protection of birds, which is both necessary and important, requires the co-operation of the State, of local authorities, societies, individuals, and, especially, of the schools. The task of the authorities, especially of State officials, is not only to protect birds, but, above all, to interest the people in the subject, especially by influencing officials, general commissions,* local boards, the administration of woods and forests, school committees, and others. As we have already mentioned, many States have energetically encouraged efforts to protect birds in an efficient fashion.†

We would impress on all who wish to be of practical use the necessity of carrying on their work in a thoroughly efficient manner. It is better to work slowly and well than to do much in a wrong way. Nothing is more discouraging than failure, but this can only result from carrying out the measures wrongly or from making use of wrong measures. By lectures, pamphlets, direct instruction, and information, intelligent people and societies can do much to further the cause.‡

The "Commission for Furthering the Protection of Birds," appointed by the Union of the German Societies for the protection of animals, will,

* An important step has been taken in Prussia in this respect. The Government has expressly directed the general and special commissions to protect, as far as possible, all plantations serving as bird-shelters, and when ground is allotted, to let new plantations be arranged as bird shelter-woods, and to have nesting-boxes hung up.

† It is much to be hoped that the catching of birds in snares, and the massacre of our singing birds in Italy, will soon be put an end to by the interference of the authorities.

‡ Instruction in bird-protection might easily be added to the annual courses for fruit culture which take place in many districts.

in the future, play an important part in the history of the protection of birds in Germany. Its officers are: Dr. Falke, Professor of Agriculture at the University of Leipsic (president); Max Rabe, Leipsic, Auenstrasse 13 (secretary); Prof. Otto Kleinschmidt; and Major Henrici. This Commission has set itself the task of examining everything new, whether practical or theoretical, that is suggested for the protection of birds, and giving an unbiassed opinion purely from the experts' point of view. It is thus the enquiry office for the protection of birds, and all enquiries should be addressed to the secretary, Max Rabe.

The names of the members are sufficient guarantee that their object will be attained. If a practical test requires a long time, it will be carried out at the Seebach experimental station, which Baron von Berlepsch has placed at the disposal of the Commission for this purpose.

It is therefore to the advantage of the cause, and also of the general public, if all doubtful cases are referred to the Commission.

Even if official bodies, societies, and individuals are active in the cause of bird-protection, the chief thing has still to be effected—the great masses of the people must be won.

Intelligent people who are seeking for an intermediary who shall introduce the established ideas on bird-protection to the masses, will naturally think of the schools. "Teachers and clergymen are the most competent people to act as ornithological pioneers," says Baron von Berlepsch, with a clear understanding of the matter; and teachers, as well as ornithologists, must acknowledge that not only the cause of the protection of birds, but the character and disposition of the children are greatly benefited by suitable instruction in this subject.

It is not a question of inflicting a new burden or a worthless theory on teacher and pupil. It is possible to combine the awakening of an understanding for a sound protection of birds with the usual school routine; and, besides, we are not dealing with experiments, but with established facts that have been well tested.

A teacher need not necessarily become a naturalist in order to further the cause of bird-protection. He must possess a love of the cause, be an attentive observer of Nature, and must conscientiously prepare for every lesson. It is by no means necessary to study learned works,

as this book gives sufficient information. No addition need be made to the time-table. Undoubtedly, it would be a good thing if certain subjects dealing only remotely with natural history could be omitted, and others on the birds of the country could take their place in the curriculum.

The necessary instruction in the protection of birds can be given easily in connection with other subjects of the lesson. For instance, when the woodpecker is mentioned, natural and artificial nesting-holes can be explained; and the nightingale can be connected with breeders in the open and shelter-woods for birds; the birds in winter with winter feeding, and so on. But, above all things, if our aim is really to be attained, we must throw aside the pedantry which not only fails to arouse the child's understanding of the beauties of Nature, and the wonderful arrangements of Nature, but even kills the existing interest. Only biological instruction can arouse enthusiasm, and only by its means can we attain what the "General Instructions" require of natural history lessons:—"The children should be accustomed to close observation, and trained to contemplate Nature thoughtfully." During walks taken together, in the playground and school garden, the children should be led to observe Nature carefully.

It is essential that they have an opportunity of doing actual work for the protection of birds, such as hanging up nesting-boxes, laying out and caring for shelter-woods for birds, winter-feeding, etc.

Here we see once more the importance of the school gardens which are being introduced more generally. We must not forget that besides tending and protecting plants, room must also be made for the protection of birds.

It is therefore the business of the school not only to train the pupils to take an interest in the cause, but it must also exercise a good influence on the home, through them and through its good example. It is only thus that we can succeed in winning people to a rational protection of birds, and only thus have we any guarantee that the measures will be correctly carried out.

CONCLUSION.

Although the increasing interest shown in the protection of birds is very welcome, and though we can safely reckon on an increase in the efforts in this direction, yet the most important thing is the way in which this protection of birds is carried out. We must keep to the principle that only that bird-protection can be of use which is the result of a careful study of our birds, of an exact knowledge of their habits and wants—in short, the scientific protection of birds.

The protection of birds as described in this book is the only method that complies in all respects with these conditions. I can assert that wherever, until now, a reasonable protection of birds promising success is observed, it can only be because the measures of Baron von Berlepsch have been used.

This should cause no surprise. Whoever has a close acquaintance with them—whoever has seen in the Seebach collection of natural and artificial woodpecker holes, the experiments that have been carried on for over thirty years, will be convinced that here is the laborious, incessant work of a lifetime.

I hope I have succeeded in explaining the measures so clearly and comprehensively that all may find this book a safe guide, and that the protection of birds, according to the ideas of Baron von Berlepsch, may become general.

This solution of the question possesses the inestimable advantage that every child can help to protect birds successfully. The rules are given here clearly and distinctly; people need only follow them out carefully.

Description, explanation, and persuasion are all less effective than studying the subject on the spot, where not only the arrangements described in the preceding pages may be seen, but the extraordinary and astonishing success that has attended them is made apparent in the most convincing fashion.

Whoever wishes to devote himself to the protection of birds, who after reading the books on the subject is in any doubt, let him, this book in hand, inspect the experimental station at Seebach, which is open for this purpose—for words may instruct, it is true, but we can only be convinced by actual facts.

APPENDIX.

CALENDAR FOR ATTRACTING AND PROTECTING BIRDS.

OCTOBER is the month for reflection in matters appertaining to the protection of birds. We must now make up our minds what to do. The most important thing is the creation of opportunities for nesting, namely, the hanging up of nesting-boxes, and the planting of shelter-woods.

We can treat these matters briefly here, as we need only refer to the corresponding chapters in this book: nesting-boxes, pp. 28-48; shelter-woods, pp. 49-62.

It will be sufficient to draw attention to the fact that the ground that is destined for a shelter-wood must be deeply dug in autumn and left in great clods, so that the frost penetrates well. The planting is done in the following spring. The requisite plants can be ordered now and kept well wrapped up till the time of planting.

It is advisable to order nesting-boxes now, as the following month is the best time for hanging them up. Berlepsch's nesting-boxes are the only ones that can be recommended, and these should bear the registered trademark. (For prices see advertisement pages.)

These are the only boxes that possess the important improvement described on p. 36. The "Kommission zur Foerderung des Vogelschutzes" therefore begs that all interested in the matter will only use those nesting-boxes that bear this trademark. This is the only way of repairing to a certain extent the error which Baron von Berlepsch committed when he did not legally protect his boxes, and of protecting the public from failures due to worthless imitations. (*See* pp. 38-41.)

Provision should now be made for winter feeding by collecting

elder berries, mountain-ash berries, sunflower seeds, and other seeds. Feeding apparatus should be inspected, "food-bells," "food-houses," "food-stones" should be ordered, so that everything is ready and in order at the right time. The "food-house" and "food-stones" and cakes can be made at home by the help of the instructions on pp. 65 and 69.

NOVEMBER is the most suitable time for hanging up the nesting-boxes. As all birds which nest in holes spend the night in holes, not only during their breeding time but during the whole year, the boxes hung up now are of use in winter. The birds which winter here become accustomed to the place they are to occupy in spring. (*See* p. 42 for further details.)

Winter feeding should now be begun, gradually, so that if the cold comes suddenly the birds will find food ready for them. The birds are not to have enough to satisfy them; they are only to get accustomed to the feeding-places, so that in case of sudden need they know where to find them.

The best way is to give them the economical "food-stones" or cakes at first. During normal weather these should be given alone, and other food, especially hemp-seed (p. 76), should not be given till it turns cold.

DECEMBER.—Nesting-boxes may be hung up in December, in fact, during the whole winter. The directions for October and November hold good for this month.

JANUARY AND FEBRUARY.—See October and November for hanging up nesting-boxes, and for winter feeding.

MARCH.—The planting of shelter-woods can be begun in March. When the land intended for this purpose has been properly prepared, it is levelled and planted in accordance with Chapter II. Nesting-boxes may still be hung up in March and April. Winter feeding must not be given up yet. It may be particularly needed if there is a sudden return of winter, after the birds of passage have begun to come back. Almost every year chiff-chaffs and willow-wrens get into difficulties on this account, but only the "food-tree" is of use in this case. They have not been noticed at any other feeding-place. (*See* October and November.)

APRIL.—The directions given for March hold good for this month.

MAY.—The chief breeding time of our birds is in May and June. All preparations for nesting arrangements must be completed by now. Now, all that can be done for the protection of birds is to keep these

places where birds can and may breed free from disturbance.

JUNE.—What was said of May holds good for June. Young shelter-woods for birds should be frequently hoed. (*See* p. 52.)

JULY AND AUGUST.—The rules given for June must also be attended to in these months. Hedges should not be cut till the end of August because of the broods.

SEPTEMBER.—At the end of the month begin collecting elder and mountain-ash berries. When dried they form very good winter food for birds living in the open as well as for cage birds. The end of August and beginning of September is a very favourable time for catching vermin.

Whoever intends to hang up nesting-boxes should seek suitable places while the trees are in leaf. This will prevent the occurrence of a common mistake by which the boxes hang too much in the dark when the tree is in full leaf, especially in chestnut trees. Most birds like a certain amount of covering, it is true, but they all avoid deep shade where no sun can penetrate.

BERLEPSCH NESTING BOXES.

Berlepsch Nesting Boxes will be supplied on application to the Royal Society for the Protection of Birds, 3 Hanover Square, London, W., from a depot in London, carriage forward.

Sizes as on page 37.

***A.**	...	...	...	...	**1/6**
***B.**	...	...	...	...	**2/-**
E.	...	...	...	...	**2/-**
F.	...	...	...	...	**1/6**

*Sizes A and B are fitted with special screw-nails; keys for these can be had at **6d.** each, and additional nails at **3d.** per dozen.

Sizes C (**4/6**) and D (**5/-**) are not stocked, but can be obtained on special order.

NOTE—Some of the other Apparatuses, such as the "Food-Bell," may be seen at the offices of the Royal Society for the Protection of Birds, but all intending purchasers of these Apparatuses should apply direct to the Manufacturer, Hermann Scheid, Büren, Westphalia, Germany.