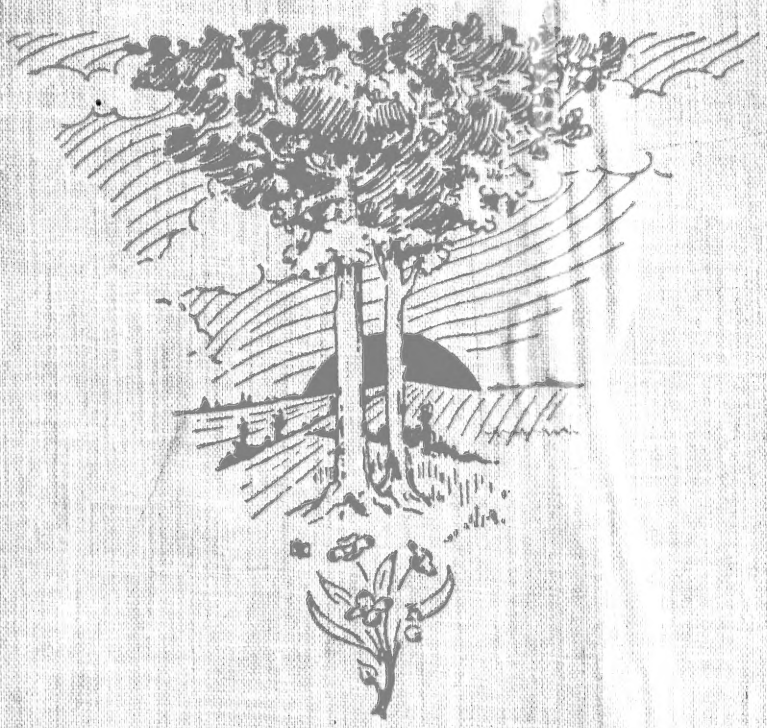
NATURE PHOTOGRAPHY FOR BEGINNERS



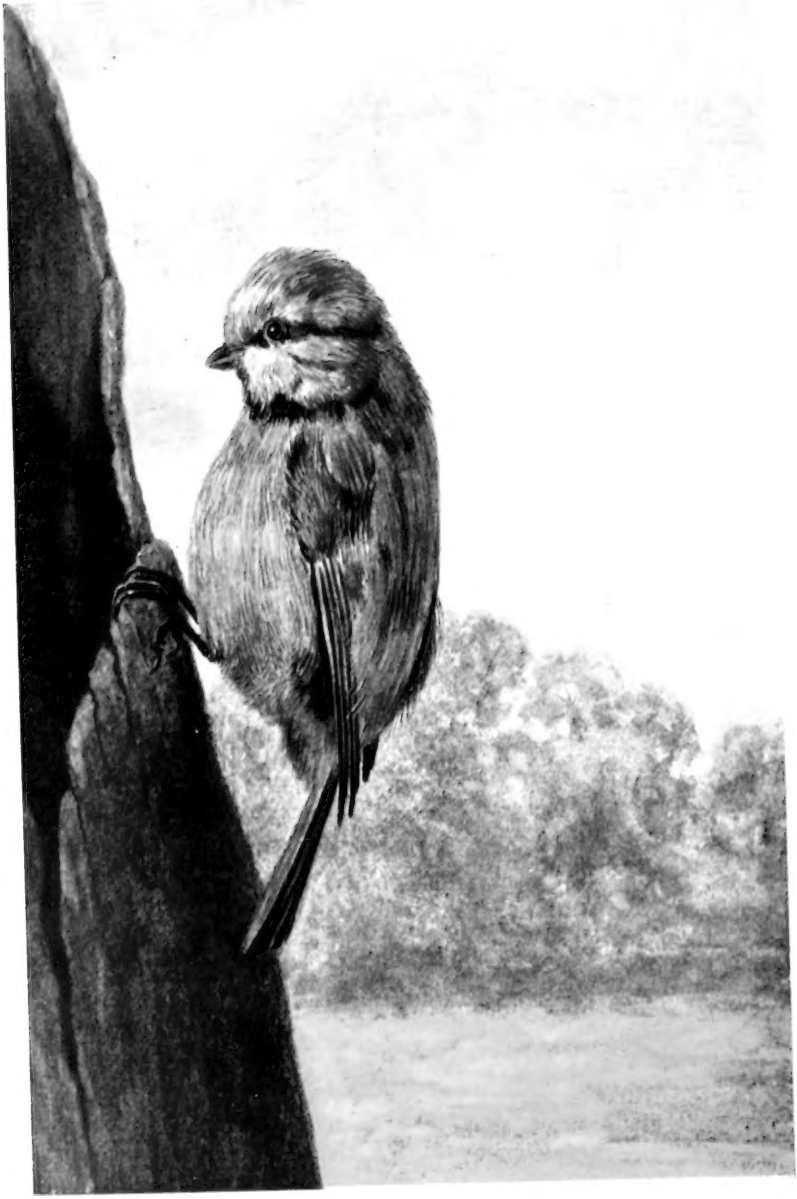
BY

EDWARD J. BEDFORD

NATURE PHOTOGRAPHY

"We see distinctly only what we know thoroughly."

JOSEPH WOLF.



Blue Tit going to Nest.

NATURE PHOTOGRAPHY

FOR BEGINNERS

BY

E. J. BEDFORD

WITH COLOURED FRONTISPIECE

AND NEARLY

ONE HUNDRED STEREOSCOPIC ILLUSTRATIONS

FROM PHOTOGRAPHS TAKEN DIRECT FROM NATURE BY THE AUTHOR

1909

LONDON

J. M. DENT & SONS LTD.

29 BEDFORD STREET, STRAND, W.C.

TO

MY FATHER AND MOTHER

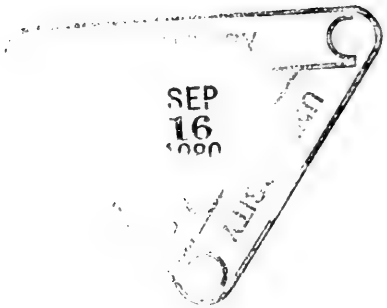
WHO HAVE

ALWAYS TAKEN THE GREATEST INTEREST

IN MY WORK,

I AFFECTIONATELY DEDICATE

THIS BOOK



brief

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PREFACE

So far as I can ascertain, this is the first book treating of Nature Photography which is illustrated almost entirely by means of reproductions of stereoscopic photographs.

I hope, therefore—notwithstanding the numerous existing volumes dealing in some form or other with the representation of Nature by means of the camera—that room will be found for this volume.

If it should also be the means of reviving stereoscopic work in the direction of Nature Photography I shall be highly gratified.

The illustrations have been selected from a very large number in my collection, and every one has been photographed direct from Nature by myself. The stereoscopic ones should, of course, be seen through a stereoscope.

I desire to express my heartiest thanks to all those friends who have assisted me by finding subjects, acquainted me with the whereabouts of curious nests, or helped in other ways.

My thanks are specially due to Mr. J. Ade, Mr. W. Wratten, Mr. W. A. Alderton, Mr. J. S. Forbes, Mr. J. E. A. Gwynne, J.P., Major H. P. Molineux, J.P., and Colonel H. Finn for permission to take photographs on their respective estates;

also to my friend Mr. E. J. Bunnett, M.A., for kindly reading through the proof sheets.

If the perusal of the following pages should be the means of inducing some persons to use the camera instead of the gun, and should also cause them to take a greater interest in our Wild Life, the purpose I had in view will have been accomplished.

E. J. B.

EASTBOURNE, *June* 1909.

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CHAPTER I

INTRODUCTION

THE number of persons who are devoting some attention to the fascinating subject of Nature Photography appears to be on the increase, judging from the many books dealing with it, in some form or other, which have been published during the past few years. Certainly, it might be said at the present day, "Of making many *Nature* books there is no end;" but it would hardly be equally true to say, "Much *Nature* study is a weariness of the flesh." On the contrary, the study of Nature is one of the best recreations for both body and mind, and should, therefore, be encouraged in all young people as well as in those of more mature years. One likes to think it is owing to an increased appreciation of Nature's ever-varying delights which has brought about the demand for additional literature devoted to the subject—a demand which is so well provided for at the present day. Nature study, as a subject of instruction, has been introduced into many schools with very satisfactory results. It has proved of far greater interest to the scholars than some of the other subjects taught.

The Nature lover will surely be gratified to find that many, who at one time took pleasure in killing our wild life, now take much greater pleasure in photographing it, and, at the same

time—what is more satisfactory still—leave it unharmed for others to observe and enjoy.

Some of the books already published show what remarkable results may be achieved, provided the photographer has the necessary time and means at his disposal; coupled with the all-important exercise of plenty of patience. The names of such successful exponents of the art as Messrs. R. and C. Kearton, R. B. Lodge, Oliver Pike, and Douglas English occur to one's mind as some of the more prominent workers. But it is not every one, however enthusiastic he may be, who has the necessary time and means at his disposal to produce similar results, even if he were willing to dangle over dangerous cliffs at the end of a rope, climb high trees, or stand in water for hours, not to mention other exciting adventures. Only being able to devote a limited amount of time to Natural History Photography myself, I have had to rely for the majority of my subjects on such as are of common occurrence.

This manual has been written specially for those commencing the study of Nature Photography, or those desirous of taking it up, the majority of whom will probably find themselves in similar circumstances to myself, as regards the time they are able to devote to the practice of their hobby. An endeavour will be made to describe how to obtain many interesting results with an expenditure of only the limited time which the majority have at their disposal, and I hope, therefore, the suggestions offered may be found both useful and practical.

When we consider it is only about forty years ago that the dry plate was introduced which made photography possible as a hobby for the average individual, we can hardly refrain from marvelling at the wonderful results which have since

Fig. 1. The Author's Cameras and the Tilting-Board.

been obtained. The illustration of our books and magazines at the present day is only one phase of the way photography has been able to minister to our profit and enjoyment, and to mention two others: astronomy owes many important discoveries to the sensitive photographic plate, which will reveal the existence of bodies quite impossible to be perceived by the aid of the most powerful telescope that has been constructed hitherto. The Röntgen Rays, too, by the aid of the sensitive photographic plate, have also administered to our infirmities, and permit a diagnosis of broken bones and many other uses in surgery which would have been quite impossible without their assistance.

But as we are here dealing more especially with Nature Photography, let us consider a few useful results now made possible in that section of work. Many of the children who are brought up in our large cities and towns, and who attend the elementary schools therein, are unable, for various reasons, to see the wonders of Nature for themselves. Photography has made it possible to bring wild Nature to such as these, and by so doing, give them an interest in living things which they could not otherwise have. Some of us may have heard the story of the boy who was going mushrooming, and on asking a pal to accompany him received the following reply, "Oh, yes, I will come as I am a good 'un to *climb!*" It is no doubt due to conditions such as the above which has led to the introduction of Nature study into our schools.

Another valuable feature of photographic work is the facility with which records can be made by its aid. Many counties have now, in full working order, what is known as a "Photographic Survey." The object of this is to obtain records of any building, object, or custom of interest—especi-

ally such as are passing away—for the use of future generations. Should we not value such records of bygone ages now, had it been possible to have obtained them? What an interest, for instance, a photograph of the egg of the Great Auk *in situ* would have, or of the bird itself, which has only become extinct during comparatively recent years, and which was at one time quite common. Very few specimens of the egg exist at the present day, and one sold by auction in the year 1894 realised the huge sum of three hundred guineas.

One cannot but fancy how Gilbert White would have welcomed the use of photography to aid him in his studies, had it been available in his day. His charming book, *The Natural History of Selborne*—which has passed through about a hundred editions, and has become quite a classic—would, I think, have been even more interesting still had it been illustrated by a series of photographs taken by the author. The admiration he has expressed for some water-colour drawings done for him by an artist named Grimm leads one to think he would have been delighted with the help of the camera also. The point that more directly concerns us in connection with these surveys is that photographs of the fauna and flora of the district, and also of other natural objects, are wanted to add to the collections of records; and here, surely, we have a vast field of interesting and valuable work in which we may all lend a hand.

But whatever may be the class of work we are engaged in, let us above all things be sincere, and never represent a thing or palm off anything as representing what it is not. There are times when it is comparatively easy to make up or manufacture subjects; let us from the very commencement steadfastly set our faces against any "faking" of this kind, and

Fig. 2. Song Thrush's Nest

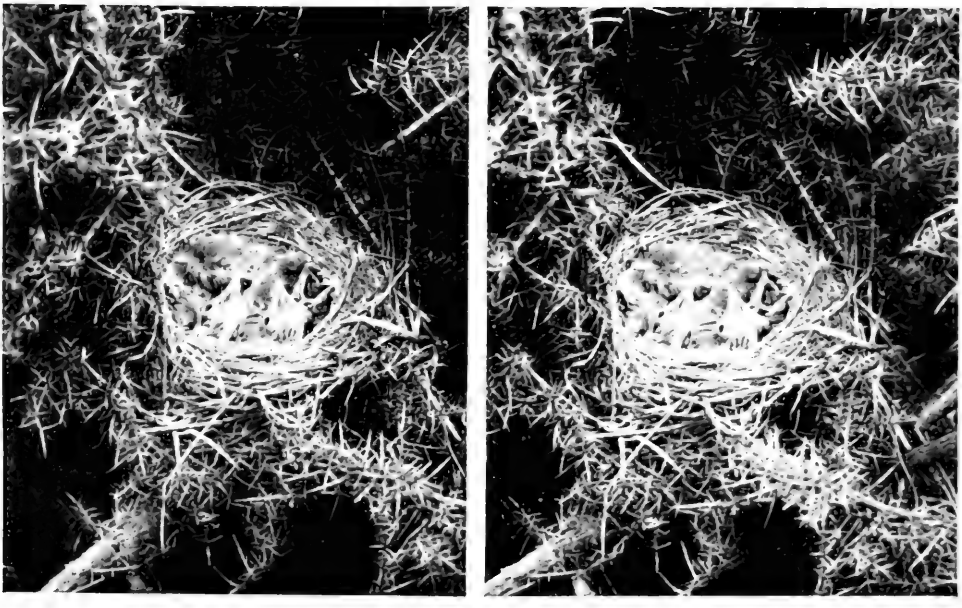

Fig. 3. Young Song Thrushes

although we ought to do so because we value the truth above everything, it is as well to remember that those who are once found out in an attempt to palm off a " fake " will be sure to find, henceforth, their work will always be doubted. In our attempts at honest work disappointments are sure to occur. Plates exposed with every prospect of success will be found, sometimes, on development, to turn out failures; but we must be prepared for this and accept the failures as the necessary road to successes which are bound to come if we persevere. Remember the story of Bruce and the spider, which is an excellent one for any Nature photographer.

Another Natural History story with a moral is one which may interest the reader, and is as follows: Two frogs accidentally fell into a pan of milk, and after swimming round for a long time, unable to get out, one gave up, sank to the bottom and was drowned. The other would not give up, and after a time, by continued efforts, he had the satisfaction of sitting on a pat of butter and was able from thence to jump out! The moral is obvious.

The field of work in Nature Photography is endless, and no one individual during his life would have sufficient time to enable him to arrive at the end of its possibilities. Therefore, although so much work has already been done, a great deal more remains, in whatever branch the worker is particularly interested in, and no one need feel that any section has been exhausted by the results already obtained.

The great advances made in the construction of lenses and other appliances, and the improvements in the quality and speed of plates, etc., have made results possible to-day which could not have been obtained a few years ago; and these improvements are still in progress. One of the latest develop-

ments is a simple means of obtaining glass positives in colour by the " Autochrome " process, invented and placed upon the market by the well-known firm of Messrs. Lumière Bros., of Lyons, France; and there is no doubt this process will be still further simplified and improved before very long. Another development, more recent still, is a method by which the ordinary cinematograph film can be thrown upon the screen in the colours of Nature. This is the invention of Messrs. G. A. Smith and Charles Urban of London.

I do not intend to discuss the practice of photography at any great length, owing to the fact that many excellent and cheap handbooks already exist, dealing much more exhaustively with the subject than could be done here. To one of these, therefore, I would direct the beginner who has no practical knowledge, at the same time advising him to become as proficient as possible in producing a good average negative of the ordinary landscape type before specialising in Nature Photography. In this branch of work one's apparatus has to be used at high pressure, as it were, and it is therefore advisable to know by means of a little previous experience what the limitations are, beyond which it is either impossible or inadvisable to go.

Some of my readers may already have certain apparatus which they wish to make use of; while others desire advice to enable them to purchase the kind likely to be of the greatest service. To the former I would say, almost any camera that can be used on a stand, and which is provided with a focussing adjustment, may be used; to the latter, any camera specially chosen for the purpose should be well constructed, of a substantial pattern, with double extension, and a rigid front, as the class of work for which it is to be used will entail

a certain unavoidable amount of rough usage. The saving of a few ounces of weight, although desirable, is not advisable in this class of work, if at the expense of rigidity. But those who desire to purchase suitable apparatus will do well to read carefully the following chapters, which deal more fully with the necessary points to be considered. In any case, the photographer will be almost certain to require little modifications in his apparatus, after his first season's work, and from his own practical experience will be in a better position to decide on those likely to suit his individual requirements.

One cannot refrain from expressing the hope that the increased knowledge gained by a closer study of Nature may, amongst other things, prevent any wilful destruction of wild life through ignorance. For instance, the Owl is a bird most useful to the farmer, and yet it is often shot in the mistaken idea that it does more harm than good, and that it is best to get rid of it. The same remarks apply to the Kestrel, which feeds principally upon insects, while the food of the Owl consists of mice and field voles. Several instances are on record of plagues of the latter rodents on account of the needless and wilful slaughter of all the Owls in the district.

The Englishman has a character which I am afraid is not altogether undeserved. It has been expressed in the following words: " It is a fine day, let us go out and *kill* something." To this class of individual I would fain reply, by all means. If you find time hang heavily on your hands, kill *time* by taking up the study of Nature Photography.

CHAPTER II

APPARATUS

THE CAMERA AND PLATE-HOLDERS

THE choice of apparatus will to some extent be governed by the amount of money the photographer desires to invest, but let me at once say there are plenty of comparatively cheap cameras and lenses, etc., on the market, which are also very good value for the prices asked. The photographer, therefore, who does not possess a deep pocket, may be sure of being able to obtain—with due care, of course—a set of apparatus which, while not costing an excessive amount, will yet be capable, if intelligently used, of turning out very good work. Remember, it is not so much the camera or lens as the man behind it, and act accordingly.

If it be desired to purchase the apparatus for the least possible cost, then a visit to one or other of the second-hand photographic dealers, or an eye kept on the advertisement columns of the weekly photographic papers, will probably result in picking up a kit at about half its original cost. One word of caution, however; never buy any apparatus unless it can be had on approval, and do not send money to strangers, but use the deposit system adopted by practically all the papers, and so prevent the chance of "being had." There are bad lenses and other goods on the market ready to be palmed off on unwary people. Lenses, for instance, may be fraudulently engraved with well-known makers' names, and

great care in selection is necessary, or it may be that, instead of saving money, it is thrown away on worthless articles.

The question of size naturally comes first, and perhaps in dealing with it my own experience will be useful. When I started—now a good many years ago—I did so with a $\frac{1}{4}$-plate camera which could be used either in the hand or on a stand. The size known as $\frac{1}{4}$-plate measures $4\frac{1}{4} \times 3\frac{1}{4}$ inches. It is an ideal size for those who wish to use apparatus of the least weight and bulk, and if the ultimate aim is to make lantern slides or enlargements from the negatives obtained, it will answer very well. After using this for several seasons, I wished to be able to obtain stereoscopic photographs, and I therefore invested in a $\frac{1}{2}$-plate stand-camera of the square bellows form with double extension. With this I could either take a single $\frac{1}{2}$-plate picture, size $6\frac{1}{2} \times 4\frac{3}{4}$ inches, or two stereoscopic ones side by side, on the same sized plate, and many of the illustrations in this book were obtained by means of this camera. It should be borne in mind that there is a considerable difference in the price of $\frac{1}{2}$-plates and $\frac{1}{4}$-plates, and as it will be often necessary to expose several plates on the same subject, to prevent the possibility of losing a chance which, perhaps, may not occur again, the difference of cost, one way or the other, will be considerable during one season's work. With the $\frac{1}{2}$-plate camera, however, we have the means of using $\frac{1}{4}$-plates by having movable carriers in the dark slides to take them, and as many of the subjects in Nature Photography are small, even if taken their full natural size, a $\frac{1}{4}$-plate will be ample for them.

There is one disadvantage connected with the $\frac{1}{2}$-plate size, and that is the weight of the camera and lens, and say a dozen $\frac{1}{2}$-plates in double dark slides, with the shutter, stand, focussing

cloth, tilting-board, and other small accessories, including the case or cases containing them. I have on several occasions found the apparent weight of my kit appreciably heavier on my return journey after a long tramp than it seemed to be at the start, although I knew full well the subjects which had been impressed on the sensitive plates had not added a fraction to their weight. I found also, with additional experience, one had occasionally to augment the already heavy weight by carrying extra lenses, and often an extra reserve of plates, and it became necessary to make some alteration unless one were to develop into a kind of pack-horse.

An opportunity having occurred of obtaining a Shew's ½-plate " Xit " camera, arranged for stereoscopic work, I took advantage of it and used this for some time; and, in fact, still use it when I want to do ½-plate work. It is an excellent pattern, very light and rigid, and if the size decided upon should be ½-plate, I can strongly recommend this make. If a " Xit " camera is selected it should have double extension of bellows, if possible, because this will add considerably to its usefulness.

There is a size of camera which takes a plate 5×4 inches. This is used more extensively in America than in this country, and, personally, I do not consider it possesses any advantages over the much more universally used ¼-plate.

Several years ago, a new size of instrument was placed on the market, known as the post card, and which takes a plate $5\frac{1}{2} \times 3\frac{1}{2}$ inches. After a trial, I decided—principally on account of generally doing stereoscopic work—to adopt this as my standard, and I now work with a camera of this size, which can be adapted for ordinary or stereoscopic work, and may be used either in the hand or on a stand.

The $\frac{1}{2}$-plate size has one advantage over the post card. The larger plate allows more latitude for the arrangement of the subject and more licence in trimming the prints for stereoscopic work, which may each be $4 \times 2\frac{3}{4}$ inches in size if desired. A post card size plate may be also carried and used in the $\frac{1}{2}$-plate slide by means of carriers. For stereoscopic work the post card size does not allow much margin for trimming, although two prints can be obtained $3 \times 2\frac{1}{2}$ inches in size. It has, however, several advantages over the larger $\frac{1}{2}$-plate. The whole kit weighs considerably less, the plates cost about one-third less than the $\frac{1}{2}$-plates, and for their area, weigh less in proportion, being usually coated on thinner glass. It is the smallest size which I should recommend for stereoscopic work, and this is the branch I strongly advise all who wish to make the most of their work to take up. After seeing the object itself in Nature, I cannot help thinking that a good stereoscopic photograph of it is the next best thing. I therefore suggest, if stereoscopic work is likely to be taken up, that a camera of the post card size be chosen in preference to any other. Stereoscopic photography will be treated of in a separate chapter, and it is, therefore, unnecessary further to discuss it here.

Supposing the size of camera has been definitely settled, let us now consider the points to be noted in selecting one. It should be strongly built and able to stand a certain amount of knocking about—which it is sure to receive sooner or later—and what is known as the square pattern for preference, as the front is more likely to be rigid. The bellows should be capable of extending to at least twice the focus of the lens to be used. This is necessary because, if an object is to be photographed full size, the lens must be double the distance from the plate it

would be if a distant view were being taken. For example, if the focus of the lens used were six inches, a camera extension of twelve inches would be necessary in order to obtain a photograph of any object its true size. The camera should possess a rising and falling front; also a swing-back, which will be found exceedingly useful at times. If it will permit of focussing being done either from the front or the back, this will be found a great convenience, although not absolutely necessary. Most of the usual patterns of ¼-plate or ½-plate cameras on the market are provided with a reversing back, an arrangement enabling a vertical or horizontal picture to be taken without shifting the camera on the tripod. This, while convenient, adds to the bulk of the camera, and in the case of the post card size is usually omitted on that account. It is really just as easy to turn the camera on its side and screw to the tripod in this position, when a vertical picture is required, and this arrangement will save a good deal in size and weight. A level should be permanently fixed to the swing-back, and if objects likely to move are being photographed—for example, young birds on a branch—a finder of some sort will be necessary in order to be sure the subjects remain in the field of view. For a stand camera, one of the direct view patterns will be most suitable, as it can be fixed to the top and in a good position for looking through at the object when the camera is on its tripod and placed too high for the photographer to be able to use one of the reflecting type.

If it has the movements mentioned above, the simpler it is, otherwise, the better, as it will be more likely to enable the user to make the necessary adjustments automatically while his eyes may be directed and his attention required elsewhere. Other little points, such as brass-binding, will depend upon

Fig. 4. Blackbird's Nest.

Fig. 5. Long-tailed Tit's Nest.

the price paid, and must be left to the individual judgment of the purchaser.

If the would-be photographer has no knowledge of apparatus his best course will be to obtain the services of a friend who has, and act on his advice. There are so many forms of cameras on the market, all equally good of their kind, that it is almost impossible to mention one in preference to another; as a matter of fact, the outlay proposed would have to decide, to a great extent, the particular instrument chosen.

Perhaps it will be as well again to remark that a camera must be selected which can be used on a stand, as in the majority of cases—with the beginner at least—time exposures will be required, and it is impossible to give these unless the camera is on a firm support. A very good type of camera is one which may be used in the hand or on a stand, and in which the base-board folds up over the lens, thus serving to protect it from injury. Several well-known makers have cameras of this type, and if the photographer is limited to one instrument it is a very useful pattern to select.

So far I have said nothing about the Reflex type of camera, because it is a very expensive instrument, and although necessary for the advanced worker who wishes to take moving objects, is unnecessary for the beginner, who will be wise during the first two or three seasons of his experience to devote himself to obtaining photographs of objects such as birds' nests, flowers, and other things of a more or less stationary character. He will find in this plenty of scope for careful arrangement and composition, without the necessity of undue haste, which would probably result in some defects, discovered only after the negatives had been developed, and when it was too late to rectify them.

To give again my own experience, let me say that, for a period of about six years after I first took up the study of Nature Photography, a stand camera proved sufficient for my requirements. The beginner will, therefore, be wise to gain some experience before investing in the Reflex type of camera. One reason of the expense of the latter is that it requires great care in construction; many of its parts have to be hand made, and consequently cost a good deal more than machine-made articles. On the other hand, one that is not well made is worthless from a practical standpoint, and the photographer who desires to invest in a reliable instrument of this type must be prepared to lay out a comparatively large amount upon it. If he is willing and able to do this, then by all means let him get one, as work can be done with it which is not possible with any other type of camera. An additional reason why he should not be in a hurry to invest in one is that the type is being greatly improved in many points, and every season sees a reduction in its size and weight. It is really astonishing how vastly improved many forms on the market are now to what they were a few years ago.

As stated previously, I used a stand camera for some years before I invested in a Reflex, but it is equally certain that when the beginner becomes more proficient and wishes to tackle rapidly-moving objects, then a camera of the Reflex type is almost a *sine quâ non*.

The next point for consideration is the kind of holders to be used for carrying the sensitive plates or films. Usually these take the form of what are known as double dark slides, and carry two plates each. Three double dark slides are generally sold with the camera and enable the photographer to carry six plates. But this number, although sufficient at

Fig. 6. Wild Duck on Nest.

Fig. 7. Wild Duck's Nest.

home, where the dark room can be resorted to for a change of plates, is not sufficient to carry out for a day's excursion. When no changing is possible twelve plates should be the minimum number carried, and as I cannot recommend the use of a changing bag, which is the only way of meeting the difficulty in places like woods, fields, or lanes, when only three slides are carried, some other method must be adopted, unless a sufficient number of extra dark slides are purchased to carry the larger supply of plates needed. There are several objections to this course. Well made double dark slides are expensive; they are also heavy and take up a good deal of space. I have, therefore, given them up for general outdoor work in favour of an arrangement known as the " Reicka " plate and film adapter, which is sold by several dealers under different names. This useful piece of apparatus is no larger than the usual double dark slide, and contains a focussing screen, which is always in correct register. I have used it for some time and have found it quite satisfactory. The envelopes are made of stout paper and cost very little, and as far as my experience goes are quite light-tight, and a dozen or two may easily be carried. Being, when filled, very little thicker than the plates themselves, and very light in weight, they are, in my opinion, a great improvement on the usual double dark slides. Envelopes are also made to carry films, and these may be used and exposed jointly with plates in the same adapter, which is a great convenience. Although films cost more than plates, at times their advantage in weight amply repays for the extra expense involved in their use. They have another advantage in being unbreakable. Another point, worthy of consideration, is that, as each envelope contains only one plate or film, there should be no danger of exposing the same one

twice over, which sometimes occurs in using double dark slides, even to the most careful and experienced operator.

A point of great practical importance is that a method such as the above allows of an unlimited number of plates or films being carried. This saves the risk always attached to changing one's plates out of doors, or in a strange dark room, which might possibly spoil results obtained only after hours of watching and waiting.

CHAPTER III

APPARATUS—*Continued*

THE LENS

THE lens is one of the most important items in the Nature Photographer's kit, even if it is not *the* most important. I propose, therefore, in this chapter to deal with some points concerning its use, which, I am afraid, are not perfectly understood, even by some workers who have had a large amount of practical experience in taking photographs.

Curiously enough, although the lens is such an important item, a photograph can be taken entirely without its aid. It is necessary to remember, in this connection, that the photographic image on the sensitive plate is formed by the rays of light which pass through the lens and not by the lens itself, which only acts as an agent. If the lens be removed from the camera and a piece of card or, better still, thin sheet metal be inserted in its place so that no light can enter the camera except through a very small hole pierced through the centre of the card or metal, it will be found that a photograph can be obtained by means of this small hole. It is known as a "pin-hole," although generally made by a fine *needle*. Such a contrivance, while practical for ordinary landscape or architectural work out of doors, is quite useless for Nature Photography, as the exposures required, even in a good light, may run into minutes, and if the light is poor might require an hour or more. Then, again, the definition given by the pin-hole is

not critically sharp and clear, as it requires to be for accurate and scientific work.

It will be understood from what has been said that a lens of some sort is necessary, in order to collect the rays of light and enable us to obtain an image in a very short space of time.

It is quite impossible to describe all the kinds of lenses on the market. Their numbers are ever increasing, and great improvements are continually being made in their construction. As far as the Nature Photographer is concerned, lenses may be divided into two broad classes, namely, single and double; and in dealing with either we shall have to understand what is meant by Focal length, Aperture, Diaphragm or stop, Depth of focus, Size of image, Angle of view, and Covering power. In describing these terms I intend only to deal with them in a practical way.

Focal Length.—This is the distance from the focussing screen to the lens, when the latter is focussed upon a distant object. The point in the lens to which the measurement should be made is the position of the diaphragm in the case of a doublet or the back surface of the lens itself if a single one. (This, although not scientifically accurate, is near enough for practical purposes.) Suppose it be found that this distance measures six inches, the lens would then be said to have an *equivalent* focus of six inches.

Aperture.—The aperture may be described as the diameter of the lens in relation to its equivalent focus. In the case of the example mentioned above, if the lens of six inches equivalent focus had its largest working stop one inch in diameter, the effective aperture of that lens would be described as *f*6, that is, one-sixth of its focus.

Diaphragm or Stop.—Nearly all lenses are now fitted with

Fig. 8. Pheasant's Nest 18 eggs

Fig. 9. Little Grebe's Nest (site)

what is known as an Iris diaphragm. This is generally controlled by a ring on the lens mount which on being revolved enlarges or reduces the aperture. The apertures in general use are *f*4, *f*5.6, *f*8, *f*11.3, *f*16, *f*22, *f*32, *f*45, *f*64. These were arranged some years ago by the Royal Photographic Society of Great Britain. Each is half the area of the one preceding it and requires double the exposure from *f*4 downwards. The relative exposures for any two stops may be found by squaring their values, *e.g.*, the square of *f*4 is 16, the square of *f*8 is 64; therefore *f*8 requires *four times* the exposure of *f*4 and not *twice* only. This is an important point in practice and should not be overlooked. The rule for finding the relative exposure will apply to any aperture, whether those given above or any other, such as *f*6.3 or *f*6.5.

Depth of Focus.—If a lens at full aperture be focussed on a comparatively near object, say one in the foreground of a landscape not more than ten or fifteen feet away from the camera, it will be found that the distance is not equally sharp at the same time, and if the distance now be made sharp by racking in the bellows of the camera, the part previously sharp will be found out of focus. In order to get both parts of the picture in focus a smaller stop must be used; in other words, the lens must be stopped down. If there is a considerable difference in the distance of the two objects, perhaps it will be necessary to stop down to *f*22 before they are both sharp. (I am now referring to scientific work only, as the photographer who goes in for work of a purely pictorial character will soon learn to use as large a stop as possible in order to obtain the sense of atmosphere and prevent all the planes of the picture being equally sharp. But we must remember that Art is not Nature.) The depth of focus of any lens depends upon the

relation of its largest effective aperture to its focal length, and the larger this aperture is the less depth of focus there will be.

Size of Image.—The size of image made by any lens will depend upon its focal length. If, for example, with a six-inch focus lens we find the image of any object measures one inch long upon the ground glass screen of our camera, another lens of twelve inches focus would give the image of that same object two inches in length if used from the same standpoint, and so on in proportion. It will, therefore, be seen that the focal length of the lens used will govern the size of the representations of the objects we photograph on our plate.

Angle of View and Covering Power.—A lens is only able to define over a limited area, and at a certain point from the axis of the lens the definition will fall off rapidly. Suppose we use a six-inch focus lens working at *f*6 on a 12×10 camera. We should find that a circle of about six or seven inches diameter would be well covered by the image formed by the lens, and outside that the definition would be poorer until it fell off altogether. If the lens were a good one, by stopping it down to, say, *f*16 or *f*22, the covering power would be considerably increased, and we should then include, for that particular lens and plate, a *wide* angle. If now we were to replace the six-inch focus lens by one of eighteen inches focus we should find the 12×10 plate would be well covered to the corners. We might call this latter a medium angle lens on this plate, and if instead of 12×10 the camera were only ½-plate it would then be called a narrow angle lens if used on the latter camera, and its covering power would be more than sufficient for the ½-plate. This eighteen-inch or any other focus lens would, however, produce an image of any given object the same size, whether used on the 12×10 or ½-plate camera, and for a

Fig. 10. Little Grebe's Nest (eggs covered

Fig. 11. Little Grebe's Nest (eggs uncovered)

space of, say, three and a quarter inches on each side of the centre of the 12×10 plate the image would be identical with that obtained on the ½-plate.

Let us now consider the difference between the two types of lenses already mentioned.

The Single Lens.—This consists of one lens which is usually composed of two or more different kinds of glass. The ordinary single lens will only work at an aperture of about *f*11 or *f*16, and if of a medium or wide angle for the size of the plate used will render vertical or horizontal lines in the object which occur near the edge of the plate as *curved* lines. Although giving a very pure image, it is not fast enough for many kinds of work. I only refer to it because in discussing the doublet the use of the single combinations of the latter will have to be considered.

Doublet Lenses.—Doublet lenses may be what are known as ordinary Rapid Rectilinear or Aplanat; or of the most modern form known as Anastigmats. The former are composed of two similar combinations, and the latter, which are by far the finest type of all round lens now manufactured, vary considerably in construction. Either kind will render correct images without distortion, the R.R. generally being made to work at an aperture of *f*8 or sometimes *f*6, and the anastigmat from *f*6 or *f*4. It will be observed what a gain of rapidity we have if able to use a lens working at *f*6 or *f*4, and what an important help this is to the Nature Photographer. During the course of my own experience I have used a variety of lenses, and for the satisfaction of those who are not able to purchase the most expensive types, let me say many of the stereoscopic illustrations in this book were taken with a pair of 6½-inch Busch Detective Aplanats, working at the aperture

of *f*6.5, and costing the very reasonable figure of thirty-five shillings each. These lenses are excellent value, and I feel certain would answer the requirements of those who contemplate taking up the study of Nature Photography. Another excellent lens at a low price is the "Aldis," made by Aldis Bros. of Birmingham. This works at *f*6 and is also of the modern anastigmatic type. There are some very good anastigmatic lenses sold by Messrs. Staley & Co., of Holborn, London, at prices considerably below those charged for the ordinary R.R. lenses a few years back.

Coming to the more expensive types of lenses, there are so many good ones at present on the market that the question of choice resolves itself more or less into a personal one; it is pretty much a case of "How happy could I be with either, were th'other dear charmer away." I have always had a leaning towards the lenses manufactured by Messrs. Taylor, Taylor & Hobson, Ltd., of Leicester, and in the "Cooke" lens they have produced a simple type possessing qualities which, at any rate in my opinion, it would be hard to beat. These may be had working at apertures of from *f*4.5 to *f*8. The brilliance of image and fine definition given by several different "Cooke" lenses I have used make me feel confident that any one who invests in one will not be disappointed. The exact and well-finished workmanship of the makers of these lenses is well known, and as their prices are considerably below those of many other types, this is an additional recommendation.

Another very fine lens is the Zeiss "Double Protar." This may be had composed of two *similar* combinations or two dissimilar ones. In the former case the full aperture of the complete lens is *f*6.3 and in the latter about *f*7 or *f*8. The great advantage of this type of lens is that each combination

can be used separately, working at *f*12.5 and of about double the focus of the complete lens. If the lens is composed of dissimilar combinations then a choice of three different foci can be had, and three different-sized images can be obtained from the same standpoint, provided our camera has sufficient extension. On this account they are known as " convertible " lenses. While expensive, their performance is excellent, and they are very convenient in use and specially appeal to the advanced and experienced worker. Where the large aperture lenses of the anastigmatic type score is in the power they place in the hands of the photographer of working with very rapid shutters and in poor lights. On the other hand, they possess, in consequence of their rapidity, very little depth of focus at full aperture, and if much of this is required, they must be stopped down, and so lose some of their advantages.

If the beginner will be content to take the advice already given and commence by obtaining photographs of objects of a more or less stationary character, he will find that the ordinary R.R. lens when stopped down to, say, *f*16 or *f*22 will give him excellent results. As a proof of this may I draw attention to the illustrations numbered 3, 14, 22, 29, 37, and 40, which were all taken by the Busch lenses already mentioned. Allowance must, of course, be made for a certain amount of loss of definition in these reproductions, compared with the originals.

In recommending lenses or other apparatus by certain makers because I happen to have used the articles myself, I should like it to be understood I am perfectly aware of the fact that many other kinds on the market will, without the slightest doubt, produce equally good results. It is, however, impossible for one worker to experiment with, or use all, the numerous types of lenses on the market, for example, and the

selection, therefore, becomes a matter of personal preference for one or other of the many good ones to be had.

Some workers use a Tele-photo lens. This is a form of lens which will give a magnified image of an object, and will therefore allow photographs to be obtained of shy animals or birds from a distance sufficiently great to prevent disturbing them. But there are certain drawbacks in its use. The exposures required, on account of the low intensity, are comparatively long ones, and the slightest vibration of the camera will cause a want of definition in the result. Certain states of the atmosphere also tend against obtaining good and clear results. With care, all these drawbacks may be overcome by a worker who has had some amount of practical experience, but as far as the beginner is concerned he will not be likely to feel that a Tele-photo lens would supply " a long-felt want."

In choosing a lens for Nature work preference should be given to one of fairly long focus, and it is a good plan to select the lens first and then see that the camera chosen will allow of sufficient extension to be able to copy an object full size. I should recommend for the $\frac{1}{4}$-plate size a lens of between six and seven inches focus; for post card from seven to eight inches; and for $\frac{1}{2}$-plate from nine to ten inches. If, however, one of the convertible anastigmats be chosen, the focus of the complete lens might be a little less than those given above, because the single combinations would supply lenses of longer foci, although working slower than the complete lens.

A lens is a delicate instrument to make and great care should be exercised to protect it from injury. When not in use it should be kept in a wooden or leather case lined with velvet, a cap being fitted over each combination. Never scrub the surface of the glasses, which have been very finely

polished and might be seriously injured by hard rubbing. If the surface be dirty, use a very soft camel's hair brush, kept expressly for the purpose, to wipe it, or if this is not sufficient it may be gently wiped with a piece of clean old silk or very soft linen, in either case holding the lens with the surface being cleaned downwards, so that the particles of dust, etc., may fall off. This will help to prevent the surface being scratched.

In using, say, a six-inch focus lens to obtain an image life size, the camera must be racked out to a focus of twelve inches. If we are using an aperture of *f*6 this will become *f*12 under these circumstances, and will require *four times* the exposure necessary for the *same* lens and *same* stop, if used at about its equivalent focus of six inches, as it would be in photographing a distant object. This fact must be carefully borne in mind in using any exposure meter or tables of exposure where the size of stop used has to be taken into account.

A sky-shade to cut off some of the top light should always be used over the lens; this will enable one to obtain clearer and better results. It may be done by having a tube on the hood of the lens itself, or by arranging a black card to project from the camera front over the lens. Whichever of these two methods is adopted, it should be ascertained by the experiment of looking at the image on the focussing screen that the sky-shade does not project far enough to cut off any of the rays required to form the image.

To sum up: I cannot do better than give the usual advice, which is to get the best lens you can afford; but unless you thoroughly understand its capabilities, the price paid, whether high or low, will not govern the results obtained.

CHAPTER IV

APPARATUS—*Continued*

THE SHUTTER, TRIPOD, AND OTHER ETCETERAS

The Shutter.—It would probably be quite correct to say the ideal shutter has yet to be invented. Certainly there are already many patterns to choose from, but there are also many important requirements which ought to be embodied in an ideal instrument that few, if any, will be found perfectly satisfactory in all ways.

There are three kinds in general use; those working between the lenses, those which can be used either before or behind the lens, and the focal plane working in front of and close to the sensitive plate. The between-lens type, of which there are several good patterns on the market, are small, light in weight, and work very quietly, and may be used for instantaneous exposures of wide range, in addition to what are known as automatic and time exposures. If only one lens is to be used, a shutter of this kind will answer all practical requirements for anything except very rapid exposures; but if more than one lens is in use, then this type is not suitable unless each lens has a separate shutter attached, which, of course, means not only extra expense, but extra weight.

A good type of shutter for working before or behind the lens is that known as the roller-blind, which can be attached to the camera front, and will enable different lenses to be screwed into the same flange by means of adapters, or by

having different fronts to fit the same shutter. The Thornton-Pickard Manufacturing Company make two well-known shutters of this kind, one, the ordinary " time and instantaneous," and the other, the " silent studio." One of the most important requirements for the Nature Photographer is a shutter that will work without noise, and the " silent studio " can claim to be one of the best in this respect. For a really silent one the best I know is the " Central " shutter, which may be had from Messrs. Dallmeyer, Ltd. This gives time and instantaneous exposures and fits on the lens hood or tube. Adapters can also be had enabling it to be used with several different lenses, and the price is also very moderate. A shutter which fits on the front of the lens has the advantage of protecting it from injury, or from moisture during any necessary wait for the purpose of making an exposure.

The focal plane pattern is the only kind which should be used for really fast work, say for exposures between the one-hundredth and the one-thousandth of a second. This type of shutter has been recently much improved and is now available for either time or instantaneous work. It can be built into the framework of the camera (as in the case of the Reflex types) or used at the back of the ordinary stand-camera, the dark slide or plate-holder then fitting into the back of the shutter. For efficiency, this shutter is far ahead of all other types, and work of a marvellous character can be obtained by its aid. It is, however, bulky and expensive, and while I should not think of buying a Reflex camera unless it had a shutter of this type, I do not think it would often be wanted on a stand-camera. The beginner, at least, is not likely to feel the need for it, and a shutter that will give fairly efficient exposures of between the one-fifteenth and the one-ninetieth

of a second, in addition to time, will be found to meet all his earlier requirements.

The Tripod.—The choice of a stand or tripod requires great care, because all our efforts may be rendered futile by using one which is not firm and rigid. The selection of one, however, is not a difficult matter, because that known as the "Ashford," of which several different patterns are made, will be found perfectly reliable. I have had one in constant use for about twenty years and it is still in good condition. In the selection of a tripod, the chief points to be considered are a good firm top, not too small; adjustable sliding legs to compensate for uneven ground; and the possibility of easily and quickly erecting and closing it. Either of the "Ashford" patterns will fulfil all these requirements, and may be had to suit the purchaser in a two or three-fold form. The latter is more convenient for travelling, the former probably more rigid in use.

Tripod Screw.—A good form of this is the one sold by Messrs. Newman & Guardia, Ltd., of London. It consists of a screw with a pin on the side, which acts as a stop when the screw has penetrated deep enough into the bush of the camera. A fly-nut is used to clamp the camera firmly to the top of the tripod, and is very convenient in use. The tripod screw will be less likely to get lost if attached, by means of string or light metal chain, to the tripod top. If it should happen to be lost amongst long grass, and one is not certain of the exact spot, it is like looking for the proverbial needle in a stack of hay, besides the possibility of preventing any further work being done for the rest of that day.

Focussing Cloth.—The focussing cloth should be of ample size, at least a yard square, and may be even larger than this

Fig. 12. Southdowns.

Fig. 13. A Team of Sussex Oxen.

one way with advantage. It will be much easier to control in a wind if it comes well over the head and shoulders when focussing. Any opaque material of light weight will answer, and if made of a good waterproof cloth will serve the purpose of protecting the camera, and even the photographer as well, in the event of a sudden shower. Mine is black one side and is lined with a green material, which enables this side to be used for concealing the camera and tripod, to some extent, when necessary. It may be fastened to the camera, either by having a hole made in it to fit over the lens, or by having several eyeholes made in it to fit over the projecting screws of the camera; or, again, by having several strings or tapes fastened to it allowing it to be tied round the camera. From experience, I can say it is a good test of one's temper to try and obtain an accurate focus of some object when a strong wind is blowing and the focussing cloth seems to prefer any position but the desired one over the operator's head.

Tilting-board.—A piece of apparatus not usually found amongst the kit of the ordinary photographer will be very useful in Nature work. It consists in some form of tilting-board, to enable the lens to be pointed downwards to photograph, for example, a nest on the ground or a flower or fungus growing very low. Without its aid, the tripod will have to be placed in very awkward positions at times, when it is very likely to overbalance by the weight of the inclined camera, and upset the whole business, including the photographer. There are several forms of tilting-boards on the market, or any one of a constructional turn of mind may easily make one for himself. In its simplest form, it consists of two boards about eight inches by six inches and half an inch thick, hinged together at two of the shorter edges. Two brass stays,

which may be purchased from any maker of camera fittings, should be screwed, one on each side of the longest edges of the upper board, and clamped at the other end by a screw nut arranged to work in a slot, so that any angle between 0° and 90° may be obtained. One of the two similar boards will be attached to the tripod head by a duplicate screw and the camera fastened to the other by the usual camera screw. This arrangement will enable the tripod to be placed in its normal and perfectly firm position, while the camera can be tilted by means of the tilting-board.

Exposure Meter.—Every photographer should possess and use an exposure meter. However experienced he may be, he will find this an additional aid to correct exposure; and correct exposure means a good negative. The different conditions under which the Nature Photographer will have to work will often make it exceedingly difficult, if not impossible, to correctly estimate the required exposure, and the actual difference in the actinic value of the light, say in the open and under trees, requires to be tested before it can be appreciated by the beginner. Therefore, I say, always carry and make use of an exposure meter. There are two well-known forms on the market—the Watkins and the Wynne—and either will be found perfectly reliable. The Nature Photographer should always carry a note-book in which full particulars of the exposure, light, lens, stop, plate, and any other remarks thought necessary should be entered immediately after photographing a subject. This will often prove invaluable for future guidance, and in the case of duplicate exposures will enable one to judge of the kind of development required to get the best result out of the plate. Some pieces of string will be found useful; amongst other things, to tie

Fig. 14. Common Whitethroat's Nest.

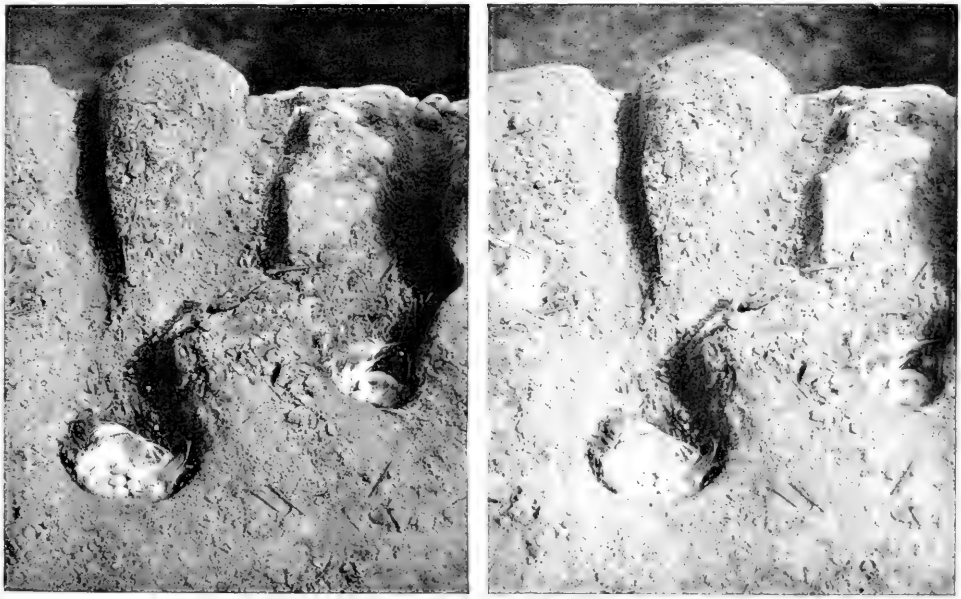

Fig. 15. Sand-Martins' Nests.

back any branches or foliage which may project into the field of view or which conceal the object it is desired to photograph; and a sheet or two of white tissue paper or a newspaper, and a small mirror five or six inches square, will also come in handy at times. The mirror will sometimes be useful for reflecting light on to some dark portion of the subject, and also will allow one to alter the stop of the lens or set the shutter by the reflection seen in the mirror when the front of the camera is in such a position that the lens or shutter itself cannot be seen. The use of the tissue paper or newspaper will be described later on when referring to field work.

This completes the list of apparatus absolutely necessary. As to the case or cases to contain the kit, it will perhaps be best to leave the choice to each individual. If many plates are carried it will be found a convenience to divide the weight of the whole kit and carry some of it in a waterproof satchel on one's back and some in a separate hand-bag.

A few hints on apparatus in general and the care of it may perhaps be useful. Cameras and lenses, etc., should always be kept in their cases or in a dry cupboard when not in use, and not left about in a room in the dust or where they are subjected to considerable changes of temperature. One's apparatus may have been put away during the winter and not used for some time. When this has occurred it should be carefully examined previous to use, in order to make sure everything is in proper working order. Previous to commencing the season's work the camera should be set up on its tripod, the lens being screwed into its flange and capped, the focussing screen raised, and the head inserted under the focussing cloth and kept there for some time in order to ascertain whether there are any pinholes or other places letting in light, and the

shutter, especially if of the roller-blind type, should be also examined to see that it contains no pinholes in the blind. If any interior fittings have become bright by wear they should receive a coating of liquid dead black, prepared for the purpose and sold by all dealers in photographic apparatus, and any parts working stiffly might have a little black lead rubbed on the surfaces coming in contact. The careful attention to little points such as these will ensure the satisfactory working of the different parts when in the field. During cold weather the blind of the shutter, which is made of a rubber material, usually becomes stiff and will not work properly when in this condition. It should be placed before a fire—but not too near—and gently warmed, and when one portion is thoroughly pliant, it should be set by winding up the other portion of the blind, which should then be similarly warmed. In my earlier experience I found on several occasions, when trying to use my camera during cold weather, that the blind of the shutter stuck and would not close on the release being pressed, and the plate was consequently spoilt. It was some time before I discovered the cause and the remedy for it.

Another possible source of trouble, and one, perhaps, difficult to account for by an inexperienced operator, is connected with the lens. This, when subjected to a sudden change of temperature, may condense moisture on its surface either outside or inside the camera, and in the latter case would not be seen. Until this condensation has passed off, the lens, of course, will not give a well-defined image. When one's head is under the focussing cloth for a long time the breath may be condensed on the focussing screen in a similar way, and it will be impossible to properly see the image or to obtain a satisfactory focus while this state of things remains. A short time

carefully spent in overhauling all the items of one's kit previous to bringing them into use, after having been laid by for a time, will often be the means of saving a loss of both time and temper, and will moreover conduce to the best results.

One word of warning with reference to the dark slides or plate-holders. Do not in the excitement of the moment forget to draw the shutter of the slide previous to exposing on the subject. I have had this unfortunate experience on several occasions, and it generally happens, in cases of this kind, that the subject has disappeared before another exposure was possible.

The photographer when out for the special purpose of stalking shy subjects or watching birds or animals should wear clothes of as quiet a colour as possible; he will then be able to make himself much less conspicuous. Mr. R. Kearton, in one of his most interesting books,[1] describes a reversible coat he had specially made of a brown colour one side and a green the other, so that he could wear either side which suited his surroundings best.

[1] *Wild Nature's Ways.*

CHAPTER V

THE DARK ROOM

DEVELOPING AND PRINTING

THE photographer who is able to devote to his own exclusive use a room for developing his exposures and for other photographic purposes should consider himself fortunate. Many of my readers may not find themselves able to do this, for various reasons, and I will, therefore, give a few hints to help them in making the best of a room which can only be used for the purpose temporarily.

Often a satisfactory arrangement can be made with the powers that be in the house to use the bath-room, or failing that the kitchen or scullery sink, and either of these can be adapted to answer very well, and may even have certain advantages attached to their use, as the dishes and other paraphernalia used for developing, etc., will have to be washed and removed each time, at the conclusion of the operations. This will tend to encourage one very important point, namely, cleanliness. In any case a room with a supply of water laid on and a waste pipe will prove very convenient, although not absolutely necessary. If a room cannot be used which has water laid on, then the provision of it by a can and a pail or two for the waste will answer very well, a small wooden table being used to place the dishes, etc., on, the pails for the waste being placed under the table, where they can be safely kept and easily found in the necessary dim light. Nowadays, the process of develop-

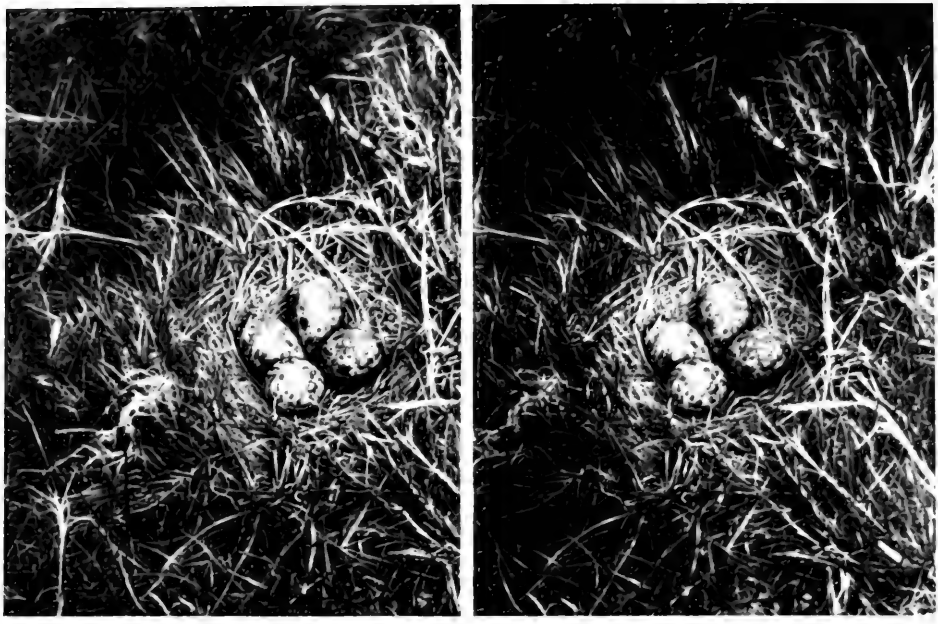

Fig 16 Lapwing's Nest

Fig 17 Young Lapwing crouching

ment can be very much simplified by carrying it out in one of the light-tight developing tanks on the market at the present time, and if this be carefully done, perhaps more uniform results can be obtained in this way than by any other method.

An absolutely darkened room—except for the light of the dark room lamp—will be necessary at times, and we must either postpone our operations until the evening or block out, by some means, the light entering the room. If the room is lighted by one window it is comparatively easy to make a frame covered with two thicknesses of brown paper or other opaque material, and large enough to cover the window completely, so that every ray of light is excluded, except that which comes from the dark room lamp within. Another method would be to have a pair of opaque curtains rather larger than the window, and so fixed that they can be quickly drawn across to shut out all the white light. But as full particulars of the best way of arranging a dark room will be found in any one of the text-books already advised for the beginner, it is unnecessary to enter into full details here.

I should, however, recommend that development, if carried out in the usual dishes, should be performed by means of artificial light. This latter is more constant than daylight filtered through red glass or medium. With a light which does not vary in intensity it is easier to judge the density of the negative, a task which is always more or less difficult in the dim light of the dark room. When Orthochromatic plates are being dealt with, it is especially necessary to be careful, not only regarding the quantity, but also the quality, of the light used for development. Now that it is possible to obtain these colour corrected plates of a high speed they should *always* be used, as they are superior to ordinary plates in

rendering tone and colour values either with or *without* a screen or filter.

As nothing has yet been said about the choice of a plate, this will be a convenient place to do so. There is " no possible doubt whatever " that any brand of plates upon the market will give good results with suitable treatment, and the only general advice that need be given is, when a plate is found which gives good results, *stick to it.* At the same time, the beginner has to first find out what kind of plate will be likely to suit him, and I will therefore recommend two brands which I have used largely with very satisfactory results. One is the " Barnet Ortho Extra Rapid." This is an excellent clean-working plate, which allows great latitude in exposure. It is fast enough for the majority of work likely to be attempted by the beginner, and has given very good results in my hands without the use of a yellow screen or filter. As an all round plate, I feel certain it would prove easily workable in the hands of the beginner, and an exposure card contained in each box of plates considerably helps to lessen the chances of error in exposure. (Do not, however, omit to use the exposure meter already recommended.)

Another plate I have found very good indeed, and rather more rapid than the " Barnet," is Marion's " Iso Instantaneous." This also gives excellent colour renderings without a screen, but being very sensitive, care must be exercised to guard against the possibility of fogging it in the dark room. If a plate is fogged during the process of development it is impossible to obtain either sufficient detail or density in a reasonable time, and the plate-maker may be blamed when the fault is really due to the photographer. Backed plates are recommended by most experienced workers as giving the

Fig. 18. Moorhen's Nest.

Fig. 19. Nightjar's Eggs.

best results, and if they are not used exclusively, a sufficient number should be carried in addition to the unbacked ones to enable the former to be used on any difficult subjects likely to give halation. A backed plate will also give more latitude than an unbacked one in case of over-exposure. In developing backed plates no notice should be taken of the backing until the image is well up on the plate. The developer, by this time, will have sufficiently softened the backing to allow it to be easily wiped off with a sponge, the plate being well rinsed on both sides under the tap before replacing in the developer. Unless the backing is removed it will be impossible to judge the density of the negative by looking through it. A trial packet of either of the above-mentioned brands of plates—or, for the matter of that, any other brand—will enable the worker to decide on the one likely to suit him best.

Unexposed plates should be stored in a dry place free from fumes of gas or chemicals, and will then generally keep in good condition for some time. Rapid brands of plates, however, have a tendency to deteriorate sooner than the slower kinds. Care should always be taken to keep the plates as far as possible from the red light when filling the slides or envelopes previous to exposure. They are much more sensitive then than when the image has appeared in the process of development, but I always keep the dish covered over during this operation, and only occasionally look at the plate to see how it is progressing.

The temperature of the developer has a great deal to do with the time of appearance and quality of the image produced by development. In summer no difficulty will be experienced under this head, but in winter or during cold weather the temperature of the developing solution should not be allowed

to fall under 60°, or a plate which has received a correct exposure for normal development will appear under-exposed, and the image will be an unnecessarily long time in appearing, and in gaining detail and density. On the other hand, the temperature of the developer should not exceed about 65° or fog will probably result, and " frilling " may even take place.

Presuming artificial light is to be used for developing by, we have now to consider the most convenient kind for the purpose. Electric light, gas, oil, or candle may be used. The first of these will require very little consideration, because the majority will probably find it not so convenient as the other kinds mentioned. For those workers who have the exclusive use of a room and who can arrange for the lamp to be permanently fixed in one position, gas will supply a convenient luminant, but for those who have to make temporary use of a room this arrangement will not answer and the oil or candle must be used. Personally I have never favoured oil, on account of the messy nature of it and the smell generally connected with an oil lamp, and do all my own developing with the light of a hard wax candle. This requires no trimming or attention, does not smell, and the light is always uniform and quite sufficient for its purpose. My own dark room lamp is one I constructed myself. It consists of a wooden box fourteen inches high, eight inches wide, and six inches deep. There are two pieces of glass which slide in grooves, one behind the other, and form the front. The outer one is of ruby glass and the inner one of ordinary glass to which two thicknesses of canary medium have been fastened. Every season the medium should be renewed, and a little vaseline rubbed between the two pieces will make them translucent, producing a pleasanter light to work by. The wooden

top has a hole in it, over which a light-tight metal chimney has been fitted with an arrangement for ventilation, and the bottom of the box has several holes bored in it for the same purpose, and stands upon legs two inches high, the spaces between being covered in at the front and sides, but left open at the back. As already stated, the light is supplied by a hard wax candle. During the process of filling slides and in the early stages of development both the canary medium and the red glass are used, but by lifting the latter a few inches the density of the plate can be more easily judged when development is nearly complete. Of course, the plate must not remain more than a second or two in this light or it will be fogged. This lamp has answered so well that I have never required to have anything else, and so feel confident in recommending a similar arrangement as likely to prove satisfactory. There are plenty of ready made dark room lamps on the market, particulars of which may be found in any photographic catalogue, but the illuminating surface in most patterns is far too small, providing so little light in the dark room. As long as the quality of the light is all right, and no actinic rays are able to get through the coloured glass or medium, plenty of it is an advantage in many ways. Of course, the plate need not be developed close to the lamp, but even if it is and the dish is kept covered over, except during the brief periods of examination, no harm will result.

For travelling purposes, and for changing plates when on tour, I use one of the hock glass lamps in which is burnt a night-light or piece of candle. As I take a good supply of envelopes for plates, I generally change mine at night after it has become dark, by means of this hock glass lamp, round which I place a roll of canary medium for greater safety, as the

less light used for changing plates by the better. Some photographers do this quite in the dark, but personally I like to *see* what I am doing. Whatever form of lamp is used it is necessary to see that no light escapes from it except through the proper place.

The beginner will also have to make choice of a suitable developer, and while there is no doubt our good old friend Pyro will do as much, and perhaps more in some respects, than any of the recent developing agents, yet from my own experience I cannot recommend its use. I gave it a good trial, but was obliged to discontinue using it on account of its staining properties. When a large number of negatives are developed with it the operator must expect to get his fingers badly stained with dirty-looking brown marks very difficult to get rid of and giving the hands the appearance of not having been properly washed. There are many non-staining developers on the market, each one of which has a certain number of adherents, who, no doubt, think their own particular choice is the best. I have experimented with a good many at various stages of my photographic career, but for a considerable time past I have used nothing but Rodinal, and that is the only one I intend to mention. I have developed hundreds of negatives with it, and it may be fairly described as a universal developer, being suitable for lantern slides, enlargements, and gaslight paper in addition to negatives. It is sold in the form of a solution, which only requires diluting with water for immediate use. Control of density can be obtained by varying the proportion of water, adding more of it for softer results. I generally use it in the proportion of one drachm of Rodinal to three ounces of water, to which is added from three to ten drops of a 10 per cent. solution of potassium bromide, and this

gives me ample density. It should be borne in mind that a developer of this character, which gives a blue-black deposit, requires the density of the negative carried a little further than appears necessary to the eye on account of the actinic nature of the deposit compared with a yellow-staining developer like Pyro. In my own practice, when the negative appears to be about right in strength it is removed from the developer and placed in clean water for two or three minutes before putting it in the fixing bath, and I find it generally improves under this treatment.

Another advantage of Rodinal is that several plates may be developed in the same solution; in fact I often develop a dozen plates in the same lot of developer which has been strengthened from time to time by the addition of a little more of the stock solution. In development, air bubbles sometimes form on the surface of the plate while in the dish, and if allowed to remain will cause transparent spots on the negative when fixed, because the developer has not been able to act on the film where the bubble existed. A good way to prevent the formation of these bubbles is to *gently* brush the surface of the plate directly after the developer has been poured over it with a soft camel's hair brush kept expressly for the purpose. The kind required is known as a " mop " mounted in a quill, and should be kept in water when not in use.

I always aim for the production of a negative inclining to thinness, as I find for stereoscopic work, and also for the production of lantern slides and enlargements, this class of negative gives the best results.

The best kind of fixing bath to use is one made by adding bisulphite of soda to ordinary hypo in the proportion of one of the former to four or five of the latter, four ounces of the com-

bined salts being dissolved in twenty ounces of water, which is equivalent to a pint. The acid fixing bath clears up the negative and prevents stains. My negatives are always left in the fixing solution for fully twenty minutes, as I believe more fading of negatives or prints is due to under fixing than to under washing. Negatives after washing should be dried as soon as possible. My own practice is to rest them against a board which has had some two-inch wire nails driven into it in horizontal rows at intervals of about three inches between the nails and about eight inches between the rows. The board should be previously placed against a firm support in a nearly vertical position so that it will not shift, and the negatives are then rested film downwards by one corner between two nails. This method enables a free circulation of air and at the same time prevents dust settling upon the film during the process of drying. If the board is placed at a distance of six or eight feet from a gas stove or fire drying will be hastened, but there must only be a moderate amount of heat or disastrous consequences will ensue. The temperature should not be changed during the drying process or unequal density may result. When the negative is thoroughly dry the back should be cleaned and a proof print taken from it. If this is satisfactory, a coat of varnish on the film side will protect it from injury and allow any necessary spotting to be done on the varnish without the risk of touching the unprotected surface of the film.

If the negative should require either intensification or reduction this should be done previous to varnishing. Full details of either of these processes will be found in any elementary text-book.

The most important thing necessary to produce a good negative is a correct exposure. If this has been secured—and

with the help of an exposure meter one cannot go far wrong—no difficulty ought to be experienced in developing a good printing image in a reasonable time. If, on the other hand, the exposure has been under or over estimated, development will take longer and a less satisfactory negative be the result. Therefore a good rule to adopt is: Take care of the exposure and the development will take care of itself!

PRINTING PROCESSES

The two most permanent printing processes known are Platinotype and Carbon. The former will give either black or sepia-coloured prints, and the latter allows the choice of almost any colour to suit the subject. Black, brown, blue, green, and red prints may be easily obtained. For either of these processes the negatives require to be full of gradation and what is known as "plucky," that is, not too thin. In practice, it is a good plan to let the printing process which is likely to be generally used settle the kind of negative produced. For instance, if P.O.P., Bromide, or Gaslight papers are used, the negatives can be thinner than those required for the best results in Platinum or Carbon. The Gaslight papers are very convenient for many reasons. They can be printed, as their name implies, by gaslight or any artificial light, and no dark room is necessary for their development, which may be carried out in any ordinary room, if during the process the paper is kept some distance from the source of light and in shadow. The ordinary printing out paper, known as P.O.P., or the more recent P.O.P. self-toning paper, provides a convenient medium for proof prints from a negative when daylight is available.

A new process, known as "Ensyna," has quite recently been placed on the market. It has been introduced by Messrs. Houghton & Co., of London, and can be printed by daylight or artificial light, and any colour from a bluish-black to quite a red may be produced simply by the different length of exposure given. No toning is required, the image being produced by physical development only, after which it is quickly fixed and washed. A finished print may be obtained in the short space of from six to eight minutes. The paper is said to be quite permanent and will probably prove a strong rival to the ordinary P.O.P. It may be had either with a glossy or mat surface, thus being suitable for all kinds of results. Enlargements may also be made on this paper, which is certainly an acquisition to the printing processes already on the market. For the production of artistic results a paper with a mat or semi-mat surface should be chosen. A print from a small negative which is required to show a large amount of detail will be best obtained on a glossy kind of paper.

THE PRODUCTION OF LANTERN SLIDES AND ENLARGEMENTS

The Nature Photographer who has become proficient in the production of a good negative and print from it will probably wish to extend his operations. This he may do in the production of either lantern slides or enlargements, or both. The exhibition of lantern slides is, perhaps, of all methods, the best for showing any good results obtained in the field, because they may be seen by a large number of persons at the same time.

Every Nature Photographer should possess a projection

Fig. 20. Young Nightjars (egg shells still in nest).

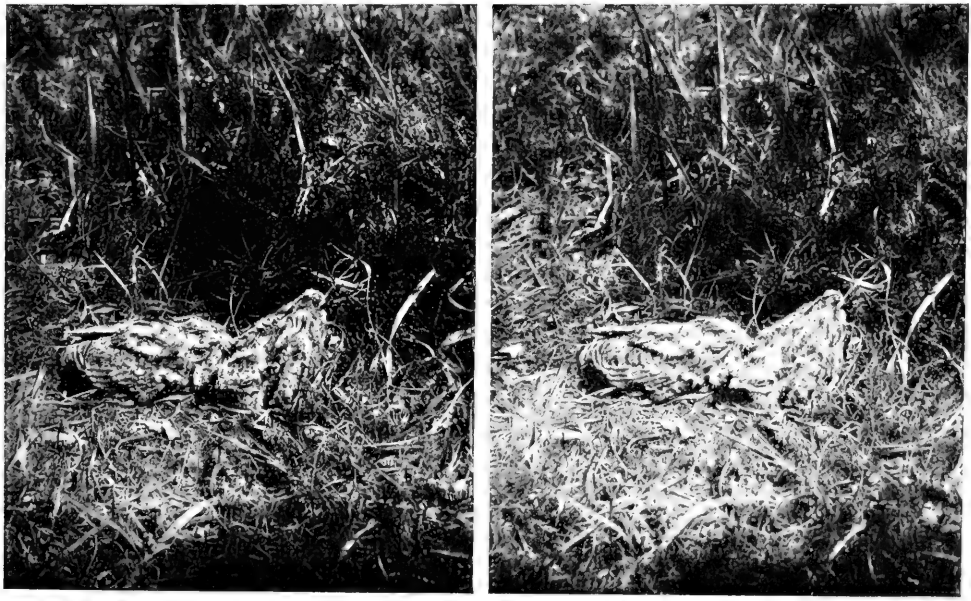

Fig. 21. Young Nightjars (Photographed 9 days after Fig. 20).

lantern, so that not only his friends but he himself can see his results full size or even larger upon the screen. No print can compare with a good lantern transparency for quality, and any one who can produce a good negative will find it easy to make a good slide from it. Lantern slides may be made in two ways, by contact or by reduction. The former method is to be preferred when possible, as the work may be carried out by artificial light during the long winter evenings, when a set of slides can be made from the negatives obtained during the past season's work.

In making a lantern slide from a stereoscopic negative, when, of course, only half the negative is used, it is a good plan to place a clear piece of glass the same size as the negative in the printing frame before placing the negative in it. This will avoid the chance of breaking the negative by the unequal pressure. The springs of the printing frame should also be slackened before the negative is placed in it, or one with weak springs kept specially for the making of lantern slides by contact. The choice of a lantern plate will be governed by the same considerations affecting the choice of a plate for negative making. The only thing I need say in reference to it is somewhat on the same lines as the well-known testimonial given to Pears' Soap. *Since using Thomas's Lantern Plates I have used no others.* (*Verb. sap.*)

Lantern plates can be developed in a yellow light that would fog the rapid plates employed for negative making, and I always use my lamp with the screen of canary medium only, without the red glass. Lantern slides can also be made by reduction in the camera, and must be made in this way when the whole of the subject on a plate larger than the lantern plate itself is required. The production of slides by reducing in the

camera can be carried out either by daylight or artificial light, and full particulars of working both processes will be found in the text-books.

Enlarging can also be done by daylight or artificial light, but in either case some form of enlarging camera will be required. One of the great advantages of using a small sized plate for negatives, apart from the reduction of size and weight in the kit of the photographer, is the easy way in which enlarged prints or negatives may be produced from the small ones. A good ¼-plate negative can be enlarged to at least 15 × 12 inches without serious loss of definition, and while the ¼-plate is somewhat lost if framed and hung on a wall, the larger sizes are suitable for framing and hanging practically anywhere. As excellent manuals dealing with lantern slide making and enlarging can be purchased for sixpence, it is unnecessary to enter more fully into these most interesting processes here.

Fig. 22. Chiffchaff's Nest.

Fig 23. Willow Warbler's Nest.

CHAPTER VI

ON THE CHOICE OF SUBJECTS

THE material which is available for Natural History Photography is, as I have already stated, so abundant that no difficulty is likely to be experienced in finding subjects. The difficulty which will probably confront the beginner is the question of what shall be taken and what left, when it is considered that one worker, during his comparative short lifetime, will be able to accomplish but a very small proportion of what might be done did time permit. As it is evident, therefore, that a *choice* has to be made, a few suggestions may be useful. But as it is the little drops of water that make the mighty ocean, so the comparatively small efforts which the majority of workers can accomplish individually may help to swell the sum total of our increasing knowledge concerning some of Nature's mysteries.

Nature Photographers will probably fall within the limits of one or other of the following classes. First, those who have plenty of time and means to devote to their hobby. Secondly, those who have the time but are limited in means; and, thirdly, those who have very little time at their disposal, and may or may not be limited in means.

The first class will be able, if they feel so inclined, to organise expeditions and travel to distant lands, where they can engage to their heart's content in the fascinating pursuit of obtaining pictures of the fauna and flora of the country and records of

events and scenes which can only be obtained in this way and by the few. There are plenty of subjects waiting to be depicted by the camera of the explorer.

The second class may find plenty of excitement, however, in hunting out subjects in the woods, fields, and lanes in their own immediate neighbourhood at very little expense, except in time and patience.

The third class, which, doubtless, will be the most numerous, may find within the walls of a small garden material enough to occupy their limited time and attention for many a day. Most houses, even in our larger towns, can boast of a small garden, and should the Nature Photographer be so unfortunately placed as to be without a garden of his own he may still be able to obtain permission to work in one belonging to some companion or friend. To take a small suburban garden as an example. Very early in the year, especially if the season be mild, the fruit or other trees will show signs of buds, which later on will develop and burst forth into leaf. Then as the season advances the early blossom will begin to show and will gradually develop until it has reached its full array of beauty; then as it begins to fall off and "set," the small fruit will form, which as the summer passes by and autumn approaches will continually be advancing towards perfection. A most interesting and instructive set of studies might be made showing the development of one or more fruit trees; comparing the different growths from the opening buds of foliage to the perfect and ripe fruit.

Another interesting series might be made by photographing a succession of flowers from those of early spring to late autumn. If suitable flowers are planted in the garden, they will be certain to attract insects, and studies may be made of

the Butterflies, Moths, Bees, and Flies which visit the blossoms. Should the photographer wish for further work in this direction, he may investigate the life histories of some of these visitors, obtaining records of their development from the egg, through the larval and pupal stages to the perfect insect.

Or, again, should he be interested in Birds he may attract them by placing food in the garden, which will help to make them tame and allow him to obtain some studies of them. A portion of a cocoa-nut or piece of bone with a few scraps of meat left on it will soon attract the attention of the Tits, and if hung up in a good light and where they can be easily seen, much pleasure will be derived from watching the birds attracted by them. The photography of Birds will be found difficult in comparison with stationary objects, owing to their quick and incessant movements. It is very seldom that they will allow a time exposure to be made upon them, and even instantaneous exposures will often be found to be useless on development owing to movement having taken place during exposure. On one occasion I was trying to obtain a photograph of a Robin feeding its young in a nest built in my own garden, but several exposures made as the bird alighted on a branch near the nest proved on development to contain no image whatever of the bird, which, although a quick exposure had been given by a shutter, had managed to fly off on the slight noise made in releasing it, before its image could be impressed on the plate. Birds are tamest during the nesting season, and studies may be sometimes obtained then which would not be possible at other times. Nesting boxes may also be placed in suitable positions, but in doing so care should be taken that they are not placed where the full rays of the sun falls on them for any length of time, or the heat will

probably suffocate either the sitting bird or young ones when hatched. If these boxes are hung up early in the year, so that the birds become accustomed to them, they will probably be tenanted later on according to their size by either Tits, Starlings, or the ubiquitous Sparrow, and will enable studies of the nests, eggs, and young birds to be obtained.

At certain seasons of the year the Spiders and their webs will form attractive subjects for the camera, and no doubt the garden will harbour at times snails of various kinds and perhaps a toad or frog.

Those photographers who, for want of time, cannot wander far from home may, during the spring, summer, and autumn, in a garden such as I have imagined, devote an hour or two before breakfast to their hobby, if they so desire, with advantage to themselves and to their work. A very interesting set of studies could be made from the various birds, insects, and flowers found in a garden during the year.

But while the garden may yield a sufficient store of material for a good deal of work, considerably more may be discovered within a small radius from a farm or homestead in the country. I have often been surprised to find a far greater number of birds' nests, for example, in and about a garden belonging to a country cottage, or in the immediate vicinity of a farm-yard, than during a walk of several miles through fields and lanes.

The photographer who does not wish to confine his attention to one branch of study may, like the Bee, flit from flower to flower—that is to say, from subject to subject—gathering honey from whence he will to add to his store of results.

Then, again, our various trees would make excellent subjects, and might be made practically useful when we remember

Fig. 24. A Summer's Day

Fig. 25. Sussex Oxen at Plough.

how few persons there are who can tell at a glance one kind of tree from another even amongst our own common examples. A series of photographs might be obtained of them in spring, summer, autumn, and winter, together with their bark, leaves, flowers, and fruit. There are, I believe, about two hundred different kinds of insects which, during their larval stages, feed upon the Oak. What an opportunity for some budding Nature Photographer to figure, not only the tree itself, but all the insects which have been known to feed upon the foliage, during their early existence. Such an undertaking would certainly be no light one.

In the vegetable world, apart from the wild flowers, studies might be made of the various grasses, and of some of the fungi, to be found in numbers at certain seasons of the year, principally in the autumn.

Some of the most beautiful curves in Nature are found in shells, and while there are a number of interesting specimens of land shells, those photographers living near the sea would be able to add a good number of marine specimens to their collection of studies; in fact a stretch of a mile or two of shingle washed by the tide would provide numerous subjects for any one interested in marine life.

In settling on the choice of subjects I would suggest that a connected series of photographs always possess more interest than a mere disjointed collection, and will often prove of far greater scientific value also. The suggestions which have been made will probably lead the earnest student to work out for himself similar ideas to those already given.

CHAPTER VII

A FEW HINTS ON STEREOSCOPIC NATURE PHOTOGRAPHY

THE astonishment generally expressed by any one looking at a good stereoscopic photograph for the first time is very striking. The sense of reality, and of being able, apparently, to see the third dimension, appeals to all, and I think quite supports the view already expressed, that a good stereoscopic Nature Photograph is the next best thing to Nature herself.

Robert Hunt, a very able early writer on Photography, makes use of the following words in connection with the subject in one of his books: " The magic result of the revolution of two plain pictures into one, possessing to the eye the most positive solidity, is so striking when witnessed for the first time, that it appears to be a deception of the senses. Even when fully accustomed to the phenomena of the stereoscope, there is so indescribable a charm in the beautiful pictures that they are gazed at again and again with increasing admiration. Living forms appear to stand out in all the roundness of life, and it is not possible to conceive a more perfect realisation of the human form than that which stands forth prominently from the background of the stereoscopic picture. In the stereoscope we have at once an instrument which enables us to study many of the phenomena of vision, and to reproduce loved and beautiful objects, or interesting scenes, through

Fig. 26 Robin's Nest.

Fig. 27. Robin going to Nest with Food for Young

the agency of those rays by which they were illuminated, in that strange perfection which, in its mimicry of visible external nature, almost baffles the examination of human sense."

The stereoscope was at the height of its popularity from the time of the Great Exhibition of 1851 until the International Exhibition of 1862. Before the close of the former a stereoscope and set of slides was presented to the then young Queen Victoria by Sir David Brewster. One professional writer at the time of the latter exhibition has said that of two favourite subjects he had, more than a hundred negatives of each were continually printing, and hundreds of thousands of prints of various subjects were sold. After this a decline in popularity took place, and it is difficult to say exactly why. Perhaps one reason was that a thing which becomes such a craze is likely to—and often does—kill itself prematurely. Other reasons were, perhaps, the careless manner in which many of the slides were mounted, and also the vulgar character of many of the examples placed upon the market. There have been signs of a revival during the last few years, and I feel certain that those photographers who take up the study of it, and who use the ordinary care required to produce good results, will never regret it.

While the best form of stereograph, as the two dissimilar prints mounted on the one card are called, is undoubtedly a good glossy photographic print itself, yet I hope the reproductions given in this book may show how suitable this class of work is for Nature Photography. Assuming that some of my readers will desire to take up this branch, I intend to devote this chapter to the consideration of the best means of setting about it.

There are ways of obtaining a true stereoscopic effect by means of only one lens, either by shifting the camera for the two exposures required when only one lens is used, or by an ingenious patented mirror arrangement to fit on the lens, but as the former method will only do in the case of stationary objects, and the latter, although I believe quite satisfactory in practice, is, after all, only a makeshift, I shall dismiss the consideration of both these methods, and deal only with the system which employs a pair of lenses. Personally I have several objections to using the standard size of stereoscopic camera which takes a plate $6\frac{3}{4} \times 3\frac{1}{4}$ inches. It is an awkward shape for any other work, and the plates being in very little demand, compared with other sizes equally suitable, are less likely to be fresh when purchased.

I have already stated that my own preference is for the $\frac{1}{2}$-plate or the post card size camera for the purpose, and on account of the weight of the former I have now adopted the latter. This size, therefore, which measures $5\frac{1}{2} \times 3\frac{1}{2}$ inches, is the one I recommend if a new camera is being purchased. It is a very good shape for landscape or general work, and will give from the one negative two trimmed stereo-prints full $3 \times 2\frac{1}{2}$ inches, which are quite large enough for practical work. Lantern slides by contact are also easily made from this size to include the whole of the picture.

Any camera used for stereoscopic work must have a septum or division arranged down the centre of the bellows inside. This is generally made of stiff folded cloth with elastic running through it in order to keep it taut, when in position, during any extension of the camera. It should be fitted so that when one picture the full size of the plate is required it may easily be removed. Its object is, of course, to allow each of the two

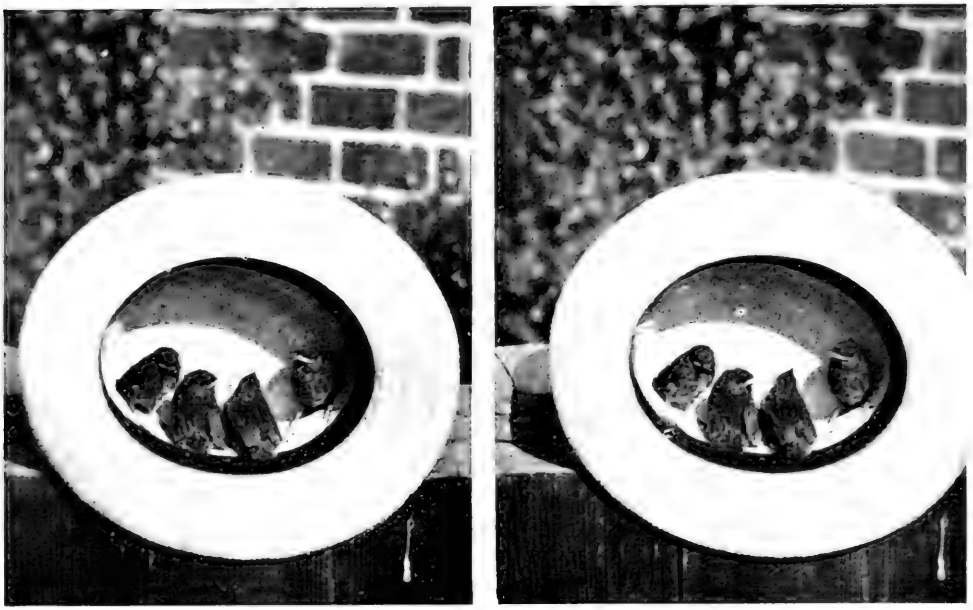

Fig. 28. Young Robins

Fig. 29. Meadow Pipit's Nest

lenses employed to see its own half of the plate only. If the camera is of the long focus pattern, as it should be, the septum ought to be so constructed that it will allow for either long or short focus work. If a good piece of elastic is employed, the same septum will easily accommodate itself to a difference of focus between the limits of from five to about twelve inches. The one I use does this, but another plan would be to have two separate ones for short and long focus work respectively, although this method would necessitate changing the septum, which is certainly not advisable for several reasons. When two lenses are used for stereoscopic work they must be "paired," that is, each must not only be of exactly the same focus and have the same sized stops, but must each give the same sized image. An extra charge of from five to ten shillings is generally made by the lens maker for doing this, and it is very necessary, for exact work, to have it done.

Some persons have an idea that two prints from the same negative mounted side by side will give stereoscopic relief, but this is entirely a fallacy and I will explain why. In looking at an object with our two eyes, which are separated normally by a distance of about two and a half inches, we see a little more of the right side of that object with the right eye and a little more of the left side with the left eye, and it is this fact which causes the appearance of the solidity of objects. This may be easily proved by the following simple experiment. Hold one finger up about five or six inches in front of the right eye covering some distant object, at the same time closing the left eye. Now open the left eye and close the right without shifting the finger, and it will be found that the object covered before can now be seen, the finger appearing to have moved

away to the right of the object, showing that we get a different view with each eye. Another experiment may be tried as follows: Hold a finger up about nine inches from the nose and look at some *distant* object, when two indistinct images of the finger will be seen. On directing the vision to the finger apparently two separate views of the distant object previously looked at will appear, one on each side of the finger. This is an easy way of seeing double and without the consequences which sometimes occur when a person sees apparently two keyholes to his door at an early hour in the morning.

About forty years ago almost every house contained a stereoscope and a collection of prints, but at the present day it is comparatively little used, and I am certain there are a number of persons who have never seen a good stereograph. On inquiring at one of the oldest established photographic dealers in London a short time ago for the loan of a stereoscope for a few moments to examine some stereographs I had with me, I was surprised to find they did not possess such a thing in the whole of their stock.

In the chapter on apparatus (Chapter II.) I have already mentioned some of the points for consideration in selecting a camera suitable for stereoscopic work, and in fact the same considerations would equally apply whether the camera was to be used for stereoscopic work exclusively or for general work in addition. If the ½-plate or post card size is chosen the same camera will be suitable for either stereoscopic or single pictures, and this is one of the advantages in the selection of one or other of these sizes. With regard to the lenses necessary, it is sometimes possible to pick up a very good pair second hand for a small sum. In stereoscopic work considerable depth of focus is necessary, as a general rule, and

therefore the lenses will usually be stopped down to, say, from *f*11 to *f*22: and on this account a pair of single lenses will answer the purpose very well if price is an object. They are even preferred by some workers, but as they cannot be used at a larger aperture than *f*11, they will not be fast enough for some subjects, and a pair of doublets working at *f*8, or better still *f*6, are preferable. In the chapter on lenses (Chapter III.) I have already referred to the pair of Busch Detective Aplanats with which many of the illustrations in this book were taken. They were of six and a half inches focus, which is quite short enough for Nature work. Long focus lenses have the great advantage of allowing a larger image of the object to be obtained from a certain standpoint than those of short focus, and this is often useful when it is either impossible or inadvisable to approach nearer. I often use two paired combinations of a Zeiss Protar, which are of eleven and a half inches focus and work at *f*12.5. These give images nearly double the size of a six and a half inch focus lens. When more than one pair of lenses are in use, it is a great convenience to be able to use them interchangeably on the same camera front. This may be done by fitting the flanges of those having the largest diameter on the front of camera or the panel fitting the shutter, and using adapters to carry the smaller diameter threads, which will also fit into the larger flanges.

Another way would be to have a separate panel for each pair of lenses used, which could be fitted to the same shutter. The Thornton-Pickard stereoscopic roller-blind shutter will admit of this being done, and is a very convenient one, as it will allow of either two lenses being used for stereo work or one lens for pictures the full size of the plate, and in choosing the camera it should be ascertained that the front of it will permit

of a shutter of this type being fitted. The shutter mentioned above can be had with an arrangement for separating the lenses, which is sometimes very useful in practice. For post card size it should be possible to alter the distance between the optical centres of the two lenses from about two inches or two and a quarter inches to three inches. As many of the subjects taken will be at fairly close quarters, I find in my own practice that a separation of from two and a quarter to about two and a half inches is used most often. In the case of our eyes the rays converge at a greater angle from a near object than from a distant one, but as we can accommodate our vision to the altered conditions we do not get an effect of exaggerated relief. With the lenses, however, the case is different, and to avoid this exaggerated effect of relief we must alter the separation of the lenses, using them nearer together for near objects and at a greater separation for distant objects. I have found for Nature work that it is not necessary to separate them more than two and three-quarter inches, although for very near objects two inches separation is sufficient, if it can be obtained. If a fixed separation is a necessity, then let it be two and a half or two and a quarter inches. A level should be fitted to the camera, one of the double patterns being best, as in taking subjects which include horizontal lines, it is important to see that they are represented horizontally in each picture on the focussing screen.

The general directions given in the chapter on development, etc., will apply equally well to stereoscopic work, but there are one or two points which will require special consideration. One is to avoid hard negatives or subjects with violent contrasts of light and shade. High lights printing

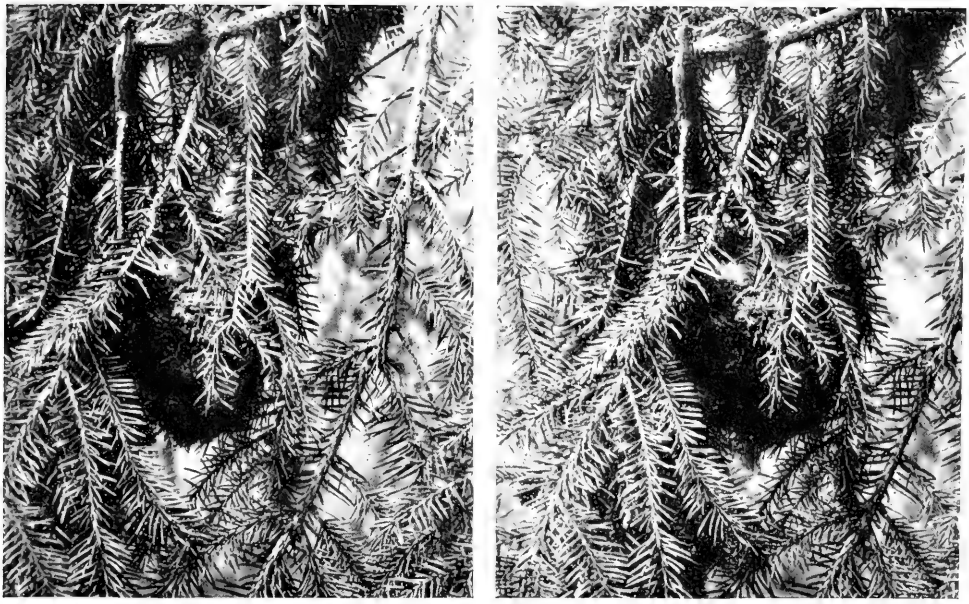

Fig. 30. Golden-crested Wren's Nest

Fig. 31. Hedge Sparrow's Nest.

out white are fatal to the best results, and if unavoidable in the negative should be obviated by a careful sunning down of all white patches on the print. In many cases the whole print may be exposed to light for a brief period after it has been removed from the printing frame. To avoid hard results the negatives should be well exposed, and if anything incline towards softness, and often a flat-looking print will be preferable for binocular examination, because the necessary relief will be obtained in the stereoscope. As a rule a glossy printing paper is the best to use, because, owing to the magnification which takes place in the stereoscope, a rough texture becomes much more pronounced. Ordinary P.O.P. is very good, or one or other of the half-mat gaslight papers may be used. The " Ensyna " paper, only recently placed upon the market by Messrs. Houghton & Co., of London, seems to be an ideal one, as any colour from a very warm brown to black can be easily obtained. As a rule warm colours are more agreeable than cold ones, but that, of course, is a matter of individual taste.

We now come to a very important point—and one often very puzzling to beginners—that of the transposition, trimming, and mounting of the prints, and, however well the process has been carried out so far, the whole effect may be ruined by want of care in these matters. What we must bear in mind is that we have taken two pictures, and the one taken with the right hand lens must come on the right side of the finished slide and that taken with the left hand lens on the left side. But as our negative is produced in the camera in an inverted position, the print from it will be reversed and will require the two halves to be separated and made to change

positions. The following diagrams will help to make the point quite clear:—

Fig. 1.

Fig. 2.

Fig. 3.

Fig. 4.

Fig. 1 gives the view as seen on the ground glass of camera inverted and which, of course, will be reproduced on the sensitive plate. Fig. 2 is the resulting negative as seen right way up when looking through it from the glass side. Fig. 3 represents the print obtained from the negative which, of course, will be identical to the view of the negative seen in Fig. 2. Fig. 4 shows the print, which has been divided and transposed when arranging it on the mount. To avoid the possibility of incorrectly mounting the prints I make use of the following simple method. Previous to trimming the print I turn it over, keeping the top at the top, and mark the back of it as shown in the diagram:—

Fig. 32. Common Partridge's Nest.

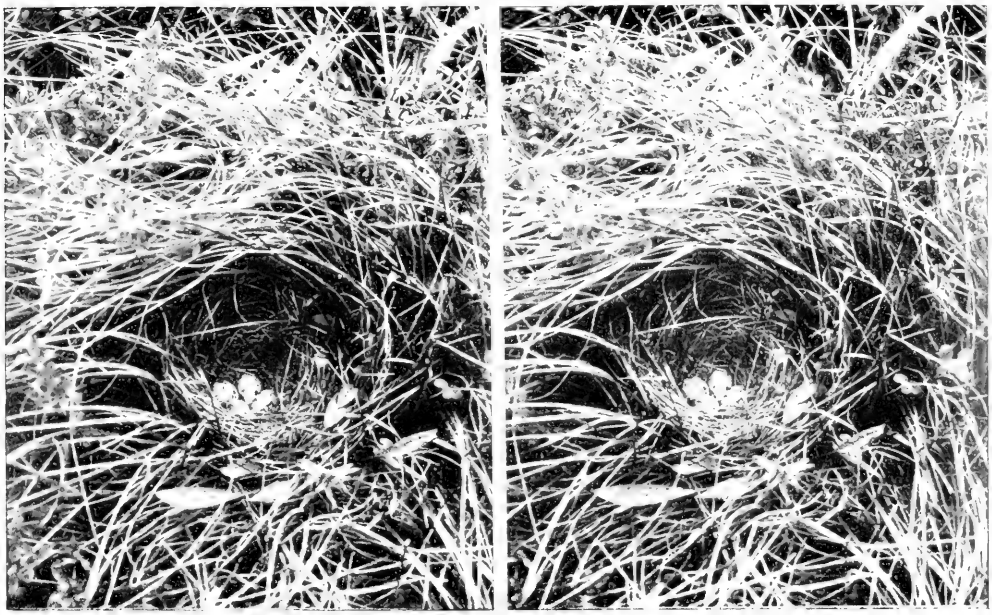

Fig. 33 Corn Bunting's Nest.

This should be done with a soft pencil so that the impression does not go through to the face of the print, and the letters should be placed about the centre of each half of it. Then when the print has been trimmed and the two portions have been separated, the one with L on it should be placed on the left side of the mount and the R portion on the right. After mounting each subject I immediately place it in the stereoscope, and if the effect produced is not correct it can be altered before the print begins to dry. Great care is necessary to see that the two prints are mounted so that similar points in each are exactly in the same relative horizontal and vertical positions on the mount.

In trimming the prints the following points should be observed. Both prints must have an identical base line, which can be secured by seeing that the trimming edge is placed so that it passes through the image of the same point in *each* print. A point near the centre of the lower margin of the print should be selected, and may be an edge of a piece of grass, or a leaf, stone, or any other point. It is better to trim by this means than by doing so parallel to the edge of the print, as in photographing objects on the ground, for example, no horizontal line would be included, and unless trimmed in the way suggested, it would be difficult to ensure the correct mounting of the two prints. The width between the eyes governs the width of print available for practical use, and this should not exceed two and a half inches. In the case of the post card size the height obtainable will not much exceed three inches, but if the $\frac{1}{2}$-plate size is chosen, then the height of prints may be as much as four inches if desired, although the width should still be kept to two and a half or two and three-quarters of an inch at the most.

I have already stated that one advantage of the ½-plate size is the additional width at disposal for trimming the prints, but this is, in my opinion, more than outweighed by the extra size and weight to carry. In the post card size, on account of the somewhat limited space at disposal for trimming the prints, extra care should be taken in arranging the subjects on the plate so that it may occupy just the right position. The points of practice mentioned will apply equally to either size.

In trimming the prints it is usual to leave a little more of the subject on the left of the *right hand* picture and the right of the *left hand* picture. Another way of expressing the same thing is to say the two edges of the prints which come together in mounting should each show from one-sixteenth to one-eighth of an inch more of the subject than the outside edges. A separation of from one-sixteenth to one-eighth of an inch should also be left between the two prints. The effect of this is to give the idea of seeing the picture through an opening, as it were, but I have found in practice it makes no difference to the effect of relief produced in the subject whether the prints are trimmed and mounted in this way or not.

It should be seen that the distance between identical points in the foreground of each print should not exceed two and three-quarter inches, and this is especially necessary if the ½-plate size is used. It will be much easier for those unaccustomed to look at stereoscopic prints to obtain the necessary superposition of the two images if the distance between the two identical points referred to above does not exceed two and a half inches.

Before making an exposure be careful to see that the two lenses are working at the same size stop, otherwise inequality of illumination and definition will result. My experience is

Fig. 34. Hawthorn in Bloom.

Fig. 35. Hawthorn in Bloom
(Nearer View of a Portion of Fig. 34).

that for Nature work generally and stereoscopic work in particular strong sunlight is better avoided. Many of my most successful results have been obtained on a grey day. For very rapid exposures, sunlight is often necessary to secure sufficient exposure, and then care should be taken in selecting the point of view to avoid, as far as possible, any very heavy shadows or excessive contrasts.

One of the most fascinating branches of work is the production of stereoscopic transparencies, and now by the aid of the " Autochrome " plate these may be produced direct in the camera in all the beauty of the colours of the original. The limits of space, however, forbid me entering upon the consideration of these points here, and I must, therefore, refer the reader who is interested to other sources.

CHAPTER VIII

HOW TO OBSERVE AND PHOTOGRAPH SOME OF OUR COMMONER BIRDS AND THEIR NESTS AND EGGS

THE reader who has followed me so far and who has obtained the necessary apparatus will, no doubt, be getting anxious to make a start in the practical work. I propose, therefore, to ask him to accompany me on an excursion to look for some birds' nests, with the idea of making some studies of them. But, before we start, it will be necessary to point out several facts which will have a distinct bearing on the subject. First of all, the would-be Nature Photographer must learn to cultivate a keen perception of sight and sound, so that he can both see and hear things about him which to the ordinary individual would pass unnoticed. There is a little story, which I remember having read some time ago, which illustrates what I mean. One boy goes for a walk and comes back unable to give an account of any interesting things he has seen during his ramble. Another boy, who has been over the very same ground, returns with glowing descriptions of the many objects which have come under his notice, and proves thereby that it is not a question of whether the interesting things are there or not, but whether they can be observed and appreciated.

How is this faculty to be acquired? By constantly bringing the powers of observation into play, by putting two and two together, so to speak, and by trying to anticipate, as it were, and so be prepared for the unexpected to happen, as it

often does. The observer who knows what he is looking for will be the one most likely to see it. The saying of Joseph Wolf, the celebrated animal painter, which I have placed opposite the title page of this book, is one full of truth, as I have proved over and over again: "We see distinctly only what we know thoroughly!" If the observer will keep these words in mind they will stimulate him to learn as much as he can about the objects he wishes to study and photograph.

One excellent way of learning to see is by learning to draw. It is astonishing how few persons can see correctly, and they only find this out after going through a course of lessons in drawing. As I am writing particularly for young people, I would advise those who are anxious to cultivate the power of observation to join one of the many Schools of Art in the country and to take up a course of work, not with the idea of making pictures, but with the object of training the eye to see correctly. Not only will it prove useful in this way, but every photographer ought to understand, amongst other things, the principles of light and shade, and to be able to make a rough sketch from Nature, which at times will be invaluable to him.

My early training in the art of finding nests was given to me by my father, and I can recall many delightful excursions into the country after school hours during the lovely evenings of spring and early summer; and can even remember going with my grandfather on several occasions for the same purpose. But I was never allowed to rob the nest of its contents or disturb it in any way, the object of the excursion being simply for the pleasure of finding and observing the birds and their nests. I have no wish to be egotistical, and hope I shall not be misunderstood when I say I believe my powers of

observation, owing to the good training I have received, are quite equal to those of the majority of people, but nevertheless I have been surprised at times, when out with a good gamekeeper who was interested in the study of Natural History—and I rejoice to say I know several such—to find how much sharper his eyes were than my own. I have often learnt a good lesson from him in the way of deducing facts—which have later on turned out to be correct—from little things which would certainly have been passed over by any untrained eyes.

Having said this much, I trust it has been made clear that to start out in the hope of finding birds' nests without any knowledge of the birds themselves, or of the places where their beautiful little homes would be most likely to occur, would be almost as bad as trying to find something which had never been lost, and with about as much chance of success. If, therefore, no opportunity has hitherto occurred of obtaining some knowledge of birds and their nests, it must either be done now by consulting a hand-book dealing with such matters, or if the services of a companion who possesses the required knowledge can be obtained, we shall be able to set out with a prospect, at least, of bringing back some exposed plates. Birds'-nesting is very uncertain sport, and I have often walked miles without finding any subjects, beyond a few common ones which I already possessed photographs of. On other occasions some most interesting finds have turned up quite unexpectedly, and the uncertainty of what we may come upon only makes the work of looking more exciting. One point I wish particularly to impress upon all my readers, and that is, never disturb the nest or the owners of it more than you can help. Remember it is their home, upon which they have

spent many hours of constant toil and labour, and be careful to see that nothing is done which would be likely to cause them unnecessary distress, or occasion them to forsake their treasures. There is no reason, however, if the work be carefully and properly carried out, why anything of this kind should occur.

A few hints on finding nests may be useful to those who have had little or no experience. The commoner kinds of birds—and these are the ones we are most likely to discover at first—seem to prefer to nest near to the habitations of human beings; and if we can obtain permission to search in and around the garden of a country cottage, or on the outskirts of a farm, or, failing either of these places, along the road-side, not far from some cottages, we shall be almost certain of some finds. The disadvantage of the road-side is that so many of the nests situated there are plundered by boys, so when one is found which it is desired to make a study of, the photograph should be taken at the time of discovery, or a visit later on for the purpose may prove to be too late. One reason, no doubt, of the preference of birds for the vicinity of houses or farms is that they pick up a great deal of food of one sort or another, and in many cases birds nesting near habitations will be tamer than those of the same species which nest farther away from the haunts of human beings.

For the purposes of photography, in commencing at least, the nests situated fairly low down will be the easiest to obtain studies of; therefore one need not look very high but near the ground. A great many birds build either on the ground, in banks and so forth, or at a distance of two or three feet above it in small bushes and rank herbage. A sharp look-out should be kept with the eye while slowly walking along a hedge or bank, and a hooked stick will be found useful to gently tap

the thicker bushes or herbage in addition to looking. If a bush be tapped in this way previous to looking in it, any bird on a nest will be almost certain to fly off, but will do so very quietly, as a rule requiring an acute sense of hearing to detect. In this case we might reverse the order of the proverb and say, "A bird in the bush is worth two in the hand," for us. A bird flushed from a nest flies in a very different manner to the usual method of flight, and an experienced eye will soon detect the difference if the bird shows itself, which, however, it will avoid doing if possible. On hearing a bird fly out, a careful search should be made, as the nest is often so skilfully hidden that its discovery is no easy matter. The foliage should be moved aside with care, or we may find the nest has been damaged or the eggs broken before we are aware of it. We should endeavour during the season to obtain photographs of as many different kinds of nests as can be found, and as we shall often discover those of species we have already obtained photographs of, unless there is anything striking about these we should leave them undisturbed, and proceed on our way for new discoveries. When the foliage is thin, it is a good plan to look through it from underneath, when any nest can then be more easily seen against the sky. If the photographer has friends who have had experience in nest-hunting they may often be able to render him a good deal of assistance in discovering subjects for the camera, but he should make up his mind to refrain from robbing the nest of its eggs or young, otherwise, if his friends discover that he is in the habit of doing so, they may refuse to help him any further. This refers particularly to places where he has obtained permission to go for the purpose of obtaining photographs, and he should be careful to see that he does nothing to give cause to the

Fig. 36. Common Partridge's Nest under Seat (22 eggs)

Fig. 37. Dormouse's Nest.

owner of the land he is allowed to roam over to complain or withdraw the permission given, because, if he does, others will have to suffer for his carelessness by perhaps being refused similar privileges.

The spring is the great nesting time, and if it is a forward one nests of the early birds, such as the Thrushes, Robin, Hedge Sparrow, and Long-tailed Tit, may be found by the end of March, or exceptionally early ones even in February. The very early nests will generally be built in the shelter of some evergreen in gardens or near houses, where food may be more easily obtained. But if we postpone our first excursion until the beginning of April we shall be almost certain to meet with nests of some or all of the birds just mentioned.

Any text-book on birds will give the most likely time for the nest of any species to occur, and, generally speaking, the resident birds nest first, followed by the migrants which arrive on our shores towards the end of April or early in May. A good many species have two broods during the season, and nests may, therefore, be found until July or even later. The months of April, May, and June will, however, be the period when the greatest number will be discovered.

I have already suggested that a series of connected photographs will be most likely to prove of additional interest, and I endeavour to carry this out in my own practice by obtaining, when a suitable opportunity presents itself, two and sometimes three or more different photographs of the same nest. For instance, many birds which nest on the ground cover their eggs over when voluntarily leaving the nest, and it is sometimes possible to show this. In the photographs of the Little Grebe's nest, shown in Figs. 9, 10, and 11, three views were taken. First the *site* before anything was disturbed at all.

Then, after the reeds had been moved aside so that the nest could be seen, another photograph was obtained showing the covering over the eggs, placed there by the bird on leaving the nest. The third picture was taken by carefully moving away the material over the eggs with the point of a stick, so that they could be seen, and, after the photograph was taken, they were carefully re-covered and the surroundings restored to their former condition. Many birds, such as the Partridge, Pheasant, etc., are very particular, and if their eggs have been handled by a human being they can tell and will often forsake them. Keepers and others who have to sometimes touch the eggs rub their hands in fresh earth to take off the scent, and by this means avoid the risk of the birds deserting, which otherwise might occur. A good many instances of two or more views of the same subject under different conditions will be found throughout the illustrations given.

At last, let us suppose the day arranged for our first excursion has arrived. It is one of those delightful spring days when the sky is filled with fleecy clouds, of a kind to warrant us in assuming there will be no rain. So we set out, having previously filled our slides or envelopes with plates and checked off each item of our kit by the list we have made, so that we are certain nothing required has been left behind. We have taken care in packing our apparatus that nothing will be able to get loose and shake about to stir up dust, especially so concerning our plates, which if much jolted about during our journey will be certain to develop a crop of pinholes where particles of dust have settled on the film before exposure. We are bound for a small farmhouse in the country, situated near a wood, where the owner has kindly given me permission to roam about to my heart's content. He will be pleased to see

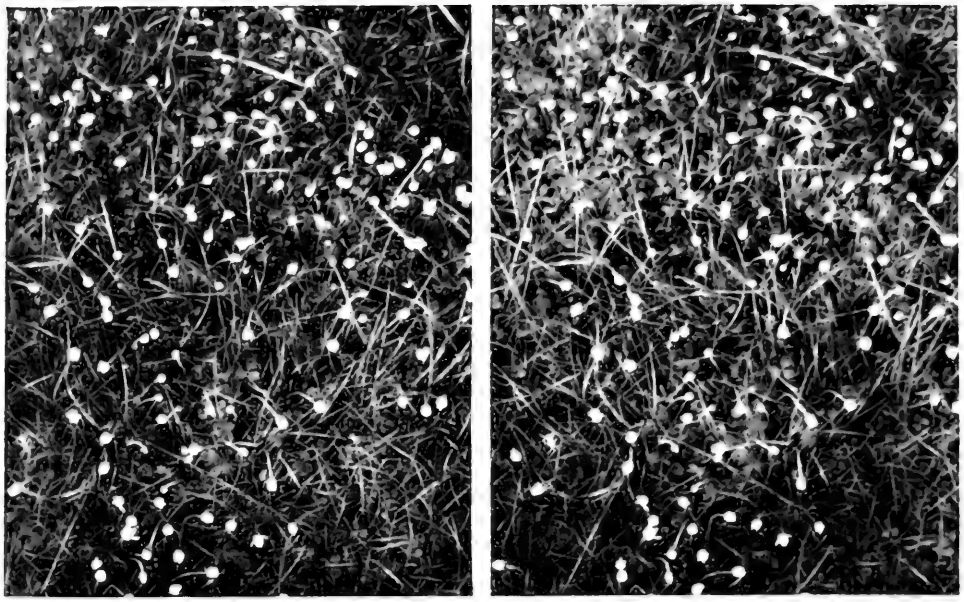

Fig. 38 Daisies Asleep

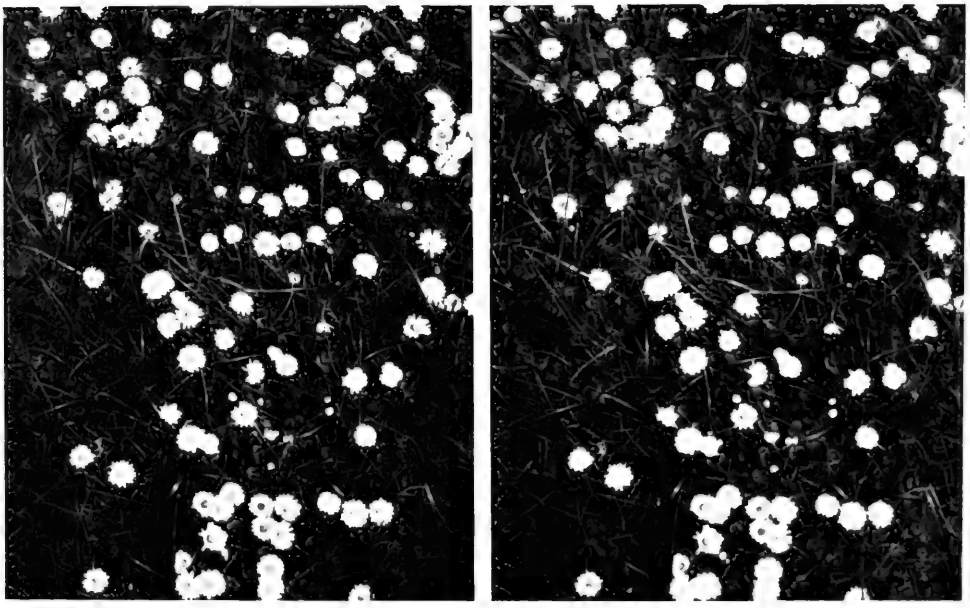

Fig. 39 Daisies Awake

you with me on this occasion. As we leave the little country railway station a few miles out from the town, we walk along the road for a short distance, and about a quarter of a mile from the railway leave the road and get over a stile, making our way across several fields until we reach the farm. The farmer's wife happens to be at home, and on going to the house we are asked in for a short rest and a glass of new milk, and a piece of home-made cake is set before each of us, which we do not refuse, the pure country air having already given us an appetite. We thank our hostess, having promised to return later on to partake of a refreshing cup of tea, before which time we hope to have made some discoveries and to have exposed nearly all our plates.

We first make for a little clearing in the wood close by, where the anemones and primroses are spread at our feet like a beautiful carpet, and the fragrance from the blossoms of both fills the air. This clearing was cut down some time ago and the new growth has sprung up round the old roots and is just the place to find the nests of the Song Thrush and Blackbird. Ah! you have stepped on a piece of rotten wood which has cracked, and the noise has sent a Song Thrush flying off from a stump just ahead of us. We walk up and there at the bottom, not more than a foot above the ground, and quite exposed to view, is the nest containing four beautiful blue eggs spotted with black dots. The nest is cup-shaped, fairly deep, and is lined with a coating of mud or rather a mixture of cow-dung and mud. This coating is so watertight that sometimes, after a heavy rain, the nest becomes nearly filled with water. This nest will make a good subject to commence with, so we erect our tripod and fix the tilting board on top. We then get out the camera, which is fastened to the tilting-

board and the lens screwed into its flange. We bring the camera fairly close up to the subject, and having opened the shutter, place the head under the focussing cloth. Now we discover the use of the tilting-board, and by raising it up to the necessary angle we see the nest shown on the screen. After you have focussed let me see how you have arranged the subject on your plate. Yes, you have included all the subject, but you have arranged the camera so that the lens points down nearly directly over the nest. You have, no doubt, been anxious to show all the eggs, but it will be much better to get a little further away so that you show two complete eggs and the tops only of the others. This will look better in your picture than if the camera were placed directly over the nest, making the result look something like a plan. You have now chosen a better position and nothing obstructs the view of the nest with the exception of two or three boughs, which can easily be bent back out of the field of the lens. If you obtain a sharp focus on, say, the near edge of the nest, you will find the further edge will not be sharp enough and the background still less distinct, so you must stop down the lens, and as the nest is fairly close stop *f*22 is required before the definition throughout all the planes of the picture is satisfactory. There is a little wind blowing, but as the buds are only just breaking into leaf we shall find it does not affect the subject much, and by exercising a little patience we notice that occasionally there is a longer interval of stillness. We get out our exposure meter and place it so that the paper which has to darken receives the same kind of light as the nest, that is to say, if the nest is in shade, the meter must be held in the shade, and if the sun is shining it will be better to wait until a cloud obscures it, as we shall get a better result without strong

sunlight on the subject. There is a cloud near so we shall not have to wait long, but if there had not been, I would have held the piece of tissue paper I told you to bring, so that it filtered the sunlight equally over the subject. This would have had a similar effect to the cloud, and would have prevented the strong contrasts due to the direct sunlight.

Now we have set the shutter and drawn the slide of the plate-holder, keeping the focussing cloth over the camera as far as possible, and we are quite ready for the exposure. We find this to be one second with the rapid plate and stop we are using, so we set the shutter for "time." There is just now a still interval, so having previously practised counting four to each second, we open the shutter by pressing the pneumatic release, count one, two, three, four, and close it again. We then close the slide and enter the particulars of the exposure (plate No. 1) in our note book, placing the slide just exposed, if it contains one plate only, in a separate part of our case so that it is not likely to get mixed with the unexposed ones. If it is a dark slide which contains two plates we mark on the small tablet provided in most patterns the subject, and wait until we have exposed plate number two before putting it apart.

But to-day, as I want you to get experience in developing by seeing the difference produced by various exposures, I suggest, as we have plenty of plates, that you expose another one on this same subject and give it two seconds. The reason for this increase is that, as you will perhaps remember, in the chapter on lenses, I mentioned the difference between any given stop and exposure when a distant or near subject was being taken. In this case we have had to rack out the bellows to more than the equivalent focus of the lens on account of

getting rather close to our subject, and consequently the value of the stop used (*f*22) is not quite correct in this instance. It may be *f*26 or thereabouts. You will probably find, when taking *near* objects, that an increase of exposure from a quarter to a half more than that indicated by the meter will allow you to obtain a softer negative, such as I aim at getting myself, and with care in development there need be no fear of obtaining too flat a result. We now close up the camera, but do not remove it from the stand, because it is probable we shall find another subject before long.

Look! there is a cock Blackbird; notice his brilliant yellow bill and glossy plumage, both exceptionally bright at this period of the year. I'll warrant he has a mate sitting on a nest not far off. Keep quite still; let us sit down for a few minutes, and I will watch him through my binoculars. There he goes to the top of another bush about twelve yards away. He has dropped down to the bottom of it, and I can see him feeding the hen bird sitting on her nest. Wait till he flies away again and we will walk up to the place. He has gone now; bring your camera, and carry it with the legs of the tripod lower down or you may poke me in the eye with them. It will be less likely to catch in the bushes too, if you hold it lower.

There goes the hen bird, and I can hear the alarm note of the cock, who has no doubt gone up to find the reason of her sudden flight. Well, we will get a photograph as quickly as possible, so that she is not kept off the nest longer than we can help. Look! no wonder she remained on the nest so long; she is just hatching out, and there are three young ones in the nest and also two unhatched eggs. We arrange the camera as before, and this time do not get quite so close as, on account of

Fig. 40. Wild Roses.

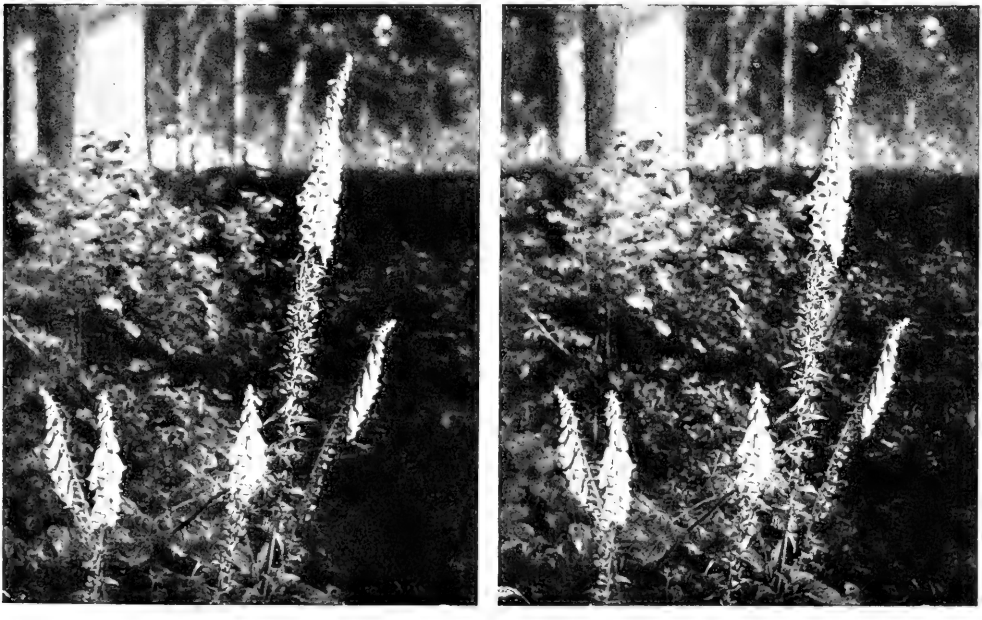

Fig. 41 Foxgloves.

the movement of the young ones, we shall have to give a quicker exposure to this subject than we did to the last one. Being further from the subject, we find that sufficient depth of focus is obtained if we use stop *f*11, and, as the light is about the same as before, we arrange to give about a quarter of a second exposure. We ascertain that the shutter is set for "time," give the pneumatic release a squeeze and let go, taking care that the young birds are as still as possible at the moment we make the exposure. Again, in this case, I should like you to see the different result produced by using a larger stop and giving a quicker exposure, so reverse the slide to plate number four, and open the lens to *f*8, set the shutter to "instantaneous," and give about the one-fifteenth of a second. As the light is very good this will give you an exposure long enough to secure sufficient detail in the negative; at the same time, if the right moment is chosen, without showing any movement in the young birds, which seem rather restless and want their mother back to brood them again. So we will now leave the vicinity of the nest and the hen bird will very soon return to them. She has been flying round us while you have been making the exposure, and is anxious for us to be gone. That makes the fourth exposure; we have still eight plates left.

I want to find a Robin's nest for you next if I can, and there is a likely place along that mossy bank by the side of the hedge where the leaves of several seasons are lying thickly. Now will you please keep just behind me with your camera while I look for a nest. What is that in the hole there? yes, it is a Robin's nest, but it is not lined yet, and there are, of course, no eggs in it. We may find another by and by, but are not likely to see one very close to this, unless this has been for-

saken, because Robins are pugnacious birds and will not suffer a rival to come into their chosen beat. If this does occur, a pitched battle is the result, and the two will either fight till the death or one be driven off to find quarters elsewhere. Let us make our way back towards the house and somewhere close there we are likely to find another nest.

I will just give this gorse a tap, as it is a good place for a Hedge Sparrow's nest. There! did you see the bird fly out? No? well I did; it went through the bush underneath the shelter of the thicker part, but I could see it was a Hedge Sparrow. Here is the nest; now isn't that a pretty picture? the green moss amongst the twigs with a lining of horsehair and wool, which has, no doubt, been picked up round about the farm, and the beautiful blue eggs—there are four—with the gorse in bloom, adding its golden lustre and delicious perfume to the scene. I find Hedge Sparrows' nests every season, but they seem just as beautiful to me each time and I always have a desire to photograph each one. Some day I hope you will take up Colour Photography, as I have recently done, and only then will you be able to do justice to such a picture as this. The nest is not very high, so you will be able to get at it easily, and I should like you to try several positions this time before making the exposure, so that you are sure you have selected the most suitable one. As a rule there is no necessity to be in a hurry when photographing nests, and that is one reason why they make suitable subjects to commence upon. At times, one may be found belonging to a species we particularly desire to photograph, but in a very awkward position, and I have had to spend at least half an hour in a case of this kind before I could get a satisfactory view of the nest and its contents on the focussing screen. Where the

Fig. 42. Spring Flowers.

Fig. 43. Wood Anemones.

camera has to be much tilted, it is best to arrange one leg of the tripod on each side of the nest, but otherwise the best position for it is with one leg in front so that it allows you to get between the other two at the back when focussing. This nest is entirely concealed by the overhanging sprays of the gorse, so we must bend them back, but in so doing be very careful not to break any or we shall not be able to restore them to their former positions, and the nest and eggs will, if left too much exposed, be liable to be seen by some boy intent on taking all the eggs he can find, notwithstanding the Wild Birds' Protection Acts; or will become a prey to one or other of the numerous enemies birds have besides human ones. The string you have brought will be useful to tie the branches back, as they not only obstruct the view, but it will be impossible to get the nearer ones into good focus at the same time as the nest and eggs. By shifting your camera as I recommended just now you will soon see where the best view point is. The next little piece of advice I am going to give you is in reference to a thing often overlooked by those taking the photograph of a nest, and I think you will learn to value the hint more after you have had some practical experience. Always try and arrange the view of the nest on the focussing screen so that its longest diameter (the more or less circular top of the nest will appear on the screen as an ellipse) is horizontal and not, as I often see in photographs, inclined. You will be able to do this by shifting one or other of the legs of your tripod so that the lens points directly to the centre of the nest. The result will be a more natural photograph, and is quite worth the extra care required to make it so.

I intend to leave you to calculate the exposure necessary for this nest of the Hedge Sparrow because I want you to begin

at once to learn to depend upon yourself. While you are making the exposure I will look round and try to find another Robin's nest.

(The reader will please imagine the narrator has been away for about ten minutes and has just returned.)

I have found one quite close to the back door of the house in an old kettle stuck up in a tree in the orchard. There are six eggs in it and the bird is not on, so if you come with me we will see whether a photograph of it can be obtained. It is higher up than the Hedge Sparrow's just left, but I think by raising your tripod as high as possible, you will just be able to manage. Give me the small mirror you have brought and I will try and reflect some light on the eggs when you make your exposure, to help to make them more clearly seen, but in doing so I must be careful to avoid making them too light or they will look unnatural. To secure the detail of the interior of the kettle you must give a full exposure, and when developing remember the character of the subject so that you can suit your developer to it.

In looking for the Robin's nest just now I came upon an interesting subject for you: a Pheasant sitting on her nest in the orchard. She is under some bramble sprays, but can be seen quite distinctly. If you go very carefully and slowly, approaching the nest by degrees, and keeping your head under the focussing cloth—but be careful to look where you are going or you may stumble and spoil your chance—if she is sitting hard you may be able to secure a photograph of her on the nest. This will be a good opportunity to use the single combination of your lens. Unscrew the front one and place it safely in your case. Then rack out the camera to its double extension and you will find an image is given on the

focussing screen twice the size of that given by the complete lens from the same standpoint. But be careful to remember the size of any stop will be only half the value marked on the lens mount, which is for use with the complete lens. Your stop *f*8, for instance, will become *f*16, and will require *four* times the exposure given for the *same* stop used with the *complete* lens. As you cannot in this case test the light with the exposure meter near the nest, do so by putting it under a similar place near you, and remember when some of the light falling on the subject is cut off by overhanging foliage the exposure will have to be prolonged. The proper time of exposure will be shown by the meter, but you may not be prepared for the extra length indicated. When you get fairly close to the sitting bird, make an exposure if possible in case she does not allow you to get nearer without leaving her nest. When you have obtained one, then cautiously approach a little closer still and try to obtain another. I will remain here so that there may be less chance of disturbing her.

(The reader will please imagine a photograph has been obtained and a still nearer one.) Bravo! I see you will soon make a good Nature Photographer, and will find from experience that, by approaching a bird on its nest very quietly and by a few inches at the time, you will often keep it still, when a sudden movement or any noise would frighten it off the nest at once. I have just seen one of the farm labourers and have found out from him that there is a Long-tailed Tit's nest in the hawthorn hedge round the front garden of the house and also a Great Tit's nest in the letter-box at the garden gate. These will make interesting additions to our day's work, and as we still have four unexposed plates, and it is nearly tea-time, you had better expose one on the Long-

tailed Tit's nest and two on the letter-box; one, the *site* showing a view of the garden gate with the box attached, and a nearer one of the nest and eggs by first opening the door of the letter-box from the back. If the bird is on you will probably find she will fly at your finger if you put it near her and will peck it sharply, but you can take her in your hand and lift her off the eggs if you like; she will not mind, and will probably remain somewhere close at hand and pop back to the nest again at the first opportunity. Notice what a large amount of material has been collected for this nest; it almost fills the letter-box.

Now you have made the exposures let us go in to tea. We have one plate left, and it is a good plan to keep one unexposed in case anything extra special turns up on our journey back. It is very unfortunate to find a good subject and be unable to photograph it because we have used all our plates. It is far better to carry one home again still unexposed than have to regret the want of one for some interesting subject which may not turn up again for a long time.

That cup of tea and the home-made bread and butter and cake seemed to be extra nice; but I often find it is so in the country, and expect the sauce of appetite has something to do with it. As the light will still be good for quite an hour, we will walk through the little wood at the back of the house to a field beyond, and we may be able to find a few subjects for our next excursion. In the meantime, you will be able to get some practical experience by developing the exposures made to-day, and the importance of this part of the work must not be overlooked, as, after all, it is very unsatisfactory to spend the time and patience required to obtain subjects if you cannot produce good negatives from the exposed plates.

Let us examine this hawthorn bush by the side of the path. After a certain amount of experience one gets to know where to expect to find certain nests, and in this case I have not been disappointed. I knew this was a suitable place for a Chaffinch to build its nest, and here is one, but it is not finished, so we must remember it when we come again next week.

Look! there goes a Stoat across the path. You didn't see him? no, you must keep a sharper look-out as you cannot expect he will stand still for you to gaze at him. He seemed to be making his way across the ride and evidently did not expect to see us. Let us go and see if he was there for any purpose. Mind where you tread, there is a Pheasant's nest, look, just in front of you; do not disturb it as there are only four or five eggs at present and they are almost covered over with the dead leaves. I fancy Mr. Stoat was on a poaching expedition and we just arrived at the right time, although, perhaps, he thought at the wrong time for him. We will hope the nest will contain more eggs next time we come, and if they are there will try and get a photograph of them. I have heard Pheasant preserving described as, "Up gets a guinea, off goes a penny farthing, and down comes half a crown (perhaps)." That is to say, each Pheasant costs about a guinea to rear and when shot is worth about two shillings and sixpence.

Here is a beautiful bunch of Primroses at the foot of this old stump. Would you like to expose your last plate on this? I think, as the light is getting weaker now, we had better not wait any longer. Besides, we shall only just have comfortable time after taking this to get to the station, as we are going a longer way round now. As you have decided to take it, remember what I said about looking down too much at the Thrush's nest and avoid the same kind of thing here. Shorten

the tripod as much as possible and fix the ends firmly in the ground or it may slip during the exposure, causing a double image on the plate. Arrange the camera so that you look across the bunch, and try and get the flowers against the dark moss-covered old tree stump, as this will help to show them up and give you an effective background. You will probably require to stop down to *f*22, and as the light here is a good deal cut off by the branches of the trees overhead the exposure will be a relatively long one. You find it is fifty seconds by your meter; well, you may give it a minute, and as there is no wind here in the wood you will not get any movement on that account. I have already cautioned you about setting your tripod firm. You will not often see a prettier group of Primroses than this one, and I hope the negative will turn out all right. I should like to have a print from it by and by.

As you have exposed your last plate you can pack up the camera and stand, first putting the lens away in its case and taking care no part of the apparatus has been overlooked and left behind. We have made twelve exposures during the afternoon, and have obtained, in addition to the Primroses, seven different kinds of nests, so I think you ought to be very well satisfied with your first excursion, so far. I shall hope to hear next time I see you that all the exposures have been turned into good negatives.

Fig. 44 Pear Tree in Bloom

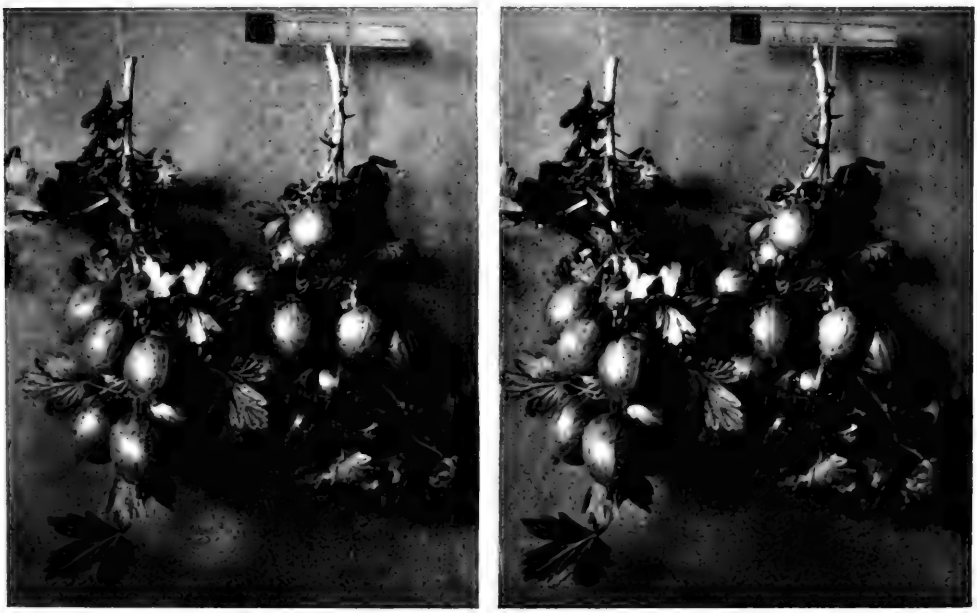

Fig. 45 Gooseberries

CHAPTER IX

HOW TO OBSERVE AND PHOTOGRAPH SOME OF OUR COMMONER BIRDS AND THEIR NESTS AND EGGS—*continued*

GOOD afternoon; so you are ready for your second excursion. Although we have had several heavy April showers during the morning, the weather has become a little more settled since mid-day, and I don't think we are likely to have any more rain, except perhaps a slight occasional shower. I am glad to see you have put on some good thick boots and leggings, as we shall find the undergrowth rather wet after the morning showers. But with the warm air it will soon dry up if we get no more rain. I keep an extra thick pair of boots for these country rambles and prepare them by rubbing a preparation of oil well in. This helps to keep the wet out and the feet dry. I am glad to hear the plates exposed last week have turned out successfully. Thanks for the print of the Primroses, which has made a very pretty picture, and later on you will be able to make an effective lantern slide from this negative. The other prints I will look at more carefully in the train, as we shall have twenty minutes to spare.

Here we are; look at the Rookery yonder in the trees round the church. The birds are very busy now and I expect most of the nests contain eggs. When you wish to obtain a photograph of their nests you had better do so from *terra firma*, using a long focus lens, as trying to obtain one from the trees is not only a difficult but a dangerous task. Rooks are

most interesting birds, as you may easily find out for yourself by watching them. On one occasion which came under my notice, a gale had blown down several nests from the trees where they had been built. One nest, however, remained, and the other birds set about rebuilding their nests underneath this one that had stood firm. There were five nests one above the other, and I was able to obtain a photograph of it. I called it "Rook-building up-to-date, in flats!" The five nests in the tree looked, from a distance, just like the figure of a man.

The weather looks better now than it did when we left the town, and we will go to the wood first to-day, because there is a field on the other side of it where the Lapwing nests, and if we are fortunate we may find a clutch of eggs. It is getting late for them, but the first clutches are often taken for the market, as the eggs are considered table delicacies and the early ones fetch big prices. They are known as "Plover's eggs." As we go through the wood let us look at the two nests we found last week. Do you think you can show me where the Pheasant's nest was? Ah! I see you did not note the place carefully enough. It was not here, but about twenty yards further on. I remember it was about half way between the Chaffinch's nest in the hawthorn bush, which stood well out from the other trees, and the old stump with the Primroses round it. Here is the old stump, but the Primroses have lost a good deal of their freshness and would not make such a good picture to-day. I also noted down there was a birch tree nearly opposite where the nest was and that there was not another one for some distance, so that it could not be mistaken. There is the birch tree just ahead. You must remember things look very different if approached from different

Fig. 46 By the Wayside Wild Carrot

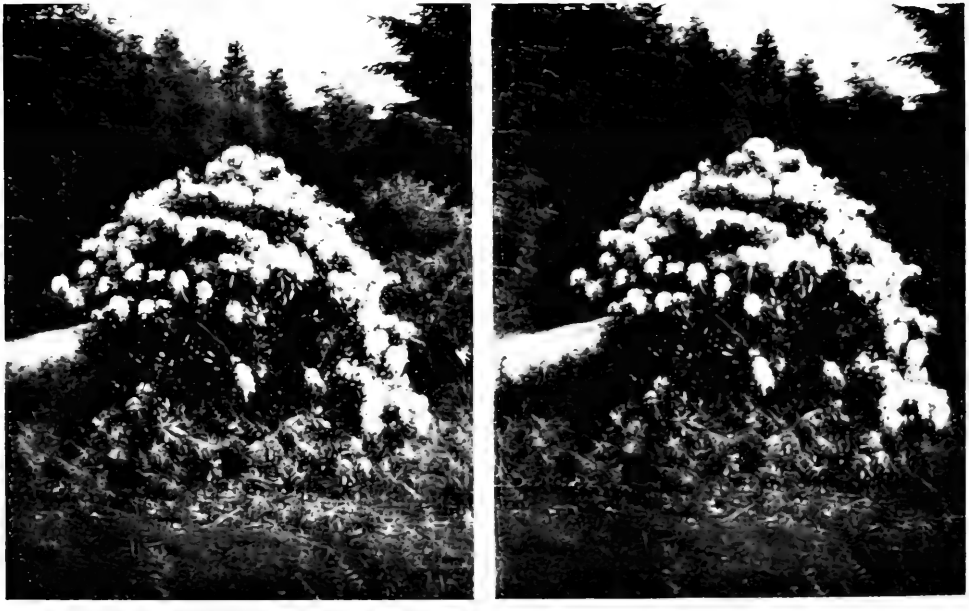

Fig. 47. Rhododendron

directions. Last time we were walking the other way and you do not recognise the place so well. The best plan is to make careful notes in your pocket book of several different points to help in identifying the *site* when a nest is discovered which you want to find again, or you will often have great difficulty in finding it the second time. Nests, as a rule, are not exposed so openly that they can be found without some amount of searching for, and you must also remember at this time of year the foliage will grow considerably in the space of a week, under the influence of the warm sunshine and showers. Look at the hawthorn bush, beyond, it is now quite green and you cannot see through it like you could last week. If the Chaffinch's nest is still there it is much less likely to be discovered now.

Here is the place where the Pheasant's nest was. I have had a careful search, but cannot find anything of the eggs. I can see where the nest was and am sure this is the right spot. Possibly they may have been carried away by the keeper to put under a hen, or the Stoat we saw last week may know what has become of them. Anyhow, we must try and find another nest and will come back to the wood presently. The Chaffinch's nest is all right; the bird is on. Look at her little head and tail just showing above the edge of the nest. Ah! you were not careful enough, and she has flown off. How many eggs are there? Three; well there will be one or two more probably before the clutch is complete. The nest is rather high up and would be difficult to photograph unless we could lengthen our tripod. However, as we are pretty certain to find one in a better position for our purpose, we will leave this, and perhaps may be able to obtain a photograph of the young birds later on if they hatch out successfully.

Now we will make straight for the Plovers' field, and as their nests are very difficult to find we may not succeed in discovering one. The hen bird, if on the nest, will rise directly she hears the alarm note of her mate, who will probably see us while we are still a considerable distance off, so be prepared directly we come to the gate at the entrance to the field to try and mark the spot where a bird may rise from. Come very quietly and when you are ready I will clap my hands. There! two birds flew up and I have marked the place one rose from as near as I can. Let us walk straight up; I will keep my eyes on the spot, and take care you do not put your foot into a clutch of eggs as you walk across the field. We are now very near the spot where the bird seemed to rise from, and, look, we are very near the nest too! Another yard and you would have walked over it. There are four beautifully-marked eggs; notice how they are arranged with the pointed ends in the centre. By this arrangement the eggs take up less space and are easier for the bird to cover. They are large in size, for the bird, in common with the eggs of most birds whose chicks run very soon after being hatched, and young birds of this kind leave the egg more fully developed than those of the warblers, etc., which are born blind and do not get their sight for about five days after being hatched. These young Lapwings, about an hour after they are hatched, in fact as soon as the warmth of their mother has dried their soft down, will run and look after themselves, and this they do in a remarkable manner by crouching on the ground and trying to conceal themselves when danger threatens.

Even had we not already discovered the nest, we should know there was one not far off as the birds are flying round us continually, uttering their plaintive cry, *pee-e-wit, pee-e-wit,*

The Long-tailed Tit's nest takes from two to three weeks to construct, and is rightly considered one of our most beautiful examples of Bird Architecture. It has been known to contain as many as two thousand feathers in the lining, each one probably meaning a separate journey for the tiny architect. As some of the earlier nests are built before there is any foliage on the bushes they are often discovered and ruthlessly torn out. It always makes me sad to come across a case of this kind, and it is hard lines on the builder, after devoting so many hours of labour, to have it made of no avail in a few moments by some unthinking boy or man. I hope you will do all you can to discourage such conduct.

Another Lapwing rose a short distance away from the first, but as we have obtained a photograph of one clutch of eggs we will not attempt to find the second nest now. I am glad you have brought eighteen plates to-day as nests are now getting more numerous. We will try and obtain a like number of different subjects, unless one occurs which ought to have more than one plate exposed on it, like the Lapwing's nest we have just left. We might look round the hedges of this field to start with, as they have been cut down during the past winter and will therefore allow you to easily photograph any nest found therein. Here is one, another nest of the Chaffinch, and it has four eggs in it. This, again, is one of our most beautiful nests, so small and neat and so tightly woven together, the outside covered with lichen and made to resemble so closely the lichen-covered fork of the branches containing it. This nest is well exposed to view, and you ought to be able to get a very good photograph of it.

When you have done, here is another Robin's nest, this time in a hole in the bank just beyond where you are standing.

The bird flew out when I tapped the hedge with my stick. It contains five eggs, and there is a pretty root of Primroses close to it which I think you will be able to include in the picture. Notice how the dead leaves, which are used a good deal in the foundation of the nest, are also left about in an apparently untidy way near the entrance. This to the ordinary eye would divert attention from the nest, but to the trained eye would draw attention to it. As it will take you some little time to make the exposure on these two subjects, I will search a little further on while you are doing so. Be careful to rake up the long grass where you have been standing after you have finished, as if left trodden down this will call attention to the place and the nest may suffer in consequence. When possible, I always like to get a chance of taking the portraits of the young birds when they get old enough. The best time is just before they can fly, and if the nest is not discovered in the meantime we shall be able to do this later on.

You have just finished in time. There is a slight shower coming, I think; cover your camera right over with the waterproof focussing cloth and we will stand under the shelter of this tree for a few minutes. The sunshine is already showing in the distance on the other side of the shadow of the cloud. But as you have brought your little cycling mackintosh, put it over your shoulders. I always carry one with me. It takes up very little room rolled up in the bag and is very useful in a shower. As I often carry my plates in a satchel on my back it serves to protect them and keep them dry too, which is very necessary.

I have just seen the Robin fly back to its nest. When the rain ceases we will walk quietly by and have a look at it, and if you like you can try and obtain a photograph of it on the

nest. Hark! I think I heard the Cuckoo. Yes, I can hear it again. There it is, look, flying across to the tree yonder. It is the first time I have heard it this season. We must try and discover a nest containing a Cuckoo's egg by and by; it will make an interesting subject for you. When flying, the Cuckoo is very like a hawk, and it is often mobbed by the smaller birds, perhaps on this account. Occasionally one sees a record of a Cuckoo having been seen in February or even January, but I think without much doubt a Kestrel or Sparrow-hawk has been mistaken for it, and that the "Cuckoo" was really the individual who made the mistake.

It has ceased raining now, you can go back to the Robin's nest. You will, no doubt, remember where you placed your camera in taking the photograph just now. Go very quietly to work and you may succeed without disturbing the bird. Ah! she has gone off, she is evidently not sitting very hard. Well arrange your camera, put in the dark slide, set the shutter, and draw the shutter of the slide ready for the exposure, and place the green side of your focussing cloth over all except the lens. Put the end of the pneumatic release on the focussing cloth over the top of the camera and see that nothing obstructs the lens, and come back to me here. Now watch until the bird returns; she may be some time, but you will be having your first lesson in patience. Do not talk loud, keep quiet, and we will give her twenty minutes. Five minutes is up, it seems a long time when waiting, but I can see her some distance off, she is evidently anxious to return. Look! she actually settled on the top of the camera, but did not stay there long and has flown back to the hedge. Now keep a sharp look out, as she will probably pop into the nest slyly and you may not catch sight of her. Have you seen

Fig. 50. Nest of Larvæ of Lackey Moth.

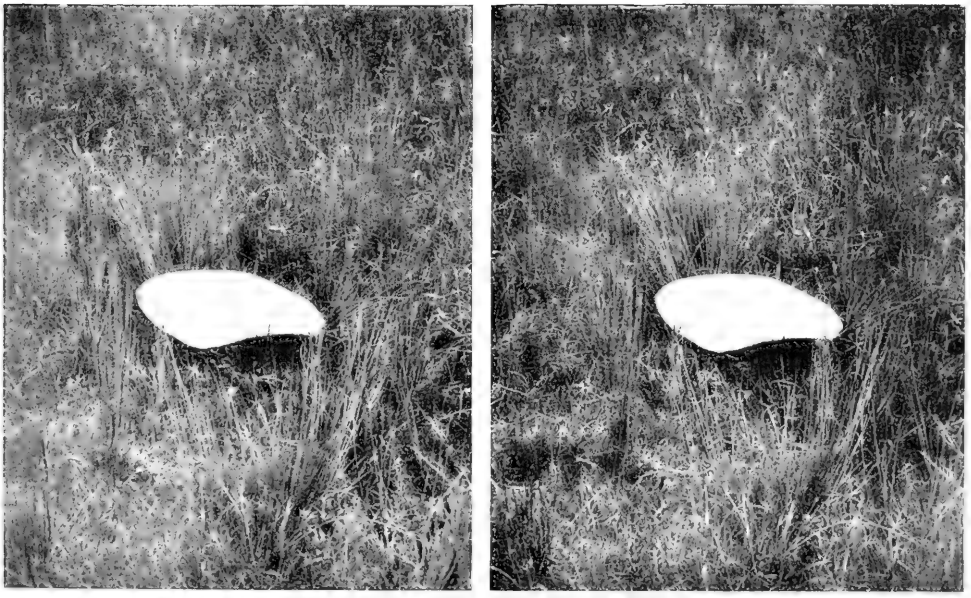

Fig. 51. Large Mushroom
(Greatest diam. 14½ ins.; 7 ins. high).

her? Not since you saw her on the hedge. Well you must still try to educate your eye to observe better. I saw her go into the nest a few minutes ago, and I have left her long enough to get settled down comfortably I think. Now go very carefully up to the camera and make the exposure. Do not walk up direct from here, but go away into the field for a few yards and then walk up quietly behind the camera. When you get close enough take hold of the shutter release, glance to see she is still on the nest, and give the exposure you have ascertained—two seconds. If she keeps still at all, she will keep still for a much longer time than that. When you have made the exposure, close the slide and quietly withdraw the camera. There, you have succeeded. I remember my first photograph of a Robin on its nest took me two hours and a half to get, but with the help of my experience you have done it in less than twenty minutes.

Let us now return to the wood and look for another Pheasant's nest. We will examine this bank on the outskirts of it as we pass along. Wait a minute, I have lost my stick; I think I must have dropped it when we stood under the tree yonder where I helped you put on your mackintosh. I will run back and see; you stay here.

I have found it; I wanted it to move some leaves in the hedge just where you are standing; it looked something like a nest to me. Yes, it is, and a Pheasant's nest too, full of eggs. Look, I have carefully moved the leaves away with the point of my stick and there are the eggs, eighteen of them; five are a different colour to the others, showing that two birds have been laying in the same nest. I expect the bird which has laid the thirteen eggs will be the one to sit upon them and the other will have to start a fresh nest elsewhere. This being

a larger subject will allow you to get further away or you will not be able to show the immediate surroundings of the nest. I always like to do this, because I think it adds interest to the picture. After you have exposed a plate on the eggs, I will re-cover them as they were before and you can then take the nest again. There, I have re-covered them, and you are quite right in expressing the opinion that anybody with untrained eyes would be almost certain to pass the spot by and never have the least suspicion there were eighteen eggs under those dead leaves. I dare say the keeper knows they are there, and no doubt a great many nests like this are found by Stoats, Weasels, and Rats, who often carry off the eggs. I am glad we have found this nest, as it will be still rather wet amongst the cover in the wood.

Here is apparently another little clump of dead leaves amongst this grass and bramble shoots in this dry ditch, but I think I know what it is. Watch while I tap it with my stick. There, you saw the bird go out this time; it is a Chiffchaff's nest. It looks for all the world like a bit of rubbish, but on the further side you will see the entrance to the pretty domed nest, thickly lined with feathers. It contains six tiny white eggs with a few dark purplish spots on them. These are quite freshly laid, as the colour of the yolk can be seen through the delicate shell, and it gives the egg a beautiful pinkish tinge. Robin's eggs have the same appearance when fresh, but the spots on these are more rusty in colour and lighter than those on the eggs of the Chiffchaff. Perhaps you noticed this when you photographed the Robin's nest just now. I want you to remember this nest is about a foot off the ground, and I will tell you why I called your attention to it another time. You will have to place your tripod partly in

Fig. 52. Red Admiral Butterfly (wings expanded).

Fig. 53. Red Admiral Butterfly (wings partly closed).

the ditch in order to get the camera low enough, as the nest is so near the ground. Do not hurry; get a good view where you can see some of the eggs, although perhaps not all, as the nest is fairly deep. You can reflect a little light upon them by the mirror, as the inside of the nest is rather dark, and this will help to equalise the exposure required for the inside and outside of the nest. I heard the cock bird just now, singing his little song of two notes: "*chiff chaff, chiff chaff,*" or "*chip chop, chip chop,*" whichever you like. He gets his name Chiffchaff from his song, and he is one of the earliest of the spring migrants to arrive on our shores. In suitable seasons he may be heard uttering his little notes from the middle to the end of March onwards, and to me the sound is always a welcome one, as it tells of the approaching spring. The birds are commoner in some districts than in others, but I have always found their nests during the season. Being double-brooded, eggs may be found as late as July.

I have arranged to have tea to-day at the keeper's cottage, which is not far away, as we can work on while the light still remains good, and then go in to tea. You still have ten unexposed plates left. I should like to look at the Thrush's nest we found last week. Here it is, but the young birds are only a day or two old and too young to take out of the nest to photograph. We will look for some more. Did I hear you say you had found another nest containing young birds? That's right. Yes, these are just the right size for our purpose. I should like you to try and get them on a branch near the nest and take their portraits. I will help you, as I know from experience it is not easy work. There are four in the nest, and when you place them on the branch one will be sure to hop off, and when you replace that one, two more will come

down. They are just beginning to know they have wings and are anxious to use them, but at present they are not able to do so at all gracefully. Bring your camera and focus on this branch; notice how much of it you include on the focussing screen, and I will try and perch all the young birds on the branch between the limits of your view. Now there are three of them; focus as quickly as you can and use stop *f*8; set your shutter at the one-fifteenth of a second and get ready to make the exposure. Ah! there goes another down; I will endeavour to keep these two while you fetch him and set him up again. Place your hand over him for a few moments and then carefully withdraw it; this will help to make him settle down. There, now quickly, that's right. I think they were still, but you had better make another exposure in case they were not. They seem less inclined to move now; so put another plate in and get ready. Now I can hear the parent bird calling them. There she is, look, just above us with some worms in her mouth. She wonders what we are doing, no doubt. You must be quick or they will get restless. There, now they are all in good positions. Have you exposed? Yes; all right, we will put them back in the nest and the parent bird will visit them as soon as we retire.

Look on the tree trunk over there; do you see anything amongst the ivy? No? Look again a little closer. What is that dark hole in the centre of that clump of moss? It is a nest of the common Wren, so artfully concealed amongst the ivy that I think very few persons would notice it. Do not put your finger in it as it may cause the bird to desert it if you do. The Wren is very particular in this respect. We cannot photograph the eggs in any case, so will be content to take the outside of the nest amongst its surroundings, which will make

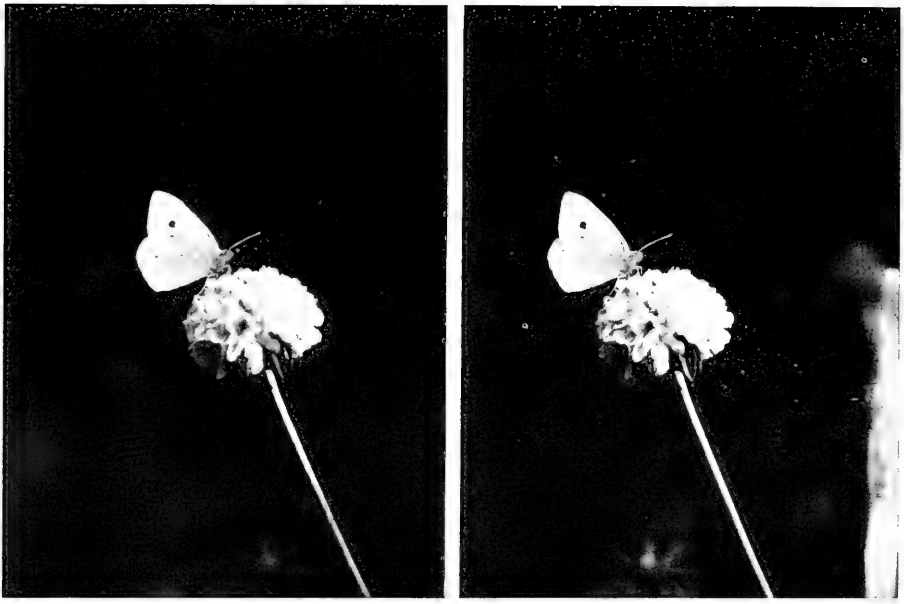

Fig. 54. Large White Butterfly.

Fig. 55. Cocoons of Six-spot Burnet Moth.

a pretty picture. You will notice this is a circular domed nest somewhat like the Chiffchaff's, but is built of moss in this case. The Wren, however, accommodates herself to circumstances and will build her nest of various materials, according to the situation chosen. I have found it constructed of hay in a hay-stack; of straw in a straw-stack; of dead leaves and moss in a bank; of dead leaves entirely in a faggot-stack or in the corner of an outhouse, and have found several beautiful examples about eighteen inches above the ground in bracken, the nest having been placed amongst the dead fronds of the last year's growth and constructed of the same material. The nest will, in each case, be lined with either feathers, hair, or fine moss. The different choice of materials for the outside of the nest leads one to think the Wren, in common with some other birds, possesses a certain amount of reasoning power, and is able to construct her nest of materials to match its surroundings, thus helping to make it more difficult to discover. Certainly this is almost invariably done.

Now let us make our way into the orchard at the back of the farm. There is a Missel Thrush's nest there situated in the fork of a walnut tree. I saw it a day or two ago, and it is about level with the top of your head. You will be able to get two views of this, one to show its position in the branches of the tree, and another showing the nest and eggs. For the latter you will have to get something to raise your camera or it will not be high enough. While you are arranging for and making the first exposure, I will go and see what I can find to help you to obtain the second view.

Here we are, a pair of steps I have borrowed from the house and three stout poles, which can be joined to the legs of your tripod and will make it about twice its usual height.

Take the camera off first, because it will be easier to tie the joints when the tripod lies upon the ground. Where is your string? You have forgotten to bring any to-day! Dear me, that might have been unfortunate, but I have some in my pocket, and I think it will be enough for our purpose. Will you hold the pole so that it overlaps the leg of the tripod about six inches, and I will tie them together. It is best to do this in two places near the end of each length, as there will be less chance of them shifting when erected. There, I have bound it round tightly, and should like you to do the other two joints in a similar manner, while I hold the tripod and pole. Yes, pull the string a little tighter if you can; that is better. Now raise the whole up and place it as near as you can in the position you will want. Now put the steps close by and mount them with the camera, which has to be fixed to the top of the tripod as usual. Be careful you do not overbalance, and incline the camera by means of the tilting-board until you get a good view of the nest and its contents on the screen. Let me look at it. Yes, that will do. Now make your exposure and be careful not to shake the camera while doing so. It is probably less steady now than usual, and will require extra care to prevent any vibration, which would, of course, spoil the definition of the image obtained. This arrangement having taken some time to get ready, you had better expose another plate in case the first one should be unsatisfactory. If they both turn out all right so much the better.

I have two more subjects for you. There is a Green Woodpecker's nest in the trunk of an apple tree close by and a Moorhen's nest on the little pond just over there. As we pass the pond on our way to the keeper's cottage, we will do the Woodpecker's first as the time is getting on. This is another

case where two views will be useful. One showing the tree taken from a distance where the entrance hole to the nest will be very small on the plate. Then you can get nearer and show this on a much larger scale. Here is the tree. Look how neatly the hole has been finished off. It might almost have been sand-papered round the edge. And remember the bird has done that with her beak. A passage has been hollowed out first horizontally towards the heart of the tree and then downwards for about ten or twelve inches below the entrance, and at the lower part of this, which has been made a little larger than the passage itself, the five to seven glossy white eggs are laid. The only "nest" consists of some of the particles of wood chipped off by the bird in boring the hole. Very often after the bird has gone to all this trouble the hole is appropriated by the Starling, which carries some straw and other materials into the hole, causing the rightful owner to give it up. Sometimes this is not permitted without a struggle, but the Starling generally comes off the victor. When the nesting hole is undisturbed it is often used by the Woodpecker for several seasons in succession. The Woodpecker has what is called a "zygodactyl" foot. It has two toes in front and two of equal length behind, and is eminently suitable for climbing. It is very interesting to watch the bird running in a spiral form up the vertical surface of a tree trunk. This bird has become much commoner of recent years, at any rate in the districts I am acquainted with; its laughing cry is generally supposed to be most frequently heard previous to rain. There are two other species of Woodpeckers in this country, the Greater Spotted and the Lesser Spotted, but both are shy birds, and are more frequently heard than seen. Both are much less common than the Green Woodpecker. But if

you are interested and wish to know more about these and many other birds, you must look it up in some standard work like *Yarrell's British Birds.*

Now make your two exposures and then we will go down to the Moorhen's nest on the edge of the pond. Here is the nest, there are eight eggs, and it is built, as you can see, on some branches just above the surface of the water. I have on several occasions found the nest floating on the surface of the water like a little craft. You can easily see this nest and its contents, but be careful you do not let the camera overbalance and fall into the pond or fall in yourself. It is probably not very deep, but you do not want either your camera or yourself to get a ducking, I am sure.

Now you have only one more unexposed plate, and it must be exposed before we go in to tea, if at all, because the light will not be very good afterwards. Here comes the keeper on his way home to tea. He will make an excellent subject for your last plate. No doubt he will let you take him, as I have already experimented on him myself. But before he comes near I might tell you that a photograph of this sort does a good deal towards making him interested in our work, and he can help us a great deal, in many ways, if he likes. If you get a good negative of him, give him a few prints, and you will find it will amply repay you. This, however, is a little confidential advice.

"Good afternoon, we are just coming up to have a cup of tea with you and the missus, but my young friend here wishes to take your portrait, if you don't mind? Thank you; will you stand just here with your gun over your shoulder and your hand on the gate as if you were just going through. Look round this way, please. There, that is very good." Now

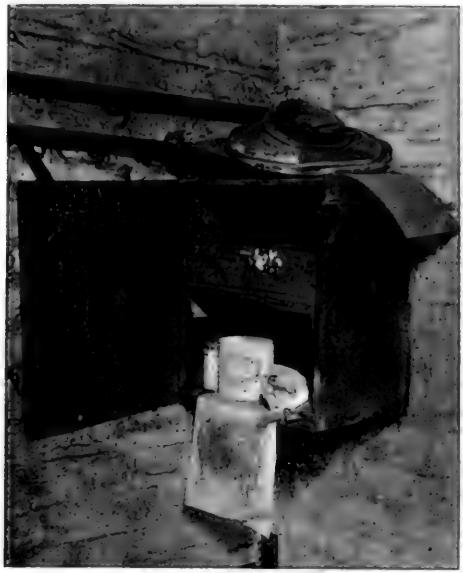

Fig. 56. Robin's Nest in Old Cupboard (site)

Fig. 57. Robin's Nest and Eggs, in Old Cupboard shown in Fig. 56

focus as quickly as you can, and let me see it is all right before you put the plate in. Remember, it is the last and don't spoil it if you can help it. Yes, you have got him in very nicely. Use your largest stop, say *f*8, and then half a second will be sufficient exposure. Are you ready now? (*Sotto voce:* I will speak to him and expose when I raise my hand.) "Now, Mr. Keeper, are you looking pleasant? Thank you, it is done, and I think you had a very pleasant smile on your face, which I hope will please your wife;" but whenever I take a portrait I always like to add: I will send you a print *if it comes out all right.*

There, we have made our eighteenth exposure, and if you are not ready for tea, I am. I am sorry I shall not be able to accompany you next week as I shall be busy, but the following week I hope to be free. If you have time drop me a line and let me know how you get on next week by yourself, and also how the exposures made to-day turn out.

CHAPTER X

HOW TO OBSERVE AND PHOTOGRAPH SOME OF OUR COMMONER BIRDS AND THEIR NESTS AND EGGS—*continued*

WHAT a nice day again. We are fortunate in the weather for our weekly excursions. I was glad to hear from your letter that you were successful last week in finding several nests, and I will tell you when we are in the train what I think the three fresh ones were you found and which you were not quite certain about.

To-day we are again bound for the same locality as before, because I think it is better to work one or two districts week by week than to try a fresh place every time. During the season many new nests will be discovered on the same route by going over the ground at intervals of, say, a week. You will find also, after some experience, that birds get attached to a district and will often nest in or near the same spot for many seasons in succession. I remember in my early days finding a Sedge Warbler's nest in the same little clump of herbage year by year. After an interval of about twelve years, during which time I had been absent from the district, I was going over the ground again and had the curiosity to look, as before, for the Sedge Warbler's nest. Sure enough, there it was, whether built by the same birds, I cannot say; if not, probably by their descendants. So that when one gets accustomed to a district it is possible almost to count on finding certain nests, and I don't mind telling you now that is one

Fig. 58. Robin's Nest in Curtain in Schoolroom (site)

reason why I have been able to find so many for you where we have been working.

Now we are comfortably seated in the train, let me see if I can remember the list of your finds last week. There were nine, I think, altogether: two Song Thrushes, one with eggs and one with young birds; one Blackbird with young; one Robin; two Hedge Sparrows; and the three you were doubtful about. The one you found in the furze bush, which looked something like a Hedge Sparrow's, but had a wool lining and which contained five greenish-white eggs with brown spots on them, belonged to the Common Linnet. The other higher up in the hedge, which you could not reach to photograph, and which was something like a Chaffinch's, but larger and much more untidy looking, with eggs similar to the last but rather larger, was no doubt the nest of a Greenfinch or Green Linnet, as it is sometimes called, a bird very common in most districts. The third one, built in the side of the haystack rather low down and containing five whitish eggs with light bluish-grey markings, sounds like the description of a Pied Wagtail's nest. As you obtained a photograph of it I dare say I can tell you from that; if not, we will go and see the nest another day.

I am glad to hear you have brought eighteen plates with you again to-day, as the nesting season is now in full swing. We are at the end of the second week in May, and in addition to our resident birds, the migrants which annually visit us have all arrived, with perhaps one or two exceptions, and will soon have nests and eggs. As I was prevented from accompanying you last week I came over two days ago in order to find a few subjects for you to-day, so that we could save time. I shall, therefore, be able to take you round without having to spend

a good deal of time in hunting for the nests. A good way to discover the whereabouts of many nests is to sit down in a likely spot, remaining perfectly still and quiet. Under such circumstances, you will soon have many birds, and probably some of the smaller mammals, round you, and by the aid of your glasses, which you should always carry, you will be able to follow many birds to the locality of their nests, and a careful search will do the rest.

The best way to carry the glasses is to sling them round the neck with the focus set for a moderate distance, so that they are ready for immediate use when required; otherwise, by the time you have got them out of their case and focussed, the opportunity of using them, or perhaps I should say the object you desired to look at, has disappeared from view. I have made a note of the subjects for to-day; they comprise the following nests, which are mentioned in the order we shall come to them: Blue Tit, Tree Creeper, Starling, Yellow Hammer, Willow Warbler, Golden-crested Wren, Skylark, Bullfinch, Wild Duck, and Partridge. Ten subjects in all.

We start at the farm, and before we leave the house I want to draw your attention to the House Sparrows' nests in the tall hedge just close to the back door. You will notice they are domed nests not unlike that of a Wren, and are much more neatly made than when built in a gutter of the house or in a hole in the thatched roof of a shed. As they are built rather high up we will not attempt to photograph them to-day, but make for the nest of the Blue Tit. This is in the post of the gate leading into the yard, and you will have to take my word for it, as you will not be able to see either the nest or eggs. I have seen the bird go in and out several times lately, and I know the nest is now finished and the hen bird has com-

menced to sit. You will be able to obtain a photograph of the post showing the entrance hole to the nest, and you can call it the *site* of a Blue Tit's nest. Listen while I put my stick into the hole. You can hear the little bird hissing like a snake, and she is no doubt puffing out her feathers and making herself look double her usual size, and even then she will not be very big; but she makes up for her small size by her large amount of courage, and will stick to her nest in the most determined manner. She will attack one's finger put near the nest, and on this account has received the nickname of " Billy-biter." As you cannot see the eggs, I must tell you they are small white ones with a few light red spots upon them. The nest is composed of a large amount of material, including moss, hairs, and feathers, and a numerous little family occupies it, sometimes as many as sixteen eggs having been found, although from seven to ten is the more usual number. The eggs of the Blue Tit, Tree Creeper, Willow Wren, and one or two other members of the Tit family, are so much alike that, unless they can be identified with the bird and nest to which they belong, it is almost impossible to tell them with certainty.

The Tree Creeper's nest is quite close. It is built between two boards forming a part of the fence round the yard. It is situated just at the corner here, by the shed, and again you will have to be content with the external appearance. It is difficult to imagine how a family of from six to nine young ones can be accommodated in such an apparently small space, notwithstanding the fact that the Creeper is one of our smallest birds. The bird itself is not often seen, unless we are specially on the look-out for it, as it is of a sombre hue, and in running up the surface of a tree trunk or wall, generally selects the side

away from the observer. It will often be seen when the observer is sitting down in a likely spot, as I mentioned just now.

You are getting so proficient in manipulating the camera and accessories now that I prefer to leave you to arrange it yourself and calculate the necessary exposure. But here I am if you require any assistance.

The Starling's nest is in the thatched roof of this shed, but is concealed as much as, or perhaps even more than the last example. Perhaps we might leave that to-day, and when you have more time to spare you might arrange your camera near the hole and try to obtain a picture of the Starling itself either entering or leaving the nest. To do this you will require a longer pneumatic release. The one you are using, known as the "Antinous," is a very good one for general purposes, because it is unaffected by the changes of temperature, but it is well to carry another on special occasions, composed of the usual rubber tube in several lengths, so that it can be joined together to make one long one, the connections being made by a small metal tube or piece of quill. You will require a larger ball than that usually supplied to work the extra length, but it will enable you to make the exposure when hidden some distance from the nest, and so obtain results impossible if you were close to the camera.

As you agree to leave the Starling's nest to-day—there are always plenty about—we will go to the next one, that of the Yellow Hammer or Yellow Bunting. This is situated in a hole amongst a bundle of rubbish just by the corner of the yard, and when I saw it contained three eggs. The bird has just flown out from the nest and there are five eggs to-day. You will easily be able to photograph this, as it is low down

and you can see the eggs distinctly. The cock bird is very handsome in his coat of brilliant yellow, and if he were a rare bird would probably be thought a great deal more of than he is. Fortunately, he is common and therefore ought to be known by sight to most persons. His peculiar song has been likened to the words, "*A-very-leetle-bit-of-bread-and-no-o-cheese.*" Certainly to me it always suggests these words, and I should like you to notice it next time you hear the bird, and let me know if it suggests the same to you. The nest is not unlike that of the Pied Wagtail, but the eggs are quite different and would serve to distinguish it at once. They are beautiful eggs, the ground colour being a very pale purplish-white, bearing streaks and veins of dark reddish-purple, or purplish-black, which appear very similar to lines scribbled with a pen. There has been a good deal of discussion on the proper way of spelling the name, whether it should be Yellow *Hammer* or Yellow *Ammer*, the latter word *Ammer* being German for Bunting. If you are doubtful which name to adopt, perhaps the best way out of the difficulty would be to call the bird the Yellow Bunting.

Our next subject is in the orchard. It is a Willow Warbler's nest, and I want to remind you of the Chiffchaff's nest we discovered some time ago. There are three birds, namely, the Chiffchaff, Willow Warbler, and Wood Warbler, which even to a trained eye are difficult to distinguish, unless their song is heard or they can be approached near enough for a good view through a pair of glasses. The Wood Warbler is a local bird and not so common as the other two, and you are not likely to come across it, at any rate just in this district. It is more partial to large woods, particularly those of beech trees. It was Gilbert White of Selborne who first distin-

guished this species, which was, and still is, I believe, fairly common amongst the beech trees in Selborne Hanger, on the side of the hill just behind Gilbert White's old house, " The Wakes." Gilbert White also wrote a description of the three different species named above with their distinguishing points, which may be found in his book *The Natural History of Selborne*. The nests of all three species are somewhat similar, but the eggs are different and will at once identify the nest to a trained eye. The nest of the Wood Warbler, also, is not lined with feathers, whereas those of the other two species usually contain a number of feathers inside. Going back to the Chiffchaff's nest, you will remember it was about a foot off the ground. This one of the Willow Warbler's, which is down here amongst the long grass by the side of the hedge, is quite on the ground, and at times may be found even in a slight depression in the ground. The nest is a domed one like the Chiffchaff's, but is smaller and perhaps more difficult to find. It is discovered more frequently by the bird flying out when one is passing too close than in any other way. The eggs are about the same size as the Chiffchaff's, but the spots are, as a rule, much lighter and of a faded or washed out looking red. The eggs of the Wood Warbler are much more thickly covered than those of either of the other two species with very dark red spots, and this will serve to identify the nest, in addition to the absence of feathers inside, should you be fortunate enough to discover one. I have found the nest of the Chiffchaff as high as three feet above the ground in a holly bush in a hedge, but all the Willow Warblers I have discovered have been quite on the ground.

We must now go to the edge of the wood where there are some spruce fir trees, and we must take the pair of steps with

us. I have found a nest of the Golden-crested Wren or the Gold-crest as it is called for short. The bird is not only our smallest British bird, but is also the smallest European bird, and is so tiny that it often escapes observation. Although so small, it is very hardy and remains with us during the winter, when it is often seen hunting amongst the trees for insects in company with the smaller Tits. Large numbers cross the North Sea from Scandinavia and alight on our shores at migration times, and it is wonderful how such a small bird can brave the cold winds. Many, no doubt, do perish during the journey, but still a considerable number arrive here safely. The nest is a most beautiful one and is quite worthy of the charming little bird. It is almost spherical in shape, with the entrance at the top, and is generally suspended from a spreading horizontal branch of a fir or yew, sometimes being placed in other trees. It is like a round ball of moss, and is very neatly and compactly fitted together, being generally covered with lichen; and spiders' webs are used in the construction of it. It is thickly lined with feathers, and may contain from six to a dozen tiny eggs of a dull yellowish ground colour, with sometimes the addition of a few light red or yellowish-brown spots. There is a story that, many years ago, the birds held a council to elect a King, and it was decided that the bird which could soar the highest should receive the crown. The Eagle out-distanced all competitors, and just as he was about to be proclaimed King a little Gold-crest popped up his head. He had been seated on the back of the Eagle during his soaring flight and had therefore been the highest. So while the Eagle received the title of King, the Gold-crest was called " Kinglet," and his golden crown was given him, which he now wears as a crest on his head. The story is, at least, a very pretty one,

and I cannot help remembering it whenever I see the diminutive little bird, which is a great favourite of mine.

Now bring the steps along and we can arrange the camera on stilts again, as we did in the case of the Missel Thrush. It is a good thing there is no wind, because the slightest breeze would cause the branch containing the nest to vibrate and make it impossible to get a sharp image. The nest literally rocks in a breeze like a little cradle. Now you can get on the steps and focus the subject. I have moved away one or two pieces of the branch so as to show more of the nest, which is almost hidden in its natural position. These can be replaced after you have exposed your plate. I should, in fact, expose two plates on the nest, as it is not often found here, and it would be a pity not to secure a good photograph of this one in case we do not find another. Now replace the branches covering the nest and expose another plate from the same position, as you have plenty to-day. Then we will take off the additional legs of the tripod and obtain a view of the tree containing the nest from a short distance away. This will make an interesting series, and I hope the plates will turn out successfully. Perhaps you would not mind taking the steps back to the house now, and I will sit down and wait for you here and watch the little Gold-crests during your absence.

You have not been long. I have been watching the cock bird making several visits to the nest, evidently for the purpose of feeding his sitting mate, and have also heard his very soft but joyous little song. You had better sit down for a few minutes, as you must be getting tired; and you can watch for a short time. Look! there he is suspended in the air while his wings are rapidly vibrating, and he is catching

Fig. 59. Robin's Nest in Curtain in Schoolroom.
(Photograph taken from the Platform shown in Fig. 58).

Fig. 60. Robin's Nest in Bookcase in Schoolroom.

the small winged insects flying round the branches near his nest. I am glad you have had a good view of my little favourite.

We had better be moving on now towards the keeper's cottage; all our other subjects are on the road thither. We shall see a Skylark's nest with four eggs near the middle of the next field—at least, I hope so.

Yes, here it is, I saw the bird fly off as we approached. The nest and eggs are almost concealed by the tuft of grass it is built under. But being on the ground it is easier to get at than the nest of the Gold-crest we have just left. This is, however, not so beautifully constructed as the latter, but perhaps you remember the lines of the poet Grahame, in his *Birds of Scotland*. Referring to the Skylark, he says:—

> Thou, simple bird
> Of all the vocal quire, dwellest in a home
> The humblest; yet thy morning song ascends
> Nearest to heaven.

I hope we shall be able to get a photograph of the young Skylarks when hatched. They are rather curious and look very much like bits of dried grass when lying in the nest. The young of birds of this kind are not very pretty compared with a young chicken or Lapwing, or any bird which is able to look after itself soon after being hatched. Notice the colour of these eggs. The greenish-brown spots almost cover the dirty-white ground colour, and remind one of some of the darker specimens of House Sparrow's eggs, although those of the Skylark are larger, and this latter fact helps to distinguish them from the eggs of the Meadow Pipit, which builds its nest in similar situations. The nest of the latter is rather better constructed and is generally deeper than that of the Skylark.

Our next two subjects are close to the keeper's cottage, and the first will be the Bullfinch's nest, not far from the back door. I am afraid this bird is greatly persecuted and often shot, owing to the notion that it damages the buds of fruit trees. Well, personally, I must admit I would rather have a few buds damaged, even if they were in my own garden, than lose the Bullfinch altogether, for he is one of our handsomest birds. His velvety-black head and bright tile-red breast, coupled with the slaty colour of his back give him a very smart appearance, and I am glad to find he is commoner than he used to be, thanks to the Bird Protection Laws now in force. This bird was often caught and blinded to make him learn to pipe better, and it is to be hoped that such cruel practices as this may—if they have not already—speedily become a thing of the past. The nest is quite distinctive in character, and I do not know any other with which it is likely to be confused. It is usually built of small dark twigs bound together with roots, and lined with finer rootlets. Sometimes a little wool is used also, and the nest always has a flat appearance, the outer twigs projecting some distance from the cup. The eggs vary in number from four to six, and the ground colour is a bright greenish-blue not quite so dark as that of the eggs of the Hedge Sparrow, spotted and streaked with dark purplish-brown, with sometimes a few lighter spots of a similar colour. The markings are generally more numerous at the larger end, but I have occasionally found this reversed.

There are several nests of the Wild Duck or Mallard round the pond by the cottage. Some of the Ducks are fairly tame and probably you will be able to get a photograph of one on her nest. Here is a nest, but the bird is not at home. See, she has covered the eggs over with the down forming the lining

Fig 61. Blackbird's Nest with 8 eggs.

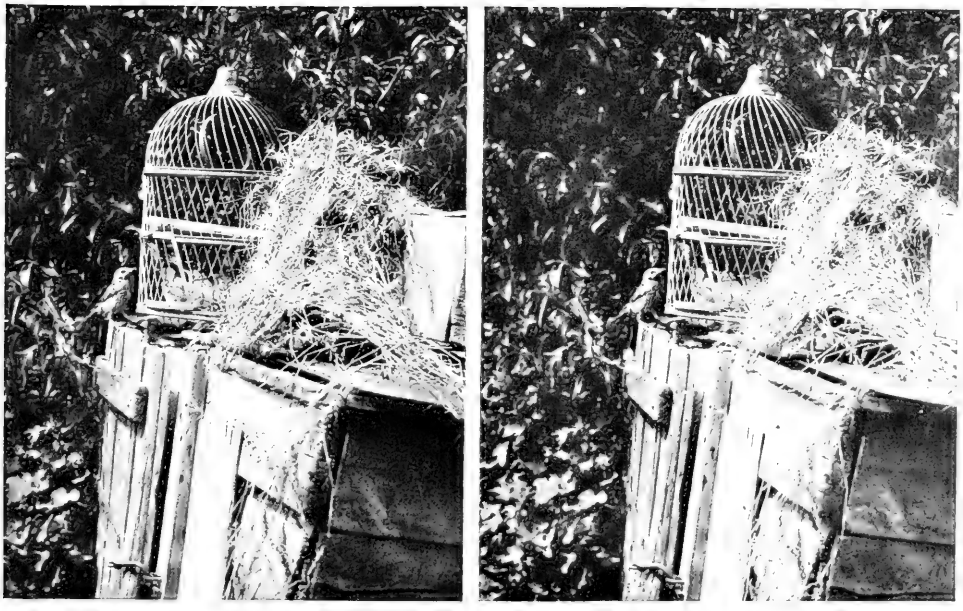

Fig. 62. Song Thrush Feeding Young in Cage.

round the edge of the nest, which she plucks from her breast for the purpose. She folds this down over her eggs with her bill, in a somewhat similar way to the folding over of a hinge, when she leaves the nest of her own accord. You had better expose one plate on this nest and we will have a look at the others before exposing another one. Ah! here is a Duck on her nest and she seems sitting very close; she will probably hatch out in the course of a few days. You had better use the single combination of your lens again for this subject. Go very steadily, as you did when taking the Pheasant on her nest, and I think you will be successful.

As you have succeeded in getting a picture of this Duck on her nest, we will now return to the other nest, and I will fold back the down covering the eggs, so that they can be seen, and you can then make another exposure on them. There are fourteen, and see how nicely they are packed together so that she can cover them well. The positions are, of course, changed, those on the outside are brought in their turn to the centre, so that all get an equal amount of warmth. If we could only see her, when they are all hatched, leading the young birds down to have their first swim, we should feel, I am sure, what a proud mother she was. We are both ready for tea now, and the days are lengthening so that the light will remain good for quite two hours after we have finished the meal.

We have enjoyed our tea. How refreshing a cup of it seems when one is tired; I think there is nothing like it. We will now walk leisurely down to the churchyard to find the Partridge's nest. It is under a seat and contains the large number of twenty-two eggs. Unfortunately, it has been forsaken by the bird. I am afraid the reason was that the

choir-boys found it out and paid so many visits that the bird was worried too much, but the eggs were still there when I looked two days ago. You can expose two plates on this subject, one before the grass is moved away and another after it has been moved, showing the eggs, or at least some of them. You will not be able to show the whole twenty-two, but I have counted them and they are all there. Notice how they are piled one on the other; I should fancy it would be impossible for the bird to cover them all properly, and some would almost certainly have been addled had the bird not forsaken them. The Partridge, however, is able to puff out her feathers to a considerable extent, as you may imagine, when she can shelter and conceal more than a dozen chicks under her.

That makes the number of plates exposed sixteen, and you have two left for any subject which may turn up before we leave to catch our train for the return journey. Although you have not exposed a large number of plates, you have obtained nine different kinds of nests, and in addition several different views of some of these. There will not be many occasions when you can expect to exceed this number in the course of a single outing. I should not attempt to develop your exposures to-night as you are tired, I know, and will get better results when you are fresh, so leave them until to-morrow evening.

CHAPTER XI

HOW TO OBSERVE AND PHOTOGRAPH SOME OF OUR COMMONER BIRDS AND THEIR NESTS AND EGGS—*continued*

As we were prevented last week from making our contemplated excursion on account of the weather, we are now at the end of May, and to-day we ought to find some nests belonging to the later builders, including the migrants, such as the Whitethroat, Sedge Warbler, Blackcap, and Flycatcher. A good place to find the nests of some of these birds is amongst the thick herbage by the side of a small stream, as many birds like to build their nests near water. So I propose we commence our search to-day by starting at the keeper's cottage and then work along the bank of the small stream which commences at the pond we are already acquainted with and meanders through the meadows beyond. The grass is getting long now, so we must be careful not to trample it down, but there is a footpath along the bank of the stream and by following this we shall do no damage. At the end of May life of all kinds seems to be teeming, in both the animal and vegetable worlds, and the numbers of Birds, Insects, and Flowers appear innumerable. We find the wealth of available material for purposes of study is so great that we are almost bewildered, and have, perforce, to leave the great mass of it untouched, selecting a few subjects which specially appeal to us from the vast store at hand, and we shall have time to notice little to-day but our birds and their nests.

We are reminded, occasionally, of the multitude of the insect kingdom by a very small member of it trying to commit suicide in one of our eyes, and we are accordingly made to experience a large amount of discomfort from so tiny an object. We are specially likely to experience this unpleasant sensation when walking by the side of a stream, and I will, therefore, give you a practical hint. The little mirror you carry—I have one in my pocket too—will be very useful in enabling you to see and abstract an intruder, such as I have mentioned, from your eye, and if this is quickly and skilfully performed much of the after effects may be avoided. You are likely also to experience some discomfort from attacks by midges, especially when sitting under the shade of trees near water. The effects produced by these tiny insects are not felt immediately. Probably the next day your face and hands will experience an itching sensation, which will only be made much worse by rubbing the places. One of the best ways of stopping the itching is to rub a little weak ammonia on the part affected, being careful, of course, not to get it near the eyes. But as prevention is better than cure, you will find a fine net, such as ladies use for their hair and called a fringe net, I believe, or another kind known as a mosquito net, if put over the head will keep a good many insects away. They do not like to go through the meshes of a net even if quite large enough for them easily to do so. A small bottle of oil of lavender carried in the pocket is useful to enable you to rub a small quantity on the face or hands when the flies are specially troublesome, and will help to keep them away.

We have now arrived at our starting point; let us commence our search. The herbage is so thick that the best way of working now is to tap it gently with the walking-stick.

Fig. 63. Great Tit's Nest in Pot: site.

Fig. 64. Great Tit's Nest in Pot: lid removed.

There goes a bird; ah! it is only a young Thrush which has been hiding in the bushes. There are so many young birds about now, which were hatched earlier in the season, and they often fly out of a bush or the herbage and lead one to think there must be a nest, so you must be on your guard against this. There goes another bird, but this time I feel certain it came off a nest. It was a Whitethroat, and is one of the commonest of our migrants and found almost everywhere. We may expect to find several nests belonging to this species to-day. Here is the nest; it is made of bents, the dead stems of Goose-grass being very often used, and is lined with hair, sometimes very sparingly, at others thickly. I remember finding one nest several years ago very thickly lined with black horse-hair, which made the eggs show up very distinctly. There is often a piece or two of wool or willow down used in the construction of the nest, which is rather loosely made, and generally one can see through it. The eggs are usually five, as in the case of the example before us, and although they vary a good deal there is a general family likeness about them. The ground is more or less of a greenish or buffish-white, and the markings usually have a green tendency, often accompanied by brown or grey spots. Another bird, called the Lesser Whitethroat, although very little less in size than the Greater Whitethroat, is found in some districts. It is much scarcer as a rule than the Common or Greater Whitethroat, and I have never found its nest in this district myself, although I have been told it has occurred. Here are the pair of birds to whom this nest belongs quite near us. They are generally of a fussy turn of mind, as you can see, and do not like their nest disturbed. You can hear their scolding and somewhat jarring note, and you must learn to recognise the various notes of the

different species of birds, because they all have several kinds in addition to what is known as their song.

One advantage connected with these nests of the Warblers is that they are generally built low down in the bushes, and so make easy subjects to deal with on that account. I will go first, tapping with my stick, and you had better follow at a little distance with your camera and keep a sharp look-out for any bird which may escape my notice. Some have a habit of slipping off the nest just when one has passed, and if the ear is not sharp enough to detect the slight rustle of the wings, may escape notice altogether; so that it is advisable to search the herbage in addition to tapping it with the stick.

Here is a little clump of rank herbage just by the water's edge. I heard a Sedge Warbler a few moments ago, and this is a likely place for its nest. Yes, here it is; there are four eggs in it. The nest is somewhat similar to the Whitethroat's we have just left, but rather smaller, and is also fairly deep. You will have to tilt the camera a good deal, as you did with the Whitethroat's nest, in order to see the eggs. They are smaller in size than the Whitethroat's, and are usually of a uniform brown colour and sometimes have a few black dots or lines upon the surface. These, as you can see, are quite typical specimens. During the nesting season this bird may be heard uttering his little song at all hours of the day or night, and if disturbed in his haunts will usually commence to sing. He will often mimic the notes of other birds also. The wind is a little troublesome here, and you had better make two exposures on this nest, but wait patiently until you get a still interval, as the surroundings of the nest are moving a good deal at the present moment. While you are waiting, I will refer to another bird somewhat like the Sedge Warbler; I

Fig. 65. Robin's Nest in Hat

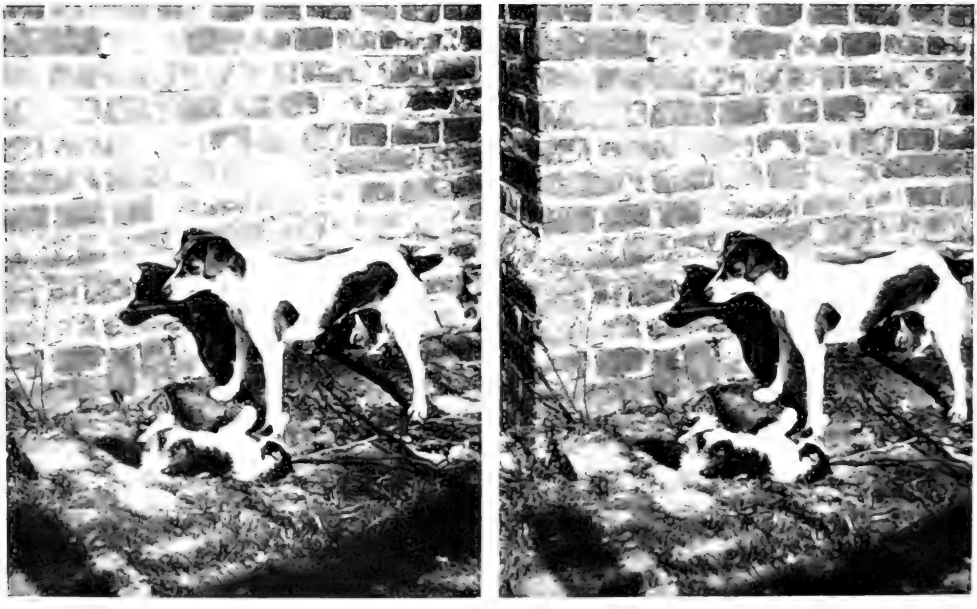

Fig. 66. Playmates

mean the Reed Warbler, which is more partial to large masses of reeds, where it usually builds its deep nest, attaching it to the stems of four reeds. The nest is so deep that even when the reeds carrying it are bent almost to the water level by the breeze the eggs are prevented from falling out. We are not at all likely to find the nest to-day. Here is another Whitethroat's nest with rather lighter coloured eggs than the last one we found, but we will not disturb it, as we have a good deal of ground to cover to-day.

I had just stepped back to look at this patch of Field Daisies, and in doing so put a Meadow Pipit off her nest. Here it is right under the edge of the bank, and quite concealed by the overhanging long grass. She must have been sitting hard as we have been standing here for some time and have not disturbed her before. The nest reminds one of the Whitethroat's as far as materials go, but is much more substantially built. The eggs are similar to the Sedge Warbler's, but are larger. You will have to bend the overhanging grass back or you will not be able to see the eggs in the nest, but be careful to replace it after you have made the exposure.

We will cross over this little foot-bridge and return to the pond by the other side of the stream. We are nearly at the pond now, and in coming along I have found two more Whitethroats' nests and one Yellow Hammer's, all with eggs in, but as you already have photographs of similar nests I did not stop to show them to you. There is generally a Reed Bunting's nest near the pond, and last year I found it just about here. Yes, here is one in the very same bush quite close to the ground. Several of the nests we have seen to-day look perhaps very similar to you, but when they contain eggs it is quite easy to determine the species to which they belong.

These four eggs have the characteristic appearance of those belonging to the Bunting family, which enables any one to identify them at once. Although rather smaller than the eggs of the Yellow Bunting, they are richer and darker in colouring, the ground being much darker, and the large blobs of deep chocolate-brown look in places as if they had been painted on a damp surface and the colour had slightly spread.

Look at the young Ducks on the pond: there are three different families and no doubt some are from the nests we photographed. There are also some young Moorhens amongst one brood of Ducks. They were hatched, doubtless, from the nest we discovered on the other side of the pond. I can also identify our three members of the Swallow family skimming the surface of the water. There is the Sand Martin—the smaller bird with the brown back—the House Martin, and the Swallow. The latter you can tell at once by its forked tail and also by the reddish colour on the throat, which is not present in the other species.

There is a colony of Sand Martins close here in a sand-pit; we will go over to it now, as I heard a day or two ago the workmen were obliged to cut away a part where the birds were nesting, and I asked the owner of the pit to open out one or two of the channels leading to the nests if possible, and leave them with the nests and eggs for us to see. I have ascertained from the foreman that four nests have been left on the top of this piece of sand and they are covered over with a sack. Help me lift the sack up carefully and you will then be able to photograph them all together. One nest contains five eggs, one three, one is empty, and the fourth contains young birds which, however, are unfortunately dead. I have just measured the longest channel, and it is twenty-seven inches in

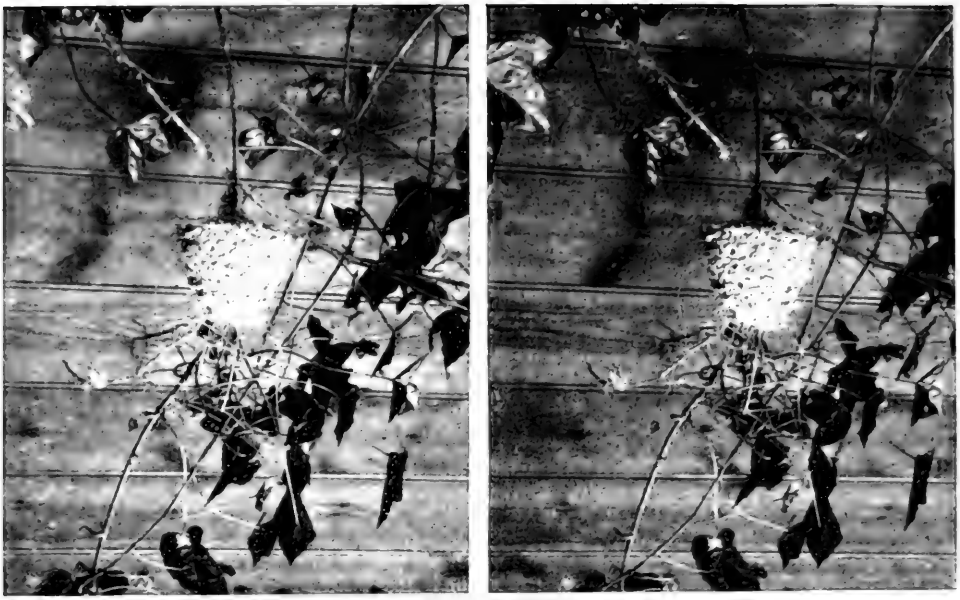

Fig. 67. Swallow's Nest built on Tendril of Ivy.

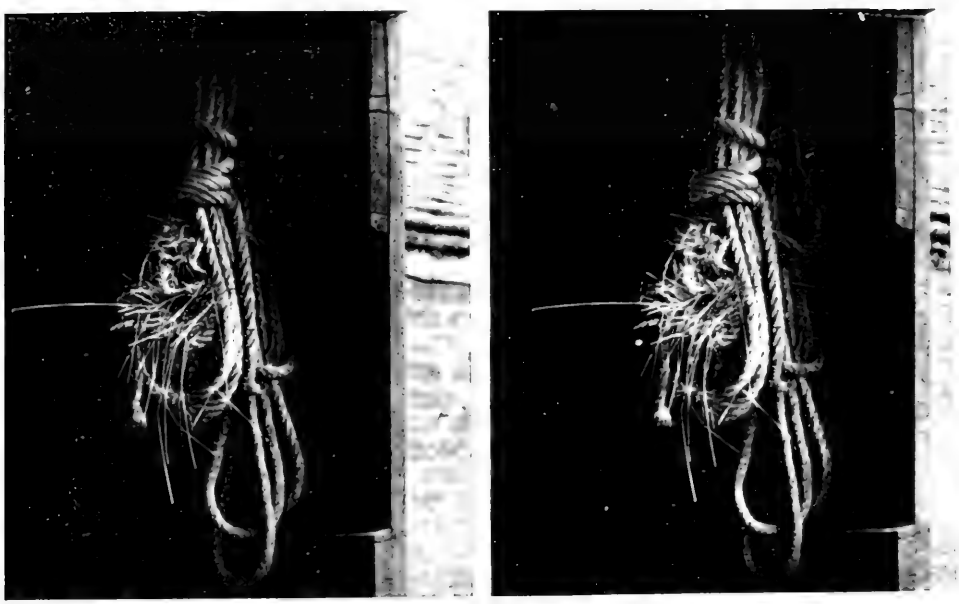

Fig. 68. Wren's Nest in Wagon Rope.

length from the face of the pit to the nest. You must bear in mind it is hollowed out of the bank entirely by the aid of the bird's beak and claws. Notice, also, the channel is enlarged at the end where the nest is, this being little more than a few bits of straw lined with a few feathers of geese. One nest has two separate channels leading from it, and it is said the bird makes two so that if one becomes blocked up from any cause she can escape by the other. The nests of these birds are usually infested with fleas. After you have taken a view of all the nests, get another of one nest from a closer position, and then get down and obtain a view of the face of the bank showing the entrance holes of the nests uncovered, and also those below. It is not often one gets a chance of obtaining a view of the nests *in situ*, and I am sure you wish to thank the owner for his kindness in leaving them for us to see and photograph.

We will now make our way to the farmhouse through the wood. There is a little clearing in the wood where I usually find a Nightjar's nest. I say " nest," but, as a matter of fact, there is none, the two eggs are laid on the bare ground. They are not at all easy to find unless the bird gets up from them just in front of us as we walk across. This, however, she usually does, if sitting on them. Look carefully as you go or you may put your foot on the eggs. There goes the bird! There are no eggs, however, and it was probably the male bird resting on the ground. It looks hopeful, though, because no doubt the hen bird is not far away. I had hardly finished what I was saying when I saw her rise just in front of us. There are the two marbled eggs lying in a little depression in the ground amongst the dead bracken. This will be an excellent example for two different views, one taken some distance from the

eggs showing the nesting *site*, and the other closer to show the eggs more distinctly. The eggs are peculiar in being the same shape at each end, and are not like most eggs, more pointed at one end than the other. I will not talk to you while you are taking the photographs, as you will require your undivided attention to prevent any mistakes occurring. When you have finished we will retire some distance and rest a while. We can watch for the bird returning to her eggs, and I can give you a few particulars while doing so regarding the bird itself. I will go over there and you can come to me when you have made your exposures.

Well, you have taken the two views. I saw the bird fly over your head and disappear again while you were focussing the second position, but she will soon be back and will settle down on the eggs. We are fortunate in finding them now, as the bird is one of our latest summer migrants and does not usually arrive before the middle of May. The bird is known by several local names, amongst them Goat-sucker, Night-churr, Fern-Owl, and Night-Hawk. The ancients believed the bird possessed the habit of sucking the teats of goats, hence its name of Goat-sucker. Of course, they were quite mistaken. The song is very peculiar, consisting of the rapid repetition of a single jarring note not unlike the noise made by the spinning of a wheel. It may be heard on a still evening for a distance of quite half a mile, and no doubt many persons would have great difficulty in explaining the cause of the sound should they hear it. The bird has another peculiar habit; that of sitting on the branch of a tree lengthways—not across like other birds—and with the head at a lower level than the tail. It is very difficult to see in this position, as it sits very close

and looks more like a part of the branch itself than a bird. It will often take this position when put up from the ground. It has long wings, and if you listen next time you see one rise from the ground you will hear two or three claps made by the wings meeting over its back in the first few strokes it makes in flying upwards. It is a nocturnal bird, and although it does not object to the sunshine, it generally rests on the ground during the day. In the evening it may be seen flying about in its haunts actively engaged in capturing the large-bodied moths, cockchafers, and other kinds of insects upon which it feeds. It is furnished with bristles along each side of the upper mandible, which it is believed assist it in capturing its prey. It is altogether a most interesting bird, and I hope later on when the young are hatched you will be able to obtain one or two more photographs of them to add to your series. The young birds when first hatched are covered with down and are not unlike young chickens, but as they get older they become more like the old birds in appearance, and are very difficult to see when resting on the ground.

Let us make our way now to the farmhouse, where we are to have tea to-day. We are almost certain to find some completed nests of the House Martin under the eaves, and I shall be able to assist you in obtaining a photograph of them before tea-time arrives. But wait a minute! I can hear the Nightingale. It is curious we have not heard it before, as it is very common about here and I have often heard several singing at the same time. I should like to find a nest for you, but I am afraid we must not stay now, because we may have to search for some time and not succeed in discovering one after all. The nests are difficult to find, because they are so much like their surroundings.

It will not be a very easy job to photograph the Martins' nests as we shall have to obtain two ladders—one to tie the tripod to and the other to mount on when fixing the camera and making the exposure. It would be possible to do with one, but as we can readily obtain two from the barn it will make it easier for you.

In many cases it is much better to be alone when out for the purpose of Nature Photography. One will usually see more by oneself as there is no opportunity for conversation, and one is only limited by one's own stock of patience. A companion may not be so enthusiastic as one's self, perhaps, and so I say it is better for several reasons to be alone. And yet the Nature Photographer who is a *real* lover of Nature will never feel alone in the midst of so much of all-absorbing interest around him. In this case, however, some help is almost a necessity to enable the photographs of these Martins' nests to be obtained. Let me assist you to raise the tallest ladder against the side of the house, and the slightly shorter one we will place beside the other. You can now tie the legs of your tripod, one at a time, to the taller ladder, and make them quite firm by binding plenty of cord round. It will take some little time to do it properly, but there is no hurry, and when all is ready set the shutter and draw the slide, and the exposure can be made from the other ladder after you have allowed time for all vibration to cease in the one to which the camera is fixed. Now go and close the slide and put another plate in position and expose again. After arranging a subject like this it is better to expose two plates, as we have by that means a greater chance of success. It is better to have two eggs in one's basket than only one. When a subject is doubtful I generally expose two or three plates on it,

Fig. 69. Sedge Warbler's Nest containing Cuckoo's Egg.

Fig. 70. Young Cuckoo 6 days old in Sedge Warbler's Nest.

and usually find in such cases all turn out to be good negatives.

There is a story told which gives the reason why the Martin builds only half a nest. A long time ago, the Martin came to the Thrush for a lesson in nest building. While the Thrush was trying to tell her the correct way of setting about it the Martin continually interrupted by saying, "I know, I know." The Thrush at last became tired of this, and said, "Well, if you know I need not tell you any more," and flew away. The nest was then only half finished, and after the Thrush had gone the poor Martin found she did *not* know after all, and therefore she had to be content to stick the half of the nest which had been completed against the wall and which she has had to do ever since. I fancy there are many young people who act like the foolish Martin when their elders are trying to give them advice, and who have to suffer later on in consequence.

As there is a good light on the front of the house you might obtain a view of it and show the position chosen for the Martins' nests and what a number there are being built. I will take the ladders back while you are doing this. Stop a minute though! I have just remembered there is a Spotted Flycatcher's nest in the cherry tree on the wall of the back of the house, so you might photograph this before you remove the tripod from the ladder. The nest is not so high as the Martin's, but still it is some distance above your head. There are only two eggs in the nest, which is an early one for this bird. The nest and eggs are somewhat like those of the Robin, but the Flycatcher's have, as a rule, a rather greener tinge in their ground colour. There is the cock bird sitting on the fence. See! he darts up when an insect appears, and after

capturing it returns again to the same position, and this takes place time after time. As you have taken the Flycatcher's nest you can now take the view of the house, and then we must go in to tea.

As you are ready to make another start we will stroll round the kitchen garden. There is a hedge on one side of it in which I have on several occasions found two or three nests. We have soon discovered one: I am not certain, though, whether it belongs to the Blackcap or Garden Warbler. The nests and eggs of these two birds are very similar, and we must try and obtain a view of the owners of the nest, if we can, which will enable us to identify it for certain. As the hen bird flew off just now, she and her mate will probably be hopping about near the nest before long. There they are, I can see the pair of them on the tree just above us; I will look through my glasses at them. There is no black cap on either of them, so we may be quite certain it is a Garden Warbler's nest. Both the Blackcap and Garden Warbler have a very sweet song, but that of the former is undoubtedly the finest, in fact it is considered by some to be equal to the song of the Nightingale. It is without doubt very rich and melodious, but I think myself the song of the Nightingale easily ranks first.

There are some Swallows' nests in the cart shed, but they are difficult to get at and there is not sufficient light to photograph them without making use of a flash lamp. We may be able to obtain a photograph of them by this means later on when we have more time to spare.

I forgot to mention when we were at the keeper's cottage that the Swift breeds under its thatched roof, and we

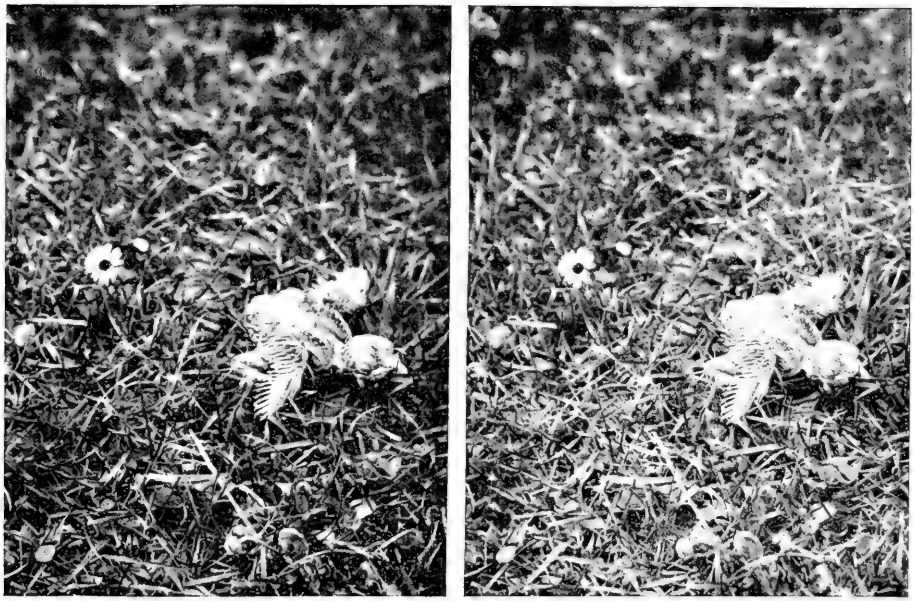

Fig. 71. Young Cuckoo 6 days old.

Fig. 72. Young Cuckoo 14 days old.

should probably see the birds wheeling about in the air near their nesting site if we were to go down there now. The nests are built a long way in, and would be very difficult to get at to photograph unless some of the thatch were removed.

One of the boys on the farm has just told me of a Yellow Hammer's nest by the edge of the field in front of the house: let us go and see it. I always like to see any nest found for us for two reasons. First, if we do not go our would-be helpers are inclined, perhaps, to think it is no use looking for nests that are not wanted, and another reason is, I find sometimes that nests discovered in this way by the farm hands occasionally turn out to be something better than we expect. The average country boy employed on a farm knows very little about any but quite the commoner kinds of nests, so let us go over and examine this one. He has described the place to me so I think I shall be able to find it. According to his description this is about the place, " Just before you come to the gate," said he, " and by the edge of the path."

Hallo! there goes the bird from the nest, and it was certainly not a Yellow Hammer. It looked to me more like a Corn Bunting. Yes, it was; there is no mistaking the handsome eggs of this bird. The nest is also larger than the Yellow Hammer's, and so are the eggs. They often have something of the rich colouring of the eggs of the Reed Bunting, but they are, of course, considerably larger. The Corn Bunting is also called the Common Bunting, but in some parts of the country it is far from common. It is a late breeder, fresh eggs being often found at the end of July. Its song always reminds me of a cart wheel which requires greasing, a comparison which I am afraid is hardly a compliment

to the bird. I like to hear the song, however, and often do so, as the bird is fairly common on the South Downs.

Look at these bees and other insects impaled on the thorns of this bush in the hedge. You may perhaps wonder how they came there. It is one of the "shambles" of the Red-backed Shrike or Butcher-bird, which feeds on insects and often young birds half-fledged. These it fastens on the thorns of a bush not far from its nest. It has received the name of Butcher-bird from this habit. You can expose a plate on this subject if you like. You have now only one unexposed plate left, and I think you will have to carry it back with you in that condition. We are both somewhat tired after our long tramp, and as it is such a delightful evening let us go to the top of the hill yonder and see the sun set. The wind has quite dropped now, as it often does towards sundown.

There is still an hour before the sun is timed to set, but the moon is already rising in the east. Its pale and silvery light cannot yet make itself apparent, but after the sun has set our satellite will become the mistress of the sky and shine forth in all the pale beauty of her borrowed radiance. The sun is disappearing now below the horizon as a ball of fire, and the few clouds around are getting redder and redder and hold forth the promise of a fine morrow. The light is now gradually fading in the western sky, and most of the birds which love the daylight have already retired to roost. The Butterflies we have seen during the day have gone to sleep on some favourite flower-stalk, and the wild Bees have either gone to rest in their nests or in some flower, where they find a warm spot during the comparatively chilly hours of darkness.

But no sooner has the daylight-loving life retired than their places are filled by an army which live and move during

Fig. 73. Young Cuckoo 14 days old.

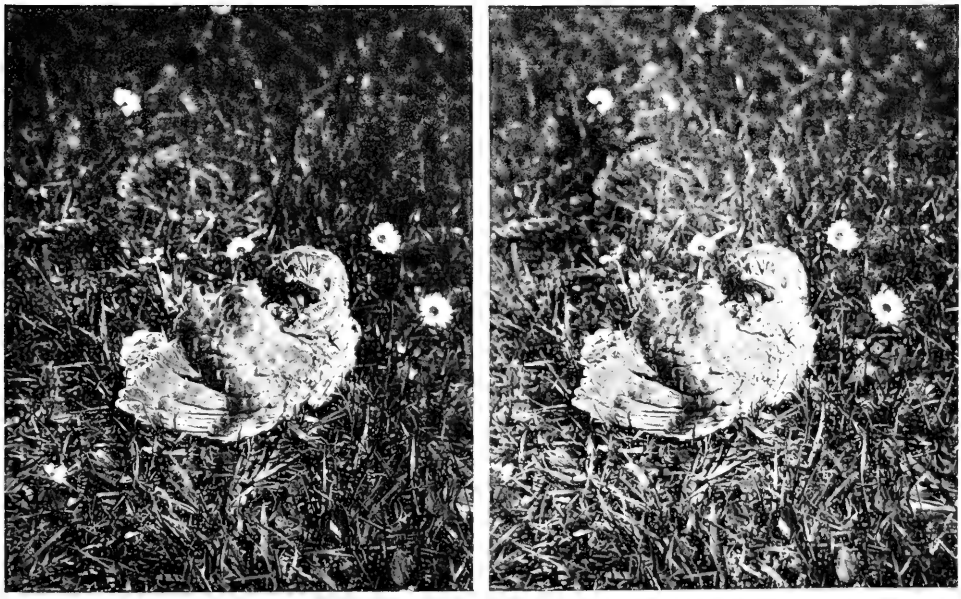

Fig. 74. Young Cuckoo 14 days old.

the hours between sunset and dawn. The Rabbits are already busy in their gambols, the Bats and Moths are continually flying by, and the Owls will now be quartering the fields on the look-out for Mice. All Nature sleeps; but not at the same time; and so the cycle goes on. But we must not stay to dream: we have our train to catch; let us be moving.

CHAPTER XII

SOME CURIOUS NESTING PLACES

I PROPOSE to devote this chapter to the description of a few curious nesting places which have come under my notice from time to time. Some of the examples given are also illustrated.

The Robin can easily take first place in the great variety of situations in which the nest has been found. Numbers of instances have come under my notice of the nest being built in some old tin on the ground or in a can or old pot placed in a tree; in an old shoe; in a church porch; in a flower-pot or basket in the greenhouse or potting-shed, etc. Figs. 56 and 57 show the site and nearer view of a Robin's nest built in an old cupboard hanging on the wall of the boiler-room in the basement of the Town Hall, Eastbourne. Two consecutive broods were brought up in the same nest during the season, the parent birds entering and leaving the room through a window which was left open for their convenience. The nest was discovered quite accidentally by a workman who was searching for something which had been mislaid. He was about to place his hand in the cupboard when the sitting bird flew out, much to his surprise. Another instance of the Robin's familiarity with human beings is given in the next example, which occurred in the elementary school at Crawley Down, Sussex. The Robin, which had been fed by the children during their luncheon hour, became so tame that it often entered the school during lesson time, and would sit on

one of the tie rods running across the room and sing to the children, much to their delight. Some time after the schoolmaster continually noticed dead leaves about the floor, and endeavoured to find out who was bringing them in, but without success. By and by, however, he discovered it was the Robin, which was building its nest in the folds of a curtain thrown up over one of the tie-rods. The nest was left undisturbed and the young birds were hatched out successfully. Fig. 58 shows the curtain in the schoolroom with the temporary platform erected for the camera, and Fig. 59 a view of the nest, which at the time the photograph was taken contained six young birds ready to fly. After the brood had flown the same Robin built again in the school library amongst the books, as shown in Fig. 60, and more curious still a third nest was constructed in another curtain folded up in a similar way to the other. The existence of this nest, however, was not known, until the curtain was taken down, when the nest and eggs fell out. The fact of three nests being built by the same bird in the same schoolroom during the same season and while the children were there day after day is, I think, rather remarkable.

One day a person went to attend to some flowers on a grave and was startled by seeing something escape which she took to be a Mouse. Further search revealed a Robin's nest built under the wreath, and at the time the photograph was taken the young birds were just hatching out. While engaged in taking the photographs of this nest, I saw in the cemetery-keeper's garden near some young Thrushes in a cage, and while I stood watching them the parent bird came several times and fed them through the wires of the cage, and I afterwards obtained a photograph of it doing so, Fig. 62.

The old hat containing a Robin's nest, shown in Fig. 65, was hung up on the door of a shed at a railway station by a man when leaving work at midday on a certain occasion. The next time he went, intending to use the hat, he found the nest partially built in it and, I am glad to say, did not disturb it, but obtained another hat and left the birds eventually to hatch out their brood safely.

A Robin commenced to build its nest by the side of the clock on a mantelshelf of a drawing-room. Owing to the litter, etc., caused by the bird the nest was cleared away, but another was soon commenced, and on this meeting with a similar fate to the first a third one was started. This was also cleared away, and the window of the room was then kept closed to prevent the bird entering again.

Next to the Robin, perhaps the Great Tit is one of the birds most likely to choose an odd situation for its nest. In the example illustrated (Figs. 63, 64) the nest was built in an old rhubarb-pot which had a piece broken off the lid. The birds entered and left the nest through the hole thus formed. When the photograph was taken there were nine young birds ready to fly and two dead ones in the nest. The amount of material comprising the nest measured eleven inches in diameter and was five inches high. On several occasions two nests of the Great Tit have been found in the same pot. Another nest of this species was built on the top of a Bee-hive. On account of the hot weather at the time, the small cap at the top of the hive cover had been removed for the purpose of allowing extra ventilation, and the hole thus left allowed the birds to make use of it for the purposes of entry and exit. This same hive also contained a Mouse's nest. When these nests were discovered they were both abstracted by the owner of the hive,

Fig. 75. Young Cuckoo 14 days old.

Fig. 76. Empty Nest of Sedge Warbler after young Cuckoo had flown

who not unnaturally considered both Tits and Mice undesirable tenants, and no doubt this action gave considerable satisfaction to the rightful owners of the hive. The Great Tit is also fond of building its nest in the letter-box on the garden gate of a country house. One remarkable instance of a case of this kind, from the village of Rowfant, Sussex, is shown in the Natural History Museum at South Kensington, several nests built in successive seasons by apparently the same birds being exhibited. The letter-box on the garden gate of the schoolmaster's house at Crawley Down—where the Robin's nests already referred to were built in the schoolroom—contained a Great Tit's nest. After I had obtained a photograph of the bird on the nest by opening the door of the box at the back, she had to be lifted off the eggs before I could obtain another photograph showing them in the nest.

The following story was related to me by an old friend. Near his house in the country was a cottage called " The Box," which had been untenanted for some time. One day he told the members of his family that " The Box " had been taken. They were very curious, especially the lady members, to know who had taken it, and he was able to inform them it was a young married couple. This only increased their curiosity. At last he had to explain to them that he meant the " box " on the garden gate, which was tenanted by a pair of Tits, which had built their nest in it. On another occasion a nest belonging to a pair of these birds was built in a letter-box at the gate of a farmhouse. The farmer told me that two broods of young birds had been reared annually in the box, with few exceptions, for thirty years! For the bird's convenience another box—it was a Cadbury's cocoa box—was nailed to the fence to receive the letters so that the birds

should not be disturbed, and the box containing the nest was fastened by a chain and padlock so that no one could interfere with it.

The Blue Tit will also make use of a letter-box for its nest, but often chooses a *site* where the entrance hole is exceedingly small, and one wonders how the birds manage to get in and out. I once watched a pair of these birds feeding their young in a nest built in a hollow ball at the top of a railway signal post. The ball had become fractured and a small hole in it gave access to the interior. During the time I stood watching the birds I timed their visits, and found that one bird fed the young eight times in six minutes, which means that the two adult birds would pay one hundred and sixty visits to their young in one hour, and supposing they brought two grubs each time (which is a low estimate) it would mean the destruction of three hundred and twenty grubs in one hour. I had watched the birds during the morning, and on returning to the station later in the day was distressed to find that during my absence one of the porters employed at the station had climbed the ladder of the signal post and had taken out and killed seven of the young birds, " because they should not get at his fruit buds." He left in two others which he could not reach, and the old birds were still busy feeding these when I returned. I could not help expressing the hope that the grubs which the young birds he had killed would be unable to destroy might eat up all his buds and thus pay him out for his cruelty and mistaken zeal.

Another nest of this species was built in a lamp-post in the street of a County town. It had been built there for several years, and on account of the nuisance caused by boys throwing stones at the birds, the aperture at the top of the post was

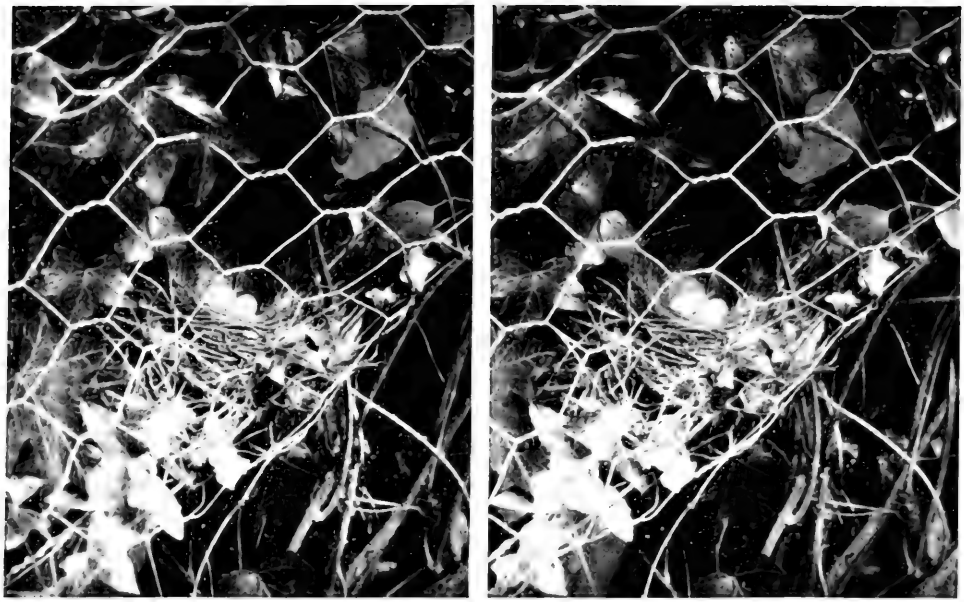

Fig. 77. Hedge Sparrow's Nest built behind Wire-Netting.

Fig. 78. Site of Nightingale's Nest

stopped up by a block of wood. During the following season the birds could not get in, but the block shrunk during the year, and the next spring the nest was again built in the post.

In the same garden which contained the Great Tit's nest in the rhubarb-pot, I also found a Blackbird's nest containing the very unusual number of eight eggs. The nest was near the centre of a large bush growing over a pond, and I feel certain had not been tampered with in any way. (Fig. 61.) Seven young birds were successfully hatched from the nest.

The Swallow often builds its nest in very odd places. One of the most curious which has come under my own notice is the example shown in Fig. 67. This was built on a tendril of ivy growing through the roof of a coach-house belonging to a large school in Eastbourne, and as may be seen by the illustration was attached in a remarkable way to the stem of the plant.

The nest of the Common Wren shown in Fig. 68 was built in a waggon rope hanging in a stable and looked exactly like a little wisp of hay. Notice how the peculiar way in which the ends of the hay project from the nest adds to this similarity.

A farm labourer who allowed me to roam about his large garden told me that one day he went into it and, while standing under a tree containing an old coat, which he had placed up as a scarecrow, he thought he heard the notes of young birds. He examined the tree but could not find any nest, and after a while traced the sounds he heard to the coat. On making an examination of the latter, he found a nest of young Sparrows in the top of the coat just inside the sleeve, and a Blue Tit's nest at the lower end of the same sleeve. Both birds had lined their nests with the stuffing of the coat picked out from the seam at the shoulder.

The House Sparrow inhabiting towns will often select a

curious place to build its nest in. Some time ago I obtained a photograph of a nest belonging to this bird which was built under the plumes of the hat of the equestrian statue of Lord Strathnairn at Knightsbridge, London. There was also at the time another nest built under the horse's tail. I have observed a nest under the plumes every season for some years past.

A Starling used to build its nest in the mouth of a cannon at Windsor Castle, and another remarkable instance of a choice of a nesting site by this bird was related to me by a friend. In his brother's garden a pair of Starlings tried to build their nest upon the inclined top of a wall. The materials placed there would not remain, however, owing to the slanting surface. The birds repeatedly tried, without effect, to obtain a lodgment for the foundation of the nest, and eventually solved the difficulty by building a buttress against the wall, commencing on the ground and carrying it up to the top level with the place they had been trying to make use of previously; and on the top of this buttress the nest was constructed.

The nest of the Hedge Sparrow shown in Fig. 77 was built behind some wire netting. As there was a cat on the premises no doubt the bird had selected this position for greater safety from pussy.

Examples of the selection of curious sites similar to those mentioned are continually occurring, and the Nature Photographer who is on the look-out for such will be able to make an interesting collection of photographs in the course of a few seasons.

Fig. 79. Nightingale on Nest.

Fig. 80. Nightingale's Nest.

CHAPTER XIII

THE FIRST THREE WEEKS IN THE LIFE OF A CUCKOO

SOME years ago, during one of my rambles for the purpose of Nature Photography, a man with whom I was acquainted brought two eggs to me, which he had taken from a nest not far away, with the request that I would tell him to what bird they belonged. I informed him they were the eggs of a Sedge Warbler, and expressed a wish to see the nest from which they were taken. This was on the eleventh of June. Having described the *site* of the nest to me, he said he had left four eggs still in it, and I set out to search for it. On discovering it, I was both surprised and pleased to find that one of the four eggs left belonged to a Cuckoo. This egg was, of course, larger than those of the Sedge Warbler, but the colour of it was very similar, and on removing it from the nest for examination the shell began to crack, the egg being just on the point of hatching. I immediately replaced it in the nest and, although the light was failing, managed to obtain a photograph of the nest with its contents, and showing the puncture made in the egg shell by the bill of the young Cuckoo.

Six days after, namely on the seventeenth of June, I again visited the nest and found the young Cuckoo had hatched and was the sole possessor of the nest. The three eggs of the Sedge Warbler had been thrown out, and one was resting on the side of the nest as seen in the photograph. The other two I found in the ditch below, and on breaking one to ascertain how far incubation had progressed, found the young bird

had been just ready to hatch when the egg was ejected, but was then dead. The young Cuckoo was six days old and still blind. I photographed it in the nest and have regretted since that at the time it did not occur to me to replace the eggs and witness the act of the young Cuckoo in throwing them out. While engaged in taking the photograph and using the point of my stick to keep back some of the long rushes which were in the way, the hen Sedge Warbler rushed down on one occasion and attacked the end of my stick, uttering harsh notes of rebuke for my interference. I took the young Cuckoo out of the nest and placed it on the grass near, by the side of a common Daisy, for the purpose of providing a scale, and the photograph obtained clearly shows the hollow in the back of the young bird and its strong legs.

My next visit was on the twenty-fourth of June, a week later, when the bird was twelve days old, and its size had increased enormously since my last visit. I again photographed it in the nest and on the grass in the same place as before (*see* Figs. 72 and 74). When I arrived at the spot on this occasion, I found the Sedge Warbler sitting on the edge of the nest beside the young Cuckoo, and it was most comical to see the foster-parent brooding over, or, perhaps, I ought to say trying to brood over, a young one quite three times her own size. The young bird was at this time very pugnacious and pecked violently at my stick when placed near it. It had also a curious motion, moving up and down in the nest and puffing out its feathers, with the idea, I suppose, of frightening me. I was able to obtain a photograph of it in one of these attitudes in the nest, and other exposures were made on it after it had been taken from the nest and placed on the top of a gate-post near by.

On the fourth of July, three weeks after it was hatched, I again visited the site and found only the empty nest. While walking near the river, about a quarter of a mile from the site of the nest, I saw a bird with food in its bill, which I thought it might be carrying to its young somewhere near me. On remaining still to watch I was agreeably surprised to see this bird fly into a small copse quite close to me, where I then noticed the young Cuckoo sitting on a branch evidently waiting to be fed. I saw both the foster-parents feed it several times, one of them being the bird I had seen flying across just previously. After the young Cuckoo had been fed it flew into a thicker part of the copse and was lost to view. I was, however, glad to find it had flown safely from the nest without any accident having happened to it, notwithstanding the experiences it had suffered at my hands of having to sit several times for its portrait. Perhaps it may have caught sight of me and, recognising me from previous acquaintance, thought it prudent to beat a hasty retreat.

I will conclude this chapter with a few notes concerning the adult Cuckoo, one of our most interesting birds. The Cuckoo is a summer visitor to Great Britain, Europe, and Asia, migrating southwards in winter as far as South Africa and Australia. It arrives in this country generally about the middle of April, the males preceding the females by a few days. There is a local tradition in Sussex that the bird is taken in a sack to Heathfield (locally pronounced *Hefful*) Fair and there turned out. This fair is held on the fourteenth of April, and it is curious that in Sussex, at any rate, the bird is heard within a day or two of this date.

Mr. William Borrer, in his *Birds of Sussex*, says: "Having kept notes of the arrival of the Cuckoo in this county for more

than thirty years, I find the earliest to have occurred on the sixth of April, 1844, but about the fourteenth is the more usual date."

Every season records are published of the Cuckoo having been heard in this country in March, or even February and January. In my opinion, if the Cuckoo was heard, it belonged to the *genus homo*, and to this individual the name is particularly appropriate, as it means a simpleton or fool. The local name of *Gowk*, also applied to the bird, means the same thing. Both the Sparrow-Hawk and the Kestrel bear a close resemblance to the Cuckoo in flight, size, and length of tail; and there is not much doubt that the early records of supposed Cuckoos are really one or other of these birds which have been mistaken for it. There is an old fable, one of many referring to this bird, that it turned into a Hawk during the winter, and no doubt that is the reason it is even now persecuted by some game-keepers, "who," says Charles Dixon, "knock it over with an oath, and fill its tuneful yellow bill with blood, because it not only looks like a Hawk, but he is 'sartin sure' that it turns into one for the winter!"

The well-known cry of two notes is uttered both by the male and female bird in flight, as well as from a perch, and during the early part of the season may be heard at all hours of the day and night. There are numerous popular rhymes relating to the bird; one is as follows:—

In March he leaves his perch,
In April come he will,
In May he sings all day,
In June he changes his tune,
In July he's ready to fly,
Come August, go he must,
In September, you'll him remember,
But October, he'll never get over.

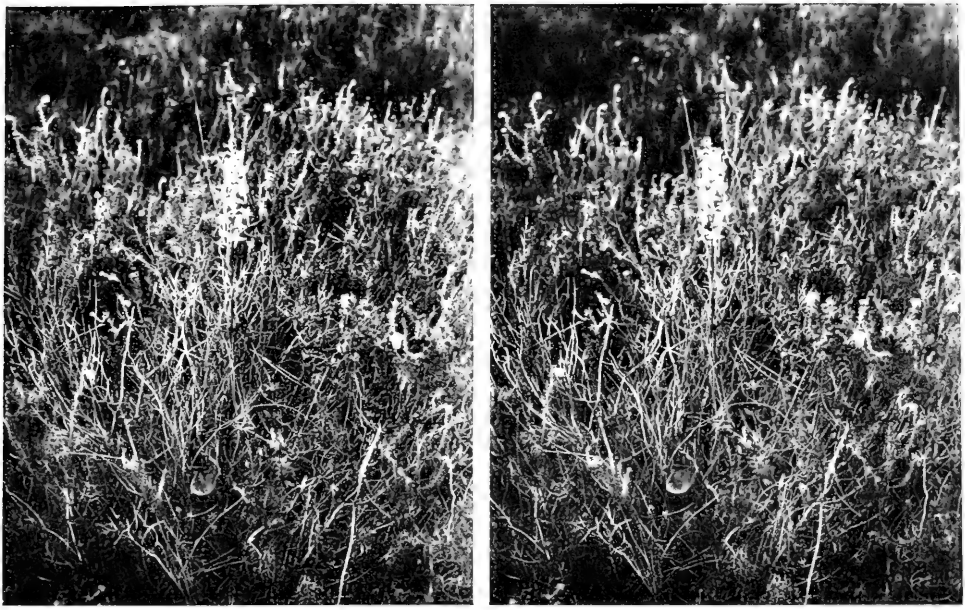

Fig. 81. Butterfly Orchis.

Fig. 82. Dandelions.

There are many passages in Shakespeare, Milton, and other great poets, referring to the bird, and there belongs to the last century an "Ode to the Cuckoo," of disputed authorship,[1] one of the most beautiful pieces in our language.

The Cuckoo makes no nest of its own, but places its egg in the nest of some other bird, leaving the foster-parent to hatch it. The egg is laid upon the ground, and is carried by the bird in its bill and placed in the nest chosen. I have found nests containing Cuckoo's eggs where it would have been quite impossible for the egg to have been laid in the nest in the usual manner. The size of the egg is remarkably small for the bird, and the nests chosen by the Cuckoo to receive it vary remarkably, as many as one hundred and twenty different species having been given. The list is too long to quote here, but I might mention, amongst the more curious, the Missel Thrush, Song Thrush, Blackbird, Starling, Jay, Magpie, Jackdaw, Green Woodpecker, Ring Dove, Stock Dove, Turtle Dove, and Little Grebe. The nests generally chosen are those of the Meadow Pipit, Hedge Sparrow, Pied Wagtail, Robin, and Reed Warbler.

The colour variations of the egg can only be described as extraordinary; in many cases the likeness to the eggs in the nest in which it is placed is so perfect that it might be taken for a slightly larger egg of the foster-parent. British specimens are usually of one of two fairly distinct types, that is to say, the markings are either greyish or brownish. On the continent blue eggs are found, and in the wonderful series of eggs exhibited at the Natural History Museum, South Kensington, where they are shown with the clutches of the foster-parents in the nests, there are three examples of blue eggs,

[1] Cf. *Brit. Quart. Rev.* lxi. pp. 500-513.

laid in the nests of the Hedge Sparrow, Redstart, and Pied Flycatcher, which also lay blue eggs.

Borrer, in his work already referred to, says: " I took one at Cowfold, from a Hedge Sparrow's nest, which was as large as that of the Alpine Accentor, and of the same colour as that of the Hedge Sparrow, of which I at first thought it was a double-yolked specimen, which it was not, and several naturalists agree with me that it is that of a Cuckoo." It is thought by some that the blue stage is in process of formation in this country, and that the grey type, usually found in the nest of the Hedge Sparrow, will be developed in course of time into the blue variety.

Many other interesting points must be passed over for want of space. We are indebted to the celebrated Dr. Jenner for the discovery of how the young Cuckoo turned out the young birds or eggs belonging to the nest in which it was hatched. This was related by him in a letter to John Hunter, who communicated the facts to the Royal Society. (*Phil. Trans.* 1788, pp. 219-237.) Jenner's account was doubted by some of his contemporaries, but has now been fully confirmed, and photographs have been published showing the act in operation.

It was on the 18th of June 1787 that Dr. Jenner examined a Hedge Sparrow's nest, which then contained a Cuckoo's egg, and three eggs of its owner. Inspecting it the next day he found therein a young Cuckoo and a young Hedge Sparrow; and as it was so placed that he could distinctly observe what went on in it, he, to his astonishment, saw the former, though so lately hatched, in the act of turning out its companion: " The mode of accomplishing this was very curious: the little animal, with the assistance of its rump and wings, contrived

Fig. 83. Larvæ and Cocoon of Puss Moth.

Fig. 84. Emperor Moth (female).

to get the bird upon its back, and, making a lodgment for the burden by elevating its elbows, clambered backwards with it up the side of the nest till it reached the top, where, resting for a moment, it threw off its load with a jerk, and quite disengaged it from the nest. It remained in this situation a short time, feeling about with the extremities of its wings, as if to be convinced whether the business was properly executed, and then dropped into the nest again. With these (the extremities of its wings) I have often seen it examine, as it were, an egg and nestling before it began its operations; and the nice sensibility which those parts appeared to possess seemed sufficiently to compensate the want of sight, which as yet it was destitute of. I afterwards put in an egg, and this, by a similar process, was conveyed to the edge of the nest and thrown out.

"The singularity of its shape is well adapted for these purposes; for, different from other newly hatched birds, its back, from the scapulæ downwards, is very broad, with a considerable depression in the middle. This depression seems formed by nature for the design of giving a more secure lodgment to the egg of the Hedge Sparrow, or its young one, when the young Cuckoo is employed in removing either of them from the nest. When it is about twelve days old, this cavity is quite filled up, and the back assumes the shape of nestling birds in general."

The adult Cuckoos usually leave this country before the end of July, but the young birds of the year, notwithstanding the fact that they have never crossed the water, do not leave until quite a month later, and then undertake their long journey all alone.

Gilbert White, in *The Natural History of Selborne*, says:

"A countryman told me he had found a young Fern-Owl in the nest of a small bird on the ground, and that it was fed by the little bird. I went to see this extraordinary phenomenon, and found that it was a young Cuckoo, hatched in the nest of a Titlark; it was become vastly too big for its nest, appearing—

. . . in tenui re
Majores pennas nido extendisse,[1]

and was very fierce and pugnacious, pursuing my finger, as I teased it, for many feet from the nest, sparring and buffeting with its wings like a game-cock. The dupe of a dam appeared at a distance, hovering about with meat in her mouth and expressing the greatest solicitude."

Here we must leave the subject, but the reader who is interested will find much further information concerning the Cuckoo in *Yarrell's British Birds*, from the pages of which I have extracted some of these notes.

[1] To have stretched its wings beyond the little nest.

Fig. 85. Burnet Moths and Cocoons.

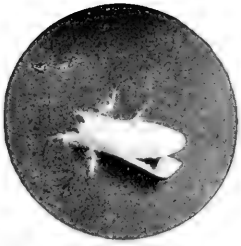

Fig. 85a. Brown-tail Moth.

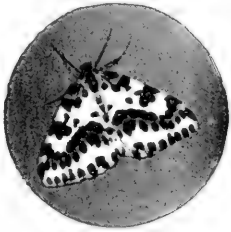

Fig. 85c. Magpie Moth.

Fig. 86b. Red Admiral Butterfly.

CHAPTER XIV

NIGHTINGALE LANE

DURING a favourite walk down a familiar lane about the end of the month of May, I saw a Nightingale with a leaf in her mouth and, feeling sure she was nest-building not far off, stood still to watch her. Having observed her go several times to the same spot in the hedge, I went up after she had left the place and found what was undoubtedly the foundations of a nest just commenced in a bramble. On visiting the spot again ten days later, I found the nest finished and containing four eggs; and a photograph of it was taken. After another interval of eleven days, during which period I had once or twice passed the spot and had seen the bird sitting on the nest, another visit was made. This time I found three young birds in the nest, the fourth egg being on the point of hatching. Three days later I paid another visit and found the four young ones in the nest. On this occasion I succeeded in obtaining a photograph of the hen bird on the nest, through a hole in the hedge. The photograph was obtained without covering or hiding the camera in any way. The exercise of patience, coupled with quiet and steady movements, will often enable the photographer to do many things otherwise impossible. A good deal of light was cut off from the nest by the overhanging foliage of the hedge, and a time exposure was therefore necessary. The bird enabled me to give this by remaining perfectly still, the newly-hatched young in the nest contributing,

no doubt, largely to this result, by making their mother loth to leave them. I then left the spot for several hours, returning in the afternoon, when the sun was shining into the hedge, helping to light up the vicinity of the nest. Exposures were made on the young birds, but, on account of their movements, instantaneous ones were necessary, and the resulting negatives were not as good as I could have wished. A view of the lane was also taken, showing the *site* of the nest. This illustrates a point I have mentioned elsewhere as to the advisability of obtaining, when possible, a series of views of the same subject. In this case, for instance, photographs were taken showing the *site*, the nest and eggs, the hen bird on the nest, and the newly-hatched young ones.

The Nightingale, that "prince of songsters," must be a favourite with every true Nature lover, since its delicious melody is unequalled throughout the whole of the bird world. It is a spring migrant, that is to say, it comes to us in the spring and leaves us again for more southern climes in the autumn. It appears to be very strangely spread over England, there being some parts, for instance, west of the Exe, and north of York, where it never breeds. It is also unknown in Scotland or Ireland. It is impossible to describe the thrill of pleasure caused by listening to its notes poured forth during the twilight of some delightful still evening in spring or early summer. The song when heard in the daytime loses somewhat in effect, because it then becomes a part of the general chorus. In the evening—when nearly all other birds are silent—the song of this minstrel of the grove may be heard in all its beauty.

The male birds arrive in this country about ten or twelve days before the females, and during this period they appear

to sing almost continuously day and night. When the females arrive pairing commences, and a site is selected for the nest, which is constructed principally of dead oak leaves and a little dry grass and lined with horsehair. It is generally placed on or near the ground in a hedge or small plantation, and is very difficult to find. The eggs number from four to six; they are olive-coloured, matching closely the dead leaves around, but occasionally they may be found of a bluish shade. It is said the bird seldom sings after the eggs are laid, and after they are hatched never; and I am inclined to think this is practically true. When the young are hatched both the parent birds are very attentive to them, and a curious alarm note, something like a hoarse croak, is uttered if the nest is approached too closely.

The Nightingale is a near relative of the Robin, and the young of both species have spotted breasts, showing their close connection with the Thrush family. In habits, also, the Nightingale is somewhat similar to the Robin, excepting that the latter is much more familiar with human beings. The Nightingale, on the other hand, is of rather a shy nature, but I have, notwithstanding, been able on many occasions to get within a yard or two of it while it was singing, by cautiously approaching it, and have seen its little throat vibrating in the ecstasy of its song. But with the slightest indication of movement on the part of the observer the bird will fly a short distance away to a more secluded spot, if it finds itself watched, and there, after a short interval, will recommence its song.

The birds seem to return to the same haunts year after year, and in the particular lane mentioned above, I have found the nest, with few exceptions, season after season for some years past. Sometimes in the northern part of England,

where the bird is not so plentiful as in the south, special trains are run to enable the people in the large towns to visit a locality where the bird has appeared, for the purpose of hearing its song. I have also heard of a case where a certain individual living in the south of England gave up a country house on account of the number of Nightingales in the vicinity. This individual was unable to sleep owing to their continuous song during the night. These two instances serve, perhaps, to show how differently the song may appeal to different persons.

The bird is a special favourite of mine, and I have been fortunate enough to live all my life near its haunts, where it is particularly numerous. I have often, during a short walk in the spring, heard as many as six or eight different birds singing. In years gone by the Nightingale used to be caught and kept in a cage, where, however, it soon pined away and died. The Bird Protection Laws, now in force in many places during the whole year, have doubtless put an end to a great deal of this sort of thing, and have benefited, not only the Nightingale, but many other birds; and indirectly all Nature lovers who delight to hear the songs of our wild birds, and who would sorely miss the songsters from their accustomed haunts.

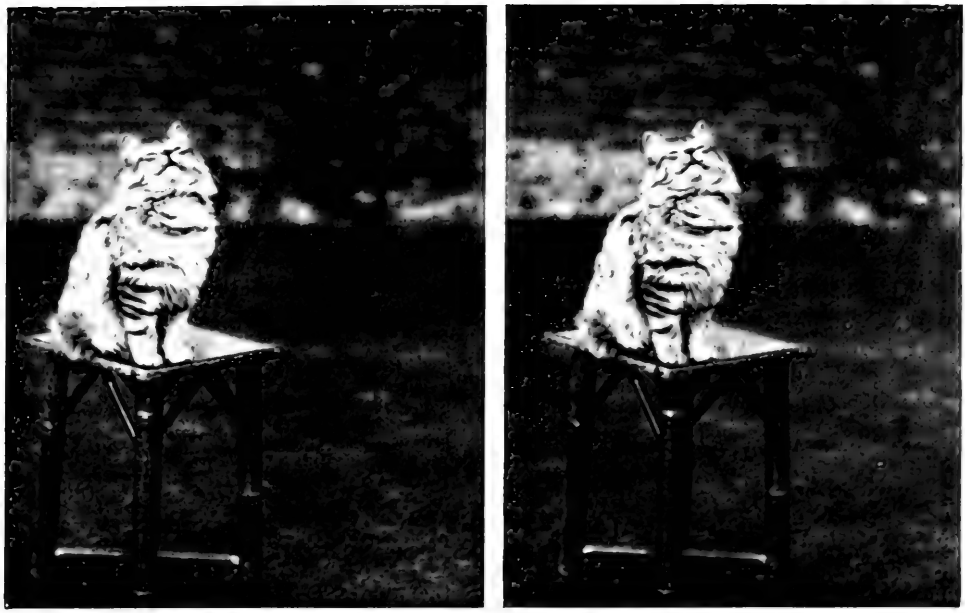

Fig. 87. Hark! the Lark.

Fig. 88 Common Toad.

CHAPTER XV

THE PHOTOGRAPHY OF ANIMALS, INSECTS, AND FLOWERS

In the following chapter I propose to say a few words about the photography of Animals, Insects, and Flowers. I am quite aware, however, that it will be impossible to deal at all adequately with these branches of work in this book. To do justice to either would require a separate volume.

Considerable space has already been devoted to the photography of birds and their nests and that for two reasons. The study of birds has always appealed very strongly to myself, and the nests, being stationary objects, will allow the beginner to spend the necessary time in dealing with them to enable him to gain a large amount of experience, which, while helping him to become more expert in his work, will also prove of considerable value to him when dealing, later on, with more difficult subjects. Birds' nests are, therefore, very suitable subjects to commence with.

But it has already been stated that the nesting period is confined practically to about three months only out of the twelve, and the Nature Photographer will require other material to deal with during the remaining nine months if he desires to continue his work throughout the year. Subjects may, of course, be found even during the winter, but the majority of workers will probably confine their attention to outdoor work for about eight months in the year, say from March to October. During very severe weather, or when

snow is on the ground, birds will become tamer on account of hunger, and if fed at regular intervals will collect in numbers ready for the expected meal. At such times good studies of them may sometimes be made, but as in the winter the days are very short and the light of very little actinic power, the worker who has only limited time at his disposal will probably not have the necessary amount required during the middle part of the day, the only period when the light is good enough for short exposures.

During the season when the days are short and, as a rule, dull, the majority of workers will no doubt prefer to engage in work which may be carried on indoors, such as the making of lantern slides and enlargements, or the arrangement, storing, and cataloguing of the stock of negatives obtained during the past season. One of the best methods of doing this is to keep each negative in a separate envelope, which bears on the outside of the flap the title, with particulars of exposure, etc., and also an identifying number. If these be arranged upright on a shelf in numerical order, and a catalogue of them made, any one can easily be found. One advantage of this method is that each negative need only be handled when required, and a system such as this will thus tend towards the prevention of accidents. Even the most careful worker will be likely to experience the mortification of breaking a favourite negative at times if his stock is on glass plates; but any methodical arrangement will help to reduce this possibility to a minimum.

PHOTOGRAPHING ANIMALS

Animals may be divided broadly into two classes, domestic and wild. In the latter I include such species as Rats and

Mice; the Weasel, Stoat, Squirrel, Mole, Hedgehog, and Bats; also the Hare and Rabbit, which have not been domesticated. The majority of these are nocturnal in their habits, and on this account, in addition to their shyness, it is almost impossible to photograph them in their natural wild state. They may, however, be brought home when captured, to be dealt with by what has been called by Mr. Douglas English, one of our most successful workers, the "control" method. Full particulars for this kind of work are given by him in *Photography for Naturalists*, and all who wish to specialise in this branch will find the necessary information therein. The results he has obtained amply prove the value of his methods, results which I have no hesitation in saying could not be obtained in any other way.

A visit to a farmyard or its immediate vicinity will give plenty of opportunity for obtaining photographs of the domestic animals, etc., and this class will be far more easily accessible to the beginner, who will have plenty of scope in trying his hand at Horses, Cattle, and Sheep, not to mention the Fowls, Ducks, Geese, and Poultry generally. Many of these subjects will also allow of being treated in a more or less pictorial manner, which will serve to bring the artistic powers of the photographer into play. The experience gained, also, will be of useful service to him when engaged on work connected with the wilder animals.

As the majority of the subjects are of a large size the photographer will be able to work at a greater distance from his subject, and will find, as a rule, instantaneous exposures may be given; by this I mean those between, say, the one-fifth and the one-twentieth of a second. In some parts of Sussex, Oxen are still used for ploughing and carting corn, etc., and

make interesting studies. I am afraid the numbers used in this way are rapidly decreasing, and no opportunity which presents itself of securing records of these or other similar subjects, which are fast disappearing from amongst us, should be neglected.

Dogs and Cats and pets generally make good subjects, but will often sorely try one's patience in the endeavour to secure a striking likeness and characteristic attitude. But they will, at least, provide interesting material within easy reach for those who have not the time to go further afield. An endeavour should be made to obtain the distinctive features of the animal in the photograph, as the value of the latter will depend to a considerable extent on the degree of success which has attended these efforts.

If the photographer can obtain access to a Zoological Garden he will find plenty of subjects there, provided the light is good. Most of this work will be best done with a hand camera, and unless the animals are too tame or curious and come right up to the bars of the cage the lens can be placed between two bars when making the exposure, thereby avoiding any chance of showing these in front of the animal.

THE PHOTOGRAPHY OF INSECTS

This branch of work, although a fascinating one, is not altogether easy on account of the small size of many of the specimens which will have to be dealt with. There is ample work to be done, however, by any one who takes an interest in the study of insect life, and every student of Nature should at least know something of the marvellous changes some insects, such as Butterflies and Moths, undergo in passing from

Fig 89 Young Common Sandpipers Crouching

Fig 90 Kentish Plover's Eggs

the egg stage through those of caterpillar and chrysalis to the perfect state. To do this, a certain amount of study must be devoted to Entomology, but the beginner who wishes to take up this kind of work may be fortunate enough to have a friend who will be willing and probably pleased to help him, and who will also be able to provide him with as much material as he desires. He in his turn, if a good photographer, may often be useful to his scientific friend by photographing for him many of his more valuable and interesting finds.

The largest insects we shall be called upon to deal with in this country are the Death's-Head Moth among the *Lepidoptera,* and the Stag Beetle among the *Coleoptera,* and these are very giants compared with some of the members of the order *Insecta.* Perhaps, on the whole, this is a thing to be thankful for rather than otherwise.

Butterflies and Moths and their larvæ will give us a number of interesting specimens to work from, and as many species as possible should be systematically dealt with by obtaining of each one a series of photographs showing the development of it through its metamorphoses from the egg to the perfect state. During the spring the larvæ of many species may be found upon their food plants. The best way to discover them is to go round the hedges and herbage in likely spots with a lantern after dark, when the majority of the larvæ feed, and collect as many as required, which can be taken home and photographed at leisure. Be careful when doing this that the caterpillars are placed upon the *right* food plant, as it would spoil the scientific value of the photograph, however good it might be otherwise, if this were not attended to.

Instructions on rearing larvæ hardly come within the scope of this book. The subject is fully treated of in *The Lepidop-*

terist's Guide, by H. Guard Knaggs, which is crammed full of information useful to the entomologist, and may be purchased for the sum of one shilling.

As most subjects of this kind will have to be done nearly or quite life size, the camera must extend to at least twice the focus of the lens used, and allowances must be made, as I have already explained in a previous chapter, for the increase of exposure required under such circumstances.

Many of the larger Beetles and the Dragonflies, Bees, Wasps, and Flies make interesting subjects also, but for many of the smaller insects the camera will require the assistance of the microscope. This branch of work cannot, however, be considered here.

PHOTOGRAPHING FLOWERS, ETC.

Whatever branch of work the Nature Photographer specialises in he will be continually meeting subjects which are worthy of having a plate exposed upon them, although perhaps not immediately connected with his own particular line of study. He may be out birds'-nesting, for example, and come upon a hawthorn in the full beauty of its white blossom looking as if covered with snow. He will in such a case, no doubt, wish to include a study of a subject such as this amongst his exposures made during the excursion.

The early spring flowers carpeting the woods often appeal irresistibly to us during the period of their beauty, and perhaps later on we may find an extra nice group of field daisies or foxgloves which we do not wish to pass over without a record to remind us of its beauty, and the pleasure the sight of it gave to us.

The large Mushroom shown in Fig. 51 was seen from the train window during a railway journey. The following week I happened to be travelling over the same ground again and was rather surprised to find it still there. It was in a field bordering the line, and being also not far from a station I obtained permission to walk along the line to the spot. Several exposures were made on it, after which I took its measurements. These I found to be fourteen and a half inches across the greatest diameter and seven inches high.

The photographer who does much botanical work will require a tripod which can be used at a very short distance above the ground, because the majority of the subjects are under three feet in height and a good many do not exceed six or eight inches. Focussing will often have to be done, therefore, under difficulties, and another drawback will be the prevalence of wind, especially in districts near the sea-coast. I think I may safely say the wind has given me more trouble than anything else during my experience of photography, and there are *very* few days throughout the year when the atmosphere is quite still. We go out, perhaps, on a day which we think, before starting, is a still one, but find on trying to photograph a head of blossom on the top of a delicate and fragile stalk what a *little* breeze is necessary to make it vibrate sufficiently to prevent us obtaining a sharp image. This may be got over to some extent by working during windy days in a wood or some other sheltered spot, if we can find the necessary material there to deal with, or by carrying specimens home to make studies of them indoors, where the wind ceases from troubling. I much prefer, however, to photograph them *in situ* whenever possible. The early morning and the evening are also times when the air is often much stiller than it is in

the middle of the day. So that those who find the wind troublesome must develop the good habit of early rising.

I have already advised that orthochromatic plates be always used, and it is not necessary to repeat this advice except to say that in Flower Photography they are more than ever required. In my own practice, I have not found it necessary to use a yellow screen, unless the subject contains a large amount of blue. The disadvantage of a screen is that it prolongs the exposure, which we often find difficult to cut short enough on account of movement due to wind or other causes. At times it is possible to give a series of intermittent exposures, if a shutter is used which can be worked automatically and without re-setting. When the subject will permit, the shutter can be opened during a comparatively short period of stillness and closed again on the slightest indication of movement. This may be repeated as often as necessary until the full time of exposure required has been given. In a case of this kind extra precaution should be taken to see that the tripod and camera are quite firm, or movement of a more serious character may be the result.

In dismissing from further consideration the important subjects treated of in this chapter, and which have been dealt with in such a fragmentary fashion, it may perhaps be observed that the beginner who has really been an earnest student of Nature will soon obtain, from the almost boundless mass of material available, a valuable store of information and knowledge first-hand from his own practical experience, which is, after all, the best teacher.

CHAPTER XVI

PROTECTIVE COLOURATION

I DESIRE to draw the attention of the reader to a brief consideration of the intensely interesting subject of protective colouring which occurs in many forms of life. The student will be sure to come upon a good many instances of it during the course of his own work. Personally I do not doubt that one of the laws of Nature is, as pointed out by the great Darwin, " the survival of the fittest." To put it another way, as bearing more directly on the subject under consideration, those animals or other forms of life which can conceal themselves best are the ones most likely to escape from their enemies, and to survive to perpetuate their species.

To give a few examples which are probably familiar to almost every one. Animals and birds which live in Arctic regions, and which have a dark or coloured coat or plumage in the summer, change this for one of a snowy white for the winter. The speckled plumage of the Ptarmigan and the brown fur coat of the Hare or the Fox which inhabit northern latitudes become white by the time the snow is on the ground. This change is brought about gradually, but it is not universal, only taking place in the higher latitudes before mentioned. The coat of the Fox, for instance, living in southern districts does not change. By this change the Ptarmigan and the Hare are more easily able to escape from their mutual enemy the Fox, but if the coat of the latter did not change, too, he would be likely to die of starvation, because his presence would

be observed before he had a chance to secure his prey. And so the protection thus afforded also helps him to survive in the struggle for existence which is ever going on in Nature.

Darwin has shown in one of his books [1] that the frequency of certain flowers in a district may depend upon the number of cats in the neighbourhood. The cats will catch the mice which, if not kept under, would destroy the humble-bees, which alone fertilise certain kinds of clover and other flowers.

But to return to the subject of "protective colouration" or "protective resemblance" as it is sometimes called. I have sometimes heard a person who was looking at natural history photographs observe that a certain nest, for example, did not show very clearly, or that they could not see the caterpillar or insect which the photograph was supposed to show. Personally I should take an expression of opinion of this character concerning my own work as a compliment, because objects such as these are not intended to show themselves clearly, and if they did so would be unnatural. The bird in building its nest endeavours to conceal it as much as possible, and if it be placed in a conspicuous position, as sometimes occurs, it is generally made to match its surroundings in such a marvellous manner that the very fact of being built in such an open spot often affords the needed protection by taking the majority of observers off their guard, and as they do not expect to find a nest in so exposed a place they do not look for it and it escapes detection.

The larvæ of some of the "Geometers" are known as "stick" caterpillars, and provide another excellent example of protective resemblance. These caterpillars fasten themselves to the stems of their food-plant by clasping it with

[1] *The Origin of Species*, chap. iii. p. 91.

their anal claspers, and then stick out their bodies perfectly rigid and make angles with the stems, to which they attach themselves similar to the angles made by the smaller stems. Their bodies also have swellings which look exactly like the natural nodes on the stalks themselves, and there are parts of a brown colour also looking exactly like the withered buds on the stalks of the food-plant. These caterpillars may be found by a careful search in the day time, in the positions mentioned, when they are resting. They feed at night, as do most other kinds of larvæ, and so have more chance of escape from the sharp eyes of the birds which hunt for them by day.

The Lappet Moth at rest looks exactly like a withered leaf both in colour and shape. It suspends itself from a stalk just as a dead leaf would hang, and is no doubt often passed over by its enemies. The Buff-tip Moth is another instance. When its wings are folded, the insect looks more like a short piece of stick cut obliquely than a moth, and this "protective resemblance" cannot fail to be of advantage to the species. The cocoons of the Puss Moth are exceedingly difficult to discover on the bark of the tree, especially as the larva before retiring inside fastens pieces of the bark on the outside of the case, and the whole is glued together so tightly that it forms a very effective protection from injury.

Many birds have dark plumage on their wings and backs and a lighter underside. Take the Lapwing, for instance. The upper surface of this bird is a greenish-black and the under surface is light. When it is resting on the ground the light from the sky falls fully on the upper surface and illuminates it, making it appear to the eye lighter than it actually is; while the underside is in shadow, appearing to the eye, therefore, darker than its own local colour. The effect of this is to reduce

the contrasts of tone, and the two surfaces merge, as it were, into one another, and the bird seems to become connected more or less with its surroundings. If the upper surface of the bird were light and its under surface dark the effect of the natural light and shade upon it would be still further to increase these contrasts, thereby making the bird more conspicuous than ever. The Ringed Plover, which runs about on the shingle by the sea-shore, is another similar instance of colouration, and many others might be given.

In the Natural History Museum, South Kensington, there is to be seen a model where the effects I have been endeavouring to explain are shown most perfectly. The model consists of two birds in a glass case, which are arranged in a certain light and coloured to show the different effect produced under similar circumstances to those just mentioned. The model was made and presented to the Museum by Mr. Abbott Thayer, an American artist, who is also a devoted student of wild life, and every one interested in Nature study should endeavour to see it.

But there are other considerations besides colour affecting this question, and changes of outline or form is one of the most important. The effect of a black or white band, or, for the matter of that, a coloured one also, will serve to " disconnect " and " break up " a continuous outline, and so serve to afford protection, especially if the object be some little distance away from the observer.

The young Lapwing shown in Fig. 17 has a white band or collar round its neck which serves to disconnect the head from the body, and so at a distance the young bird is more likely to appear as two separate objects instead of one. The young Sandpipers, too, in Fig. 89 have a dark line running along the

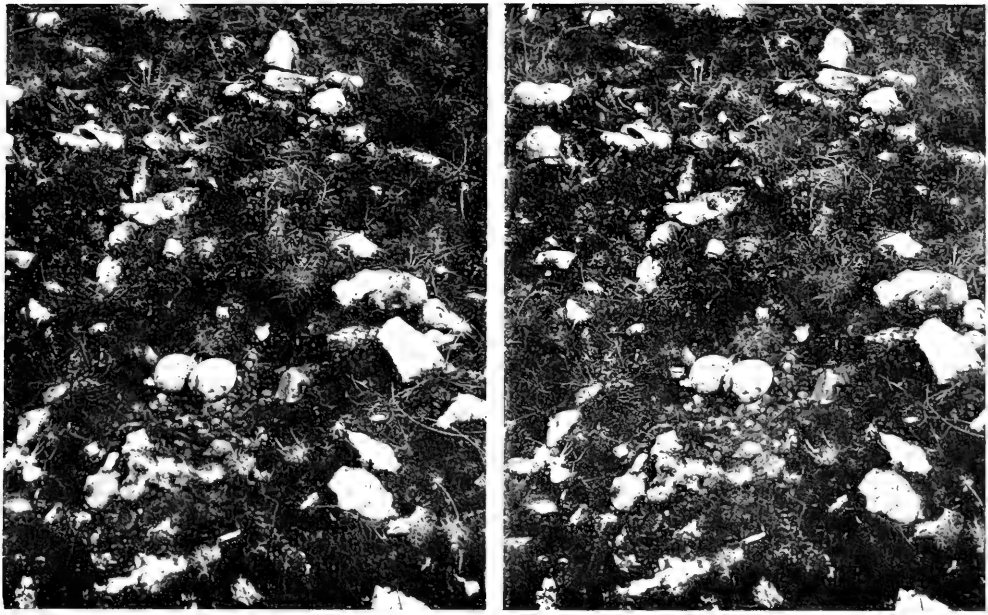

Fig. 91. Stone Curlew's Eggs *in situ*.

Fig. 92. Pheasant on Nest.

top of the head and the back. The birds, as will be seen by the illustration, endeavour to conceal themselves—when it is impossible for them to run into some hole or under some projecting ledge of a bank—by lying very close to the ground, either in a little natural hollow or between two stones, and probably the first thing about them to strike the eye of an observer would be this dark line. The eye would be likely to follow the course of this line, and in doing so probably overlook the shape of the bird itself.

Other examples illustrated are the eggs of some of the sea-birds, which are placed upon the shingle, generally without any nest, and are extremely difficult to find, looking almost exactly like some of the millions of stones lying around them. Another instance given is that of the Stone Curlew's eggs. These are usually placed among stones, as shown in the photograph, Fig. 91, and at a short distance off might very well pass for stones themselves.

A good illustration of protective resemblance is given in Fig. 92, which shows a Pheasant on her nest. The brown-spotted feathers of the back of the bird look for all the world like the surrounding dead leaves, and I have found that nearly every one who looks at this photograph has to be shown where the bird is before they can see it. Another remarkable protection afforded to the ground-nesting birds, or at any rate some of them, is that during the period of incubation the scent usually given off, and by means of which dogs are able to discover them, is absorbed inwardly by the system, and the birds are consequently less likely to be disturbed.

Very few with untrained eyes would be likely to discover the Wren's nest in the bracken shown in Fig. 93. The nest itself is built of bracken, and is to my thinking a good instance

of the instinct of the builder. Another nest of the Wren was found close by this one in a green honeysuckle bush, and was built of *green* moss, which also matched its surroundings, and had the one in the dead bracken been built of green moss or hay probably it would have been noticed at once.

Those interested in Entomology will no doubt have noticed that butterflies which generally have gorgeous coloured wings on the upper surface have the under surface of a much quieter colour scheme. The upper wings are generally folded between the under wings during rest and the insect is much less conspicuous. The Orange-tip Butterfly when at rest on an umbelliferous plant with its wings closed, almost exactly matches the appearance of the latter, and is very inconspicuous compared with the same insect when showing the bright orange tips of the wings in flight. Moths are, perhaps, better examples even than butterflies, because while the latter are generally brightly coloured, the former are, in Great Britain at least, usually of a dull colour, and when any brighter colouring exists it is as a rule confined to the hind wings, which are covered over by the upper wings when the insect is at rest. Many moths look extremely like their surroundings when at rest and often deceive a most practised eye. Some moths have conspicuous eye spots on their wings, and these appear in certain positions very like a face. The Emperor Moth, for instance, when resting in the heather with its wings partly extended and its abdomen projecting, looks very much like the eyes and nose of some concealed face, and doubtless frightens many of its enemies away by this similarity. Many more instances might be given, but enough has probably been said to set the reader thinking and, I hope, observing similar instances for himself.

"Mimicry" is another interesting subject for study. There are many insects which are either poisonous or very disagreeable to the taste, and their enemies, having found this out, avoid them. But there are other harmless insects which mimic these others either in appearance or colour, and sometimes in both, and so escape their enemies in the same way as the former. The insects coming under this head are usually of a strong colour, for example, our common wasp, which has bright yellow and velvety-black bands, very conspicuous, and these bright colours are often described as "warning" colours, because after a young bird, for instance, has captured a wasp and has been stung he will probably be wise enough to let a similarly coloured insect alone for the future. But there is a fly (*Chrysotoxus sylvarum*) very like a wasp and yet perfectly harmless, and no doubt the ordinary human being would avoid the fly if it settled near him on account of its resemblance to a wasp. The Hornet, too, is mimicked by the Hornet Clear-wing Moth, which certainly no one but an entomologist would think of taking for a moth; another dipterous fly (*Volucella Bombylais*) resembles a Humble Bee (*Bombus agrorum*) and lives parasitically in the nest of the latter. There are two species of moths known as Bee Hawks from their resemblance to the Humble Bee, and the Hive Bee (*Apis mellifica*) may often be seen on a flower-head in company with *Eristalis tenax*, a fly of very similar appearance.

The effect of heat or cold has a good deal to do with the colouration of animals or insects; there are certain moths, for example, found in Great Britain which, although belonging to the same species, vary almost from white to black in different localities from this cause.

The student who thinks on the matters dealt with in this chapter will have abundant reasons for marvelling at Nature's most wonderful ways.

Before I conclude I wish to ask the reader who is interested in the wonders of creation to do all in his or her power to discourage to the utmost the wearing of birds, or the feathers of birds not killed for the purpose of food, for personal adornment. Surely the ladies, who are the greatest offenders in this respect, can hardly have given the question their earnest consideration or they would never help in the wholesale work of slaughter did they realise what it means.

Last year (1908) a Bill was introduced into the House of Lords by the Lord Avebury whose writings and work in connection with Nature study are so well known and appreciated. In the preface of the Bill the following words occurred:—

" As a proof of the extent of the destruction that at present goes on, and which is threatening the extinction of some of the most beautiful species, it may be mentioned that at the plume auctions held in London during the last six months of 1907 there were catalogued 19,742 skins of the Birds of Paradise, 1411 packages of the nesting plumes of the White Heron (representing the feathers of nearly 115,000 birds), besides immense numbers of the feathers and skins of almost every known species of ornamental plumaged bird. At the June sale, held at the Commercial Sale Rooms, 1386 Crowned Pigeons' heads were sold, while among miscellaneous bird-skins, one firm of auctioneers alone catalogued over 20,000 Kingfishers. A deplorable feature of recent sales is the offer of large numbers of Lyre Birds' tails and of Albatross quills. The constant repetition of such figures as the above—and these plume sales take place at least every two months—

Fig. 93. Common Wren's Nest in Bracken.

Fig. 94. Common Tern's Eggs *in situ*.

shows that the Legislature must choose between the extermination or the protection of the birds in question."

The House of Lords passed the Bill, but the House of Commons would not spare the time to consider it. A similar measure was introduced this year (1909) by Sir William Anson, but unfortunately was "talked out" after passing its first reading.

The thanks of all Nature lovers are due to Lord Avebury for his timely help and valuable support to a work in which the Selborne Society, of which he is the distinguished president, has always taken the greatest interest, namely, the preservation from needless destruction of such wild animals and plants as are harmless, beautiful, or rare.

Lastly, I hope the reader who has followed me through the pages of this book will be led to study and think for himself, and to dip as deeply as he can into the open book of Nature, the contemplation of which cannot fail to be to him in later life "A Thing of Beauty and a Joy for Ever."

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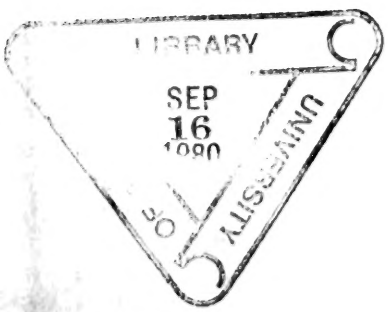
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