

THE CONDOR

A BI-MONTHLY MAGAZINE OF
WESTERN ORNITHOLOGY

Published by the
COOPER ORNITHOLOGICAL CLUB

VOLUME XXVIII

JANUARY-FEBRUARY, 1926

NUMBER 1

LESSONS IN AVICULTURE FROM ENGLISH AVIARIES

WITH SIXTEEN ILLUSTRATIONS

By CASEY A. WOOD

I. INTRODUCTION

IF, in the British Islands, tender, exotic birds can be kept alive in the open, and even induced to nest and raise families, how much more easily and with what greater success ought their culture and study be pursued in lands more favored with warmth and sunshine. Among the numerous advantages that a subtropical climate offers for bird culture is economy in the erection and maintenance of shelters. Protection from severe weather involves some form of artificial heating, and when the outdoor aviary is built in a country with a wintry climate, punctuated by ice, snow and cold fogs, these meteorologic conditions demand not only a substantial shelter, involving a considerable initial outlay, but added labor and expense of upkeep. Hardy birds *may* come through a severe winter without fire, albeit they will probably not be comfortable; but delicate exotics will need stoves or central heating.

Speaking of avian diseases and of other obstacles to satisfactory aviculture in Great Britain, a well-known British aviarist remarks: "Great as are undoubtedly the natural difficulties of bird-keeping, I know of nothing more deadly than the English climate." Yet, he might have added, England has been the home, *par excellence*, of bird culture for the past 300 years; and there are now more aviaries, rookeries, heronries and bird sanctuaries attached to English homes than can be found in any other country. During the past three centuries, it might be said, the keeping of captive birds, foreign and domestic, has been as much a matter of course on an English estate as the maintenance of the ancestral library or the family picture gallery. The writer, therefore, makes no apology for suggesting that in considering possible aviaries for the Pacific Coast we take advantage of the age-long experiences of our transatlantic cousins. Of course, we must in the long run work out our own salvation; but in the preliminary studies of the problem the fact persists that those rules that have proved, after generations of trial, to be applicable abroad to the culture of avian species, alien and other, will be found to apply to the same or similar birds in California, Oregon or British Columbia, and perhaps still more to aviculture in Illinois and New York.

That a study of English methods in bird-keeping might be something more than theoretical, the present writer, in company of his wife and Miss E. Maud Knobel, Honorary Secretary of the British Avicultural Society, made (in September, 1924) excursions to some of the principal private aviaries of the south and middle counties of England. We were most hospitably and kindly welcomed, and when it was explained that one of the objects of our visit was to obtain, at first hand, data for a

paper in *THE CONDOR* that might be useful to actual and prospective American aviarists, every opportunity was afforded the party to examine the buildings and appliances used in housing both captive and free-flying birds. The owners of the aviaries replied freely and fully to the many questions we asked, and they also furnished us with many photographs (several of which are here reproduced) illustrating the construction of the houses, provisions for heating, and many other details essential to the care and breeding of foreign birds.

While on this subject, I seize the opportunity to thank these helpful friends, among them Her Grace the Duchess of Wellington, Ewhurst Park, Basingstoke; the Marquess of Tavistock, Warblington House, Hants; Mr. Alfred Ezra, Foxwarren Park, Cobham, Surrey; Mr. H. Whitley, Primley House, Paignton, South Devon; Mrs. Dalton-Burgess (since, alas, passed away), Helston House, Bristol; Rev. Hubert Astley, Brinsop Court, Hereford; Mr. W. Shore-Baily, Boyer's House, Westbury, Wilts; Captain L. R. Waud, Falcon Close, Newbury; and Miss Ethel Chawner, Forest Bank, Lyndhurst, Hants.

The literature of aviculture, pure and commercial, in most of the European languages, is quite abundant. Much of it is illuminating and useful; but some of it is useless and misleading, or at least not likely to assist American bird lovers. A few practical books are worth a whole library of promiscuous treatises, and of the former I would advise, as an adjunct to the present chapters and for subjects not treated in them, one or more of the following inexpensive manuals: "Aviaries, Bird-Rooms and Cages", H. Norman, post free, 75 cents; "Foreign Birds for Beginners", by Wesley Page, post free, 40 cents. These can be ordered from "Cage Birds", 54 Fetter Lane, London E. C. 4, England. "Through a Bird Window", by C. D. Farrar, \$1.60, post free, is to be had from Wheldon and Wesley, 2 Arthur St., New Oxford St., London, England. A good American treatise is "Pets: Their History and Care", by Lee S. Crandall (Henry Holt and Company, New York). I am myself indebted to the above sources for some of the information in these pages.

I shall now offer a necessarily brief description of the construction of a few typical aviaries and will speak of the care needed of their live contents, to be followed by an account of their modifications and special forms as seen on the excursions just mentioned.

II. THE CHOICE AND ERECTION OF AN AVIARY

It may be said at the outset that while much pleasure may be gained from the so-called "verandah" aviary, from large bird-cages for such pets as canaries and Java Sparrows, and from the various kinds of small, movable aviaries, I do not propose to give much, if any, space to their consideration, but refer the reader to the numerous books on the subject. Also, while I am well aware that even large, high-flying birds may live for years in a properly furnished, indoor bird room, it is not my intention to encourage that form of avian captivity. Doubtless many human occupants of a well-kept penitentiary live longer while working out, let us say, a twenty year sentence, but how many of them would not prefer liberty, even under less sanitary surroundings? If we elect to make wild birds a part of our household, it is undoubtedly better to bring them up in an environment as much as possible like that to which they or their ancestors have been accustomed, and in which they will be as healthy and as happy as they can be made. It must not be forgotten, also, that the outdoor aviary, made as large as circumstances permit, is not only the best and most natural place to keep and breed birds in a favorable climate, but it affords the most satisfactory chances to watch and study these interesting animals. In this way, too, one may have the pleasure and profit of becoming acquainted with them almost as well as if they were

observed in their native habitat. A collection of free-flying birds, properly housed and fed, is as interesting and attractive as any faunal collection it is possible to gather. Moreover, it is much easier to feed, water and clean birds when they are housed in a good outdoor aviary than to care for the same number kept indoors or in individual cages. In my opinion, also, birds in a fair-sized and properly constructed garden aviary are healthier, happier and more contented, breed better, and certainly look better than when confined in the individual cages of a bird-room, however clean and well-lighted it may be.

The ordinary aviary consists mainly of two structures, a shelter or bird-house where the occupants can be defended against hot sun, strong winds, pelting rain or too great cold, and an outdoor "flight", or enclosure of wire netting, that permits of their flying about freely or of basking in the sunshine. Some birds, also, like to take a natural rain bath; indeed, certain parrots will bathe only in the falling rain. The flight allows indulgence in this and other vital habits. The enclosure should be partially turfed and planted with appropriate shrubs, and in some instances provided with gravel walks. The size and form of one's aviary, single or compound, will depend, of course, upon individual taste, upon the character and number of the birds one desires to keep, and upon the amount one is willing to spend on construction and "overhead". Quite satisfactory outdoor bird-houses can be erected and furnished at small cost. Several of these are portrayed in this article and others are pictured and described in the general treatises mentioned.

The site of the garden aviary is important, even in the sunshiny climate one finds on the Pacific Coast. Since birds are more cheerful and active and sing most in the early morning, the bird-house should be so placed that it has at least the benefit of the rising sun. About mid-day and in the early afternoon birds are generally quiet, seek shelter from the sun, and take their noon siesta. It will then be well if the aviary is in at least partial shade. Fierce sunshine at mid-day, especially during the heated season, may be as fatal as raw winds, sudden cold, or an entire absence of sunlight. It must be remembered, also, that birds should have the option of securing a shady retreat at any hour of the day, that heat (that is, sun) stroke is not an unusual cause of death in the bird-house, and that in their native state most birds avoid the fierce rays of the noontide sun.

With properly regulated sunshine there should be a free circulation of air through the buildings, combined with adequate protection from strong wind and driving rain. A wind-break of quick-growing trees and creepers can generally be planted in such a situation as to protect against storms and also furnish the desired amount of shade. I am in favor of building the ordinary garden or outdoor aviary where it will have an outlook on all four sides. However, it may be erected in a corner or against the side of another building, in either case reducing the cost of construction.

III. CONSTRUCTION OF THE AVIARY

Most books on aviaries furnish a more or less satisfactory estimate of building costs and prices of furnishings, together with a description of the material needed, the exact measurements of the lumber required for the bird-house (its roof, front and floor), and plans of the shelters and flights. For this reason I shall not enter into a discussion of these details of construction, but will confine my observations to the completed structures.

There is, however, one item of furnishing upon which it is desirable to lay some emphasis, and that is the perches. First of all, they should be of different sizes and, within bounds, of different shapes; that is, while most of them ought to be round, a

few should be slightly oval. As Norman points out, birds, especially immature birds, are not infrequently crippled through lack of sufficient exercise for their toes. If we, ourselves, were obliged constantly to handle only objects of exactly the same thickness, our hands and fingers would in the course of time become cramped and crippled, a lesson to be learned from the hands of workmen using daily only certain tools; their muscles become fixed and assume a cramped condition. Birds need exercise of their foot and leg muscles as well as of their wings. For the perches and roosts of a garden aviary, natural branches of trees well supplied with twigs not only look well but meet the requirements of an outdoor roosting place better than any other form of perch.

The interior of the bird-house should not have too many perches, otherwise they will interfere with the free flight of the occupants. They should, of course, be placed so that they will permit of a good "fly" from one set of perches to another. Tree perches should be placed in the aviary as one finds them, generally, in the forest, not upright but sloping. This arrangement prevents the droppings of a bird sitting on an upper branch from soiling the plumage of another perched lower down. Additional perches should, of course, be placed within the shelter, and it must not be forgotten that a number of these should be near the roof, so that birds may roost, if they so desire, high up and well out of sight of anything that is likely to interfere with their rest and privacy. Long, straight perches are to be avoided, since some birds love to "hog" a roost by running along its whole length and driving their weaker brethren off it. Some aviculturists place a row of wooden hat-pegs along one side of the shelter, and this provision makes an excellent and popular set of perches.

I have an objection to metal perches, even if they are easier to clean than wooden roosts and are not destroyed by parrots and other birds, mainly because they are unnatural and slippery resting places, not adapted to the ordinary bird's foothold. I am also firmly convinced that there is nothing a bird dislikes more in the way of a perch than one that turns round when he alights on it. To a swaying branch he is accustomed, but a revolving one must be very tiring and disagreeable; and my sympathies are all for that unfortunate parrot in a cage however large, whose perches are not only metallic but twist in his grasp every time he sits on them. Do not place your perches close to outside netting; the vagrant cat is ever on the watch for birds within reach of her claws.

IV. A WESLEY PAGE AVIARY

Although I do not intend to devote much space to the various types of aviaries, I would like to describe one that greatly impressed me as a simple, inexpensive and yet quite spacious and efficient structure. I noted it when I visited the home of the late Wesley Page in 1921. He has elsewhere described and pictured it. The illustration in this text is somewhat modified from his published plan, and shows an enlargement of the original, verbally suggested to me at the time of my visit to Lingfield. Of course, the area covered by the building, as well as the height of the structure pictured in the accompanying plan, can be varied to suit the taste, convenience and pocketbook of the bird fancier. Moreover, the flight may be widened and the whole aviary subdivided and provided with separate doors to make three or more compartments, corresponding to the same number of combined shelters and flights. This, indeed, is the form adopted by several of the aviculturists whose aviaries I shall later describe.

The ground covered (see figure 1) by this shelter and flight was 23 x 10 feet. The structure (intended to be placed as near the center of the garden as possible) is 16 feet high, and has a "lean-to" shelter measuring 12 x 4 feet. With the exception of two 11 inch boards, placed equidistant, the shed is open completely in front. (I

would suggest here that two 12 inch boards be run along the upper front of the shed, to furnish increased privacy and protection to the inmates.) It is also open at either end for the space of a foot from the ground, thus providing a passage through which the birds may fly.

The lean-to was made of match-boarding and 2 inch scantling. The roof was covered with felt and sloped into the aviary proper, but was blocked out, so that the birds could not get onto the top of it and thus be at the mercy of cats. The netting of the "flight" was $\frac{1}{2}$ inch mesh. It and the scantlings were tarred; elsewhere paint was used. The frame of the flight was made of 2 x 1 scantlings. Along both the cornice and base of the "flight" there was a 12 inch board, and the netting was carried 18 inches below, to keep out rats and other enemies.

The owner of the aviary portrayed here believed that, if the necessary space were available, a useful addition might be made to it and the whole scheme improved by

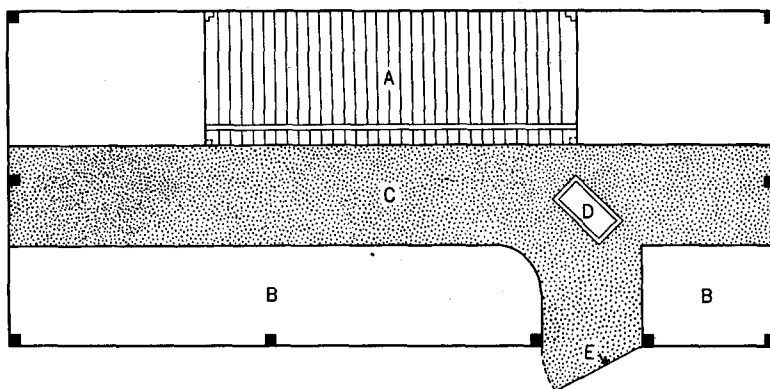


Fig. 1. GROUND PLAN OF SIMPLE AVIARY, 23 FEET LONG, 10 FEET WIDE, SUGGESTED BY WESLEY PAGE.

A, Shelter, that may be extended the whole length of the enclosure;
B, Tangle of shrubs and other plants; C, Gravel (or strip of turf) three feet wide; D, Bath; E, Door to flight.

attaching a second building that had been enclosed all round. One side of this addition should be of glass, save for 18 inches at the bottom. In this inclosure, delicate birds could be kept during severe weather (exceptional on the Pacific Coast), or allowed out "for a fly" at midday or during sunny and pleasant hours. As a further adjunct, there ought to be one or more large cages placed in quiet corners for sick or wild birds (not yet accustomed to aviary life) that it is not expedient to allow in the "flights".

Mice are a great nuisance and cause of disease and dirt in English aviaries, and may readily be a menace to the comfort and safety of birds in American shelters. They foul the food, make their nests in breeding boxes, and discourage the raising of avian families. Food and water containers should be so placed that these active rodents cannot climb or jump into them. Do not try poison (which is sometimes recommended), but use traps that will not also catch birds. If you cannot altogether exterminate the pests you may at least limit their numbers, so that they will not seriously interfere with the operations of your aviary.

V. THE FURNISHINGS AND SURROUNDINGS OF THE AVIARY

The garden bird-house should be properly supplied with several self-feeding seed-hoppers, enameled dishes for soft food, and one or more earthenware water-hoppers of one quart capacity, so constructed that the birds cannot pollute the contents. In the simple Wesley Page aviary the birds' bath was an ordinary glazed earthenware sink (sunk to the level of the ground) with a dummy well beneath it. Into the waste-hole of the sink was fitted a cork bung, in the centre of which a small waste-pipe kept the water constantly at a maximum depth of three inches. The bottom of the bath was covered with small stones so that it was not slippery. At the sides the layer of gravel reduced the depth to about an inch, so that the smaller birds could bathe with comfort.

The floor of the shelter was covered with coarse sand or "bird grit", a covering that was carefully raked over every week, the rakings and other superficial dressings being removed from the bird-house. Fresh sand was then scattered over the floor. The whole depth of this grit was dug up and renewed every three months.

The lean-to was provided with branches (the bark on) close against the roof as well as around the sides and back of the building. Among them were disposed a number of small nest-boxes and cocoanut husks (shells are in most instances better), several of the outside boxes having waterproof tops for protection against the weather. To the two upright 11 inch boards, already mentioned as extending from the roof to the ground, two tiers of removable nesting boxes were attached. These served not only as breeding places but also as private shelters for the birds in cold or otherwise inclement weather.

The spaces marked B B in the cut form a tangle of weeds and shrubs. Page advises that it be planted with almost any hardy sorts of bushes (such as gooseberry or privet) between which may be seeded sunflowers, rudbeckias, flowering grasses, dandelions, etc., as well as oats, meadow grass and other herbaceous plants, to make a small jungle in which the birds may hide (and sometimes nest) and which will provide them with plenty of green food. If they have the latter, especially if it be in the form of sprouting grains, grasses and growing wheat, they will not be tempted to attack and destroy the shrubbery. Most birds are very fond of lettuce, a food plentifully grown on the Pacific Coast, and the bird-house should be liberally supplied with it.

Norman pictures a hopper for soft food that is convenient and easily set up.

It is fastened to the inside of the building, and has a small platform underneath, one and a half inches from the front of the trough. Beyond this is a stout perch, so that the birds can stand and feed, and as they have the habit of taking little pieces out of the feeding vessel, part of which they invariably drop, the platform catches it and so prevents waste. The wires in front of the vessel allow the birds to get their heads through, yet prevent their throwing the food about. A small door in the wood-work of the aviary, made to correspond with the back of the feeder, will enable the bird-keeper to take the vessel out, refill and replace it without disturbing the birds, the upright wires preventing their escape through the aperture. A similar doorway will suffice for supplying food to other birds.

As food for seed-eaters, Page prefers millet, canary and "dove" mixtures. Now and then he scatters about the "jungle" oats, hemp, rape and sunflower seed. Some of this is not eaten but takes root and furnishes an acceptable addition to the supply of green food. He also believes in furnishing his captives with plenty of cuttle-fish bone as well as grit. Food for insectivorous birds and other "soft-bills" is not so easily secured. Of the many substitutes for their natural diet (not forgetting that meal worms and live insects are also to be had in varying quantities), Page preferred the following formula: Take equal parts of good meal, ants' cocoons, dried flies,

boiled potato and stale bread crumbs. Mix these thoroughly, moistening the mass, meanwhile, with a sprinkle of water. Add the best currants, about one-tenth of the whole.

If there are any frugivorous birds in the aviary, a supply of bananas, grapes, figs and other ripe fruits should always be on hand for their benefit. It must be remembered that rock salt is relished by a number of birds, especially by parrots and doves.

Strict cleanliness of all parts of the aviary is absolutely essential to the health, happiness and life of its occupants. While outdoor bird-houses (and particularly the flights) do not require as frequent cleansing as bird rooms, individual cages or "verandah aviaries", yet perches, nesting boxes, food and water receptacles (especially the last two) must be inspected daily and kept neat and in a sanitary condition. Every few months the interior of the shelters and all the woodwork of the aviary should be scraped and whitewashed; perches, unoccupied nesting boxes and small shelters may at the same time be similarly treated as part of the regular routine. It is better to err on the side of too frequent and too thorough work than through irregular and insufficient housecleaning—if one wishes his pets not only to present a good appearance but to keep free of disease. Indeed, it may be said that if birds are always kept clean, suitably fed and given plenty of room to fly about, they will rarely be ill; if the aviary becomes infected it is difficult to make it once more aseptic. Then it must not be forgotten that very little can be done for infections in cage or aviary birds, all the books on avian ailments to the contrary notwithstanding. Hygienic precautions are worth all the bird medicines in the world. It will do no harm to change all water in the various containers, including that in the bath, twice a day, scrubbing out the latter and thoroughly rinsing and cleaning the former. Many birds like to bathe morning and afternoon, and enjoy fresh water for the purpose just as much as we do.

Furthermore, to promote cleanliness, all food pans should have flanged edges, to prevent the birds from scattering their contents; and food and water vessels should, for obvious reasons, never be placed under a perch. A successful aviculturist once said to me: "A good rule to observe as regards cleanliness of the aviary vessels and of the food and water that are served therein, is to put oneself in the place of the birds. Are plate and pot, platter and dish fit for *me* to dine from?"

There is no objection to a strip of turf in the flight, although this is generally practicable in the larger aviaries only. At any rate, it looks well, adds to the attractions of the aviary and, perhaps, conduces to the health of the birds. The short grass will be welcomed by ground birds and, if it requires to be kept fresh by artificial means, the same watering will suffice for all the greenery about the flight. Another addition to an aviary of the larger kind is a fountain. It is an attractive (even if expensive) item, and many birds love to take a shower-bath.

Now and then birds persist in sitting for hours exposed to heavy storms, afterwards to die of pneumonia or other acute lung troubles. For this reason some aviarists advise us to cover over the flight completely, unless it be a very large one, when a partial roofing will suffice. I do not think, however, that such a precaution is necessary in the semi-tropical (diurnal) climate of the Pacific Coast. A cover also presents some disadvantages that I shall not discuss here.

VI. FOOD SUPPLY FOR THE OCCUPANTS OF OUTDOOR AVIARIES

Seed, best bought in bulk from only the most reliable dealers, should be kept in containers proof against dampness, mice and rats. There is nothing better for the purpose than new, galvanized iron, sanitary dust bins. They are dust and vermin proof and prevent the seed from becoming damp and musty. Smaller quantities of

seed are best preserved in glass jars. It will do no harm to sift this form of bird food, as, no matter how well it is supposed to have been cleaned, one can always separate out a little more dust and other unknown forms of dirt. All these precautions are of supreme importance when one is aware that of the causes of death among birds enteritis, generally another name for poisoning by improper food, heads all the rest. If all this be true of hard seeds, how much more careful should one be of the highly nitrogenous and easily decomposed diet of "soft bills"! The greatest care should be taken to provide insectivorous and fruit-eating birds with a fresh supply of food appropriate to their wants. A supply of sour, stale, decomposed articles of diet or dirty drinking water is sure to be followed by "mysterious" deaths in the bird-house family.

VII. HOW TO STOCK THE AVIARY

This is an extremely important consideration, because upon judicious selection may depend success or failure of the avicultural experiment. In America the supply of birds available for an outdoor aviary is not as large nor of as great variety as one finds in the London markets. It is, on that account, desirable that the intending aviaryist consult those well-known dealers in our cities as to possible stocks, and as to the varieties of these that should be allowed to occupy the same flight and shelter.

Generally speaking, birds of similar strength and size should be chosen. Still, as Frank Finn remarks, a bird's size should not be the only consideration; this rule should be modified in respect of the bird's mandibles. A strong-billed small species may be more than a match for one with a larger body and smaller beak. The courage and combativeness of a bird must also be considered, and it must not be forgotten that insectivorous (that is, carnivorous) varieties are particularly untrustworthy as companions for small and weak birds. Occasionally, and without apparent reason, a previously well-behaved bird will run amuck among his fellows, and annoying losses will occur; all of which shows that vigilance and frequent observation of the aviary are essential to success.

It is unwise to let loose a recently caught specimen, or one that is not fully tamed, among steady birds. Wildness is both a disturbing and a "catching" element in a bird's character, and the new arrival may contaminate all his companions and set them flying about like wild things. The unsteady or untamed newcomer should consequently be placed in a separate enclosure until he has to some extent "come to hand", before introducing him into conventional society.

It is well known that in every aviary there is a certain amount of competition as to who shall be "cock-of-the-walk", and many are the tales told of this kind of rivalry among birds that are compelled to live together. In a company of apparently equal size, strength and vigor it often happens, as in human communities, that the previously unknown and unexpected one comes to the fore and rules the roost. Quarrels, too, sometimes arise, and the aviary should be watched for these, lest one or more contestants be killed or stripped of feathers. Little birds may agree in their nests, but they are quite human when they grow up! One of the advantages of a spacious flight well planted with shrubbery is that the weaker birds can generally dodge into the bushes when pursued by larger or stronger associates. It is a mistake to overcrowd the aviary. In the Wesley Page bird-house, just described, accommodation is provided, with careful attention to hygiene, for 150 small birds; but Page rarely kept in his at one time more than fifty; and I would not make the figures more than a hundred.

Catching Birds in the Aviary.—It is, for a variety of reasons, sometimes necessary to catch, either in the flights or in the shelter, one or more occupants of the garden

bird-house. The best plan, if time permits, is to trap the desired bird and not to chase it around the place, with or without a butterfly net. It is very easy to "tail" or frighten a bird half to death, not to mention unduly disturbing all the other birds, by netting an occupant of flight or shelter. There should be arranged in a convenient part of the aviary a small compartment in which food and water are kept, and into which birds may fly at will. This cage or box is provided with a sliding door that may be easily closed from the outside. When it is necessary to catch a certain bird, remove the outside food and water pans, and before long the unsuspecting one will enter the trap. A regular bird-trap may also be employed in the open flight, but it frightens the other birds more than the contrivance just described.

Taming and Acclimatizing New Arrivals.—Among the various adjuncts to an outdoor aviary is an acclimatization cage for recent additions to the collection, especially for immigrants from tropical countries. These are of various designs, but the home-made article described by Farrar is inexpensive and efficient. It is fashioned from a full-sized travelling cage (such as dealers supply) in the bottom of which a large, round hole is cut. Over this is nailed a piece of perforated zinc. In a large biscuit tin make a hole corresponding to the opening in the cage. Bore some smaller holes around the bottom of the tin for ventilation. Under the biscuit tin place a potted-meat pot filled with olive oil in which a wick is immersed; or a "night light" will answer the same purpose. Light the wick, place the delicate stranger in the cage and he will keep warm and thrive during the cold nights of our semi-tropical California and Oregon winters. The fumes of the burning wick will not do the bird any harm. When the immigrant gets accustomed to his new environment he may be permitted to join the birds in the aviary.

Visitors to the Aviary.—It is but natural that the proud owner of an aviary should wish to show, and his friends desire to see, the interesting collection of birds he has gathered. Attention is directed to the excellent and ingenious arrangement made in the aviaries of the Duchess of Wellington for watching the feathered occupants without alarming them. Provision for studying the pretty ways of the captive birds should be provided without the necessity of walking through the flights. Birds soon get accustomed to the one that feeds them and who cleans their houses, but strangers annoy and often harm them. Unless special arrangements are made for the inspection of captive birds without making them dash about the aviary as if pursued by a hereditary enemy, it is better to look them over from the outside only.

Birds easily escape from aviaries through open doors and windows. Captives confined in cages and bird-houses are ever on the watch to make a dash for liberty through any exit if opened for even a few seconds. When one is obliged to enter an aviary the greatest care must be exercised to prevent this form of loss. Once out in the open, the majority of birds do not return to their houses, partly because of a pure delight in liberty, but more often because they become confused and wander away, eventually to fall a prey to cats, hawks, owls and other enemies; or just as frequently to die of starvation or from exposure. The door of the flight should be a low one, as birds generally fly to the top of the enclosure when they are disturbed by a visitor. While it is, as a rule, not necessary to have an assistant hold a sheet over the entrance every time a visit is paid to the bird-house, yet it is always prudent to enter when there are few birds near the door. If the aviary be a small one and the neighborhood of the entrance cannot readily be cleared of birds, a sheet, reaching three-fourths of the distance to the ground and hung by rings over the door, may make one's entrance and exit secure from serious consequences.

Among the minor details of the aviary is the provision of materials for nest-building. In large aviaries with extensive flights most birds will be able to provide the linings for their nests and much of the nest itself without artificial aid; but in smaller houses it will be wise to place here and there and within easy reach a supply of cotton wool, "excelsior", dry grass, hay, moss, small twigs, rags, paper packing, etc. It must not be forgotten, in this connection, that long hairs and threads, as well as all tough and small fibres are taboo, since they may entangle and perhaps strangle the smaller birds. Another matter: Do not forget to protect your glass windows and doors with wire netting. Otherwise some young, untamed or inexperienced bird will dash against the glass and break his neck in the mistaken belief that he is about to fly through an uncovered opening.

VIII. SPECIAL AND ELABORATE AVIARIES

I have said very little about those buildings and flights intended to house large or specialized collections of birds, partly because I shall describe some that I have recently visited and partly because they must be constructed to meet unusual or particular needs. With plenty of space, appropriate surroundings, and money unlimited there is, in practice, no limit to the size, number and variety of aviarial groups of bird houses that may be built and stocked. Indeed, a series of private aviaries, as in the case of at least one English collection, may rival the public gardens of London, New York or Washington. However, quite as much real pleasure and mental profit may be derived from the possession and study of a moderate-sized bird-house and its feathered population as from the most elaborate and expensive aviaries.

IX. CAPTAIN WAUD'S AVIARIES AT FALCON CLOSE

The bird houses here were planned and built by the owner, who, at my request, has described and photographed them for this paper. I must prefix to his notes the statement that he has successfully bred the American Robin (*Planesticus migratorius*) and our Bluebird (*Sialia sialis*). This, however, is not the first time that the American Bluebird has been successfully bred in England. It was bred in the Zoological Gardens as far back as 1869, and on several subsequent occasions. Captain Waud allows his Cranes, Trumpeters and Doves to have their liberty and to fly perfectly free about the grounds. On short winter days he extends the "daylight" for his aviary occupants by artificial (electric) light and believes the effect is beneficial. The lights are often turned on from 3:30 P. M. until 6 P. M., or later. He finds that boiled meal worms are better for his birds than live ones, and that his stock like them quite as much.

Captain Waud was preparing to extend his aviaries by adopting for the purpose those ready-made structures known to gardeners as "lean-to fruit enclosures", which he believed would make effective and cheap bird-houses. But let us listen to the Captain:

I have my aviaries arranged in one long rectangle, and this I have divided into compartments, each compartment being 9 feet long by 3 wide. The front faces south-east and is all covered with quarter-inch wire netting. The top has 18 inches of wire in front, as I have found that parakeets love to hang on the wire and let the rain fall directly on them, after which natural shower-bath they usually seek their plunge bath and bathe thoroughly. The remainder of the roof is covered with wood and felt, so as to keep the birds dry and furnish them with a good shelter from the sun and wind. I find that birds require shade as well as sunshine, and I try to provide both. I keep chiefly parakeets, and so cannot have any shrubs in their aviaries, only two perches across the bird-house, with a few pieces of apple-wood hanging on the wires, for them to exercise their mandibles on and to amuse themselves with. I always give them as

much exercise as possible; for that, I think, is the most essential thing for keeping them in good health. When the breeding season is over I open a succession of doors that lead all along the line from one aviary to another. All winter the birds have a free flight from one end of the aviaries to the other. Of course I keep together only birds which agree, and I find that Broadtails will live in the same aviary in peace and quietness except during the breeding season. Conures, however, must be separated from other parakeets, as they are quarrelsome at all times with other species.

I have exercised some care in the building of my bird-houses, as I hope the photographs indicate. The whole rectangle rests on a foundation of brick that extends 18 inches below the ground, a distance I have so far found sufficient to exclude rats. Mice I cannot keep out, as they creep through the wires when they are very young, and never leave the aviary. However, as there is in the parakeet houses no cover in which to hide, they do not give me much trouble, but in the other aviaries (for finches, quails, etc.) they are a fearful nuisance, and I am continually warring with them. This year (1924) I have not had much success in breeding, as the cold east winds of the spring

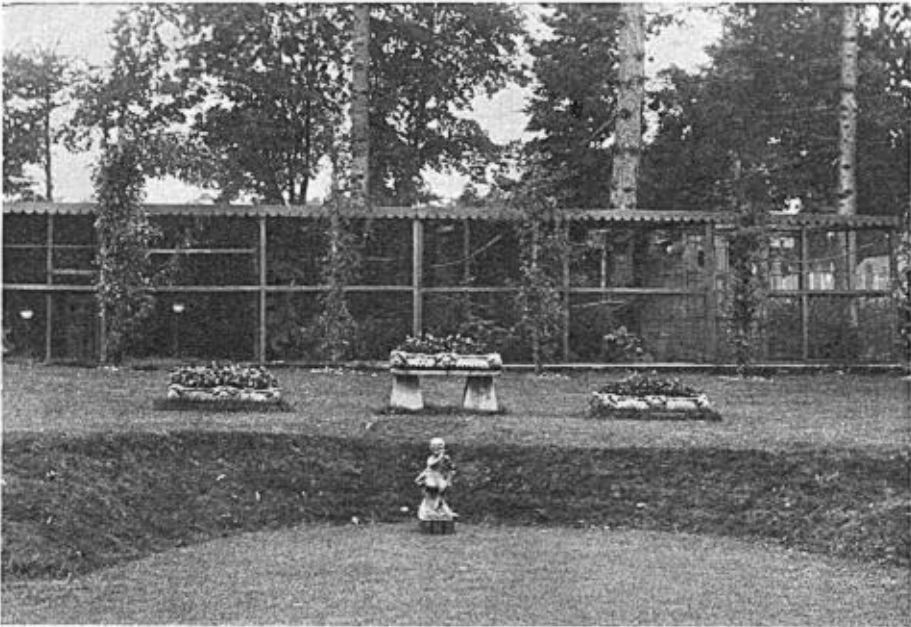


Fig. 2. FRONT ELEVATION OF CAPT. WAUD'S COMBINED AVIARIES.

rendered the parakeet eggs infertile, and even when a few of the eggs did hatch, the cold, damp weather killed the nestlings. I lost two nests of the Yellow-fronted Conure, a grave disappointment, both from the weather, I fear. In the last nest I had two young ones, and they nearly feathered before they died. Now (in October) I have a nest of Gouldian Finches (three nestlings nearly feathered) and a nest of three Green Singing Finches, but as the last named was built in a very exposed situation, I am afraid the heavy rains will wash the youngsters out of their nest.

The Chinese Painted Quails have laid again, as they do every autumn, but I fear that, owing to the lateness of the season, nothing will come of it. In anticipation of this event, I have been trying to induce a pair of Barbary Doves to nest. If I succeed I shall put the quails' eggs under them, and attempt to rear the young quails by the aid of a foster mother. Last year I entrusted them to an incubator, but without success. My quails also nested in the spring of this year, but, alas, the eggs were eaten by mice. My Shamas (*Cittocincla macroura indica*) had three nests this year, but the hen bird ate the nestlings as soon as they were hatched. This unhappy result was due to giving her too stimulating food. The second nest of eggs I placed under

a Spotted Flycatcher, and she brought the young ones up to a good size; and then I tried to hand-rear them, but they all died. I fear I gave them too much food, although I fed them chiefly on live insects. I have, however, reared successfully three Ring-necked Parakeets, all strong, healthy birds, and just over their moult.

I conclude by hoping that other aviculturalists have had better luck than I have had this year. I must, however, remember that 1923 was a much more interesting

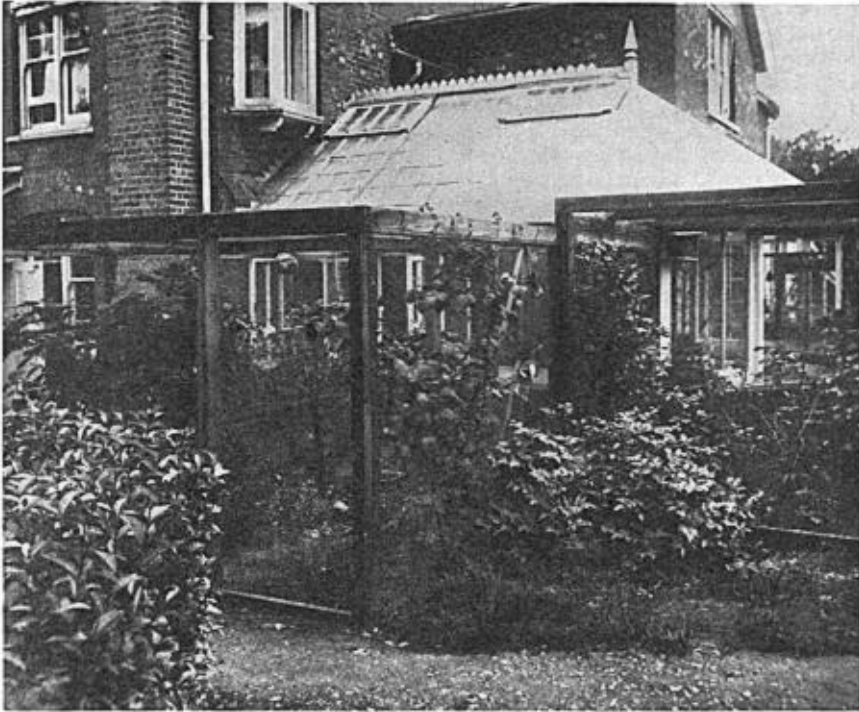


Fig. 3. HOUSE AVIARIES IN WHICH CAPT. WAUD BRED THE AMERICAN (EASTERN) ROBIN AND THE AMERICAN BLUEBIRD.

year in the aviaries for me, chiefly, I think, because of more favorable climatic conditions. I had an interesting cross between a Bauer Rosella (*Barnardius zonarius*) and a Mealy Rosella (*Platycercus pallidiceps*). The result was four beautiful young birds, two of which I presented to the London Zoological Society. One of my remaining young birds died during the first month; the other I still have, a most intelligent animal, an excellent mimic, and extremely handsome. She imitates the call of the cock Painted Quail exactly. In the spring I shall try and pair her with an Adelaide Parakeet (*Platycercus adelaidae*). Of course the result may be nil, but the experiment will be worth a trial.

X. THE ASTLEY AVIARIES AT BRINSOP COURT

The bird-houses of this collection although not extensive are more substantially built than the average shelters and flights. As seen in the photographs (kindly taken for this paper by Mr. W. H. Bustin of Hereford), the house is of brick and plaster, with concrete flooring, and heavily tiled roof with wide, projecting eaves, on a deep concrete foundation, against the plague of rats. The flights have substantial iron-pipe frames completely covered with wire netting. The house is centrally heated and has ample room for all the stores and other paraphernalia of the aviary. A strip of lawn

lies in front of the shelter, and the roosts and nesting boxes are so arranged that birds can be overlooked with the minimum amount of interference with their peace and privacy.

In this compound aviary Mr. Astley has been able to realize the ideals set forth in his book ("My Birds in Freedom and Captivity", J. M. Dent and Co., London, 1900) written when he lived in his ancestral home, the beautiful Chekers (*not* Chequers) Court, now the official country house of the British Prime Minister. I quote some extracts (pp. 200-205) from that charming and authoritative volume:

"The wire flights must, of course, be firmly and closely secured to the wall by iron bolts, &c., and the supports and framework are best in iron.

"It is advisable to leave the floor perfectly clear of encumbrances, partly because it looks better, and partly because the mice, which are difficult to keep out, have less chance of finding a permanent shelter.

"The roosting house or houses at the back must be well built; and the roof should have felting between tiles and plaster, to keep it cool in summer and warm in winter. Perhaps it is advisable to feed the birds inside, because the food (seed or insectivorous

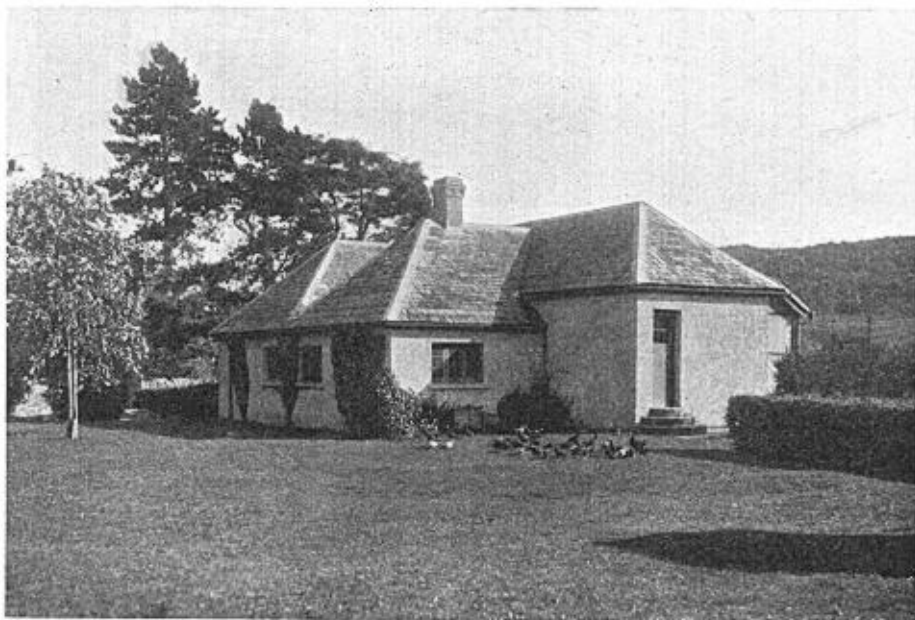


Fig. 4. THE AVIARIES AT BRINSOP COURT. NOTICE THE SOLID CONSTRUCTION OF THIS SHELTER.

mixture) keeps dry in wet weather; besides which, the birds are not induced to keep out too much, which, even in the hardest weather, they are very apt to do.

"And the food must not be on the ground, nor under any perches, but on a table with legs of a build that will puzzle mice to climb. Outside, any titbits that will be eaten up during the day can be placed, along with green food and mealworms.

"For the water, if there is a handy supply, it is much better to adopt the plan in the Western Aviaries of the Zoological Gardens of London. Shallow concrete basins with rims, into which the water runs by means of a pipe, right through each pen.

"A waste pipe must be constructed to draw the water off each morning, so that the basins can be brushed out.

"But they *must* be shallow, at any rate towards the rim, or birds, especially new arrivals in perhaps shabby plumage, will be drowned.

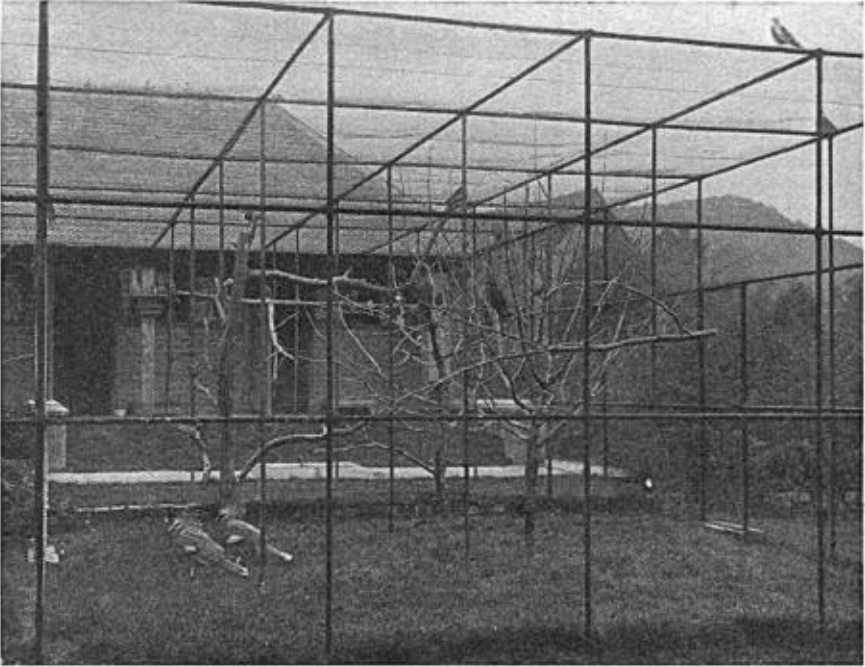


Fig. 5. AVIARY AT BRINSOP COURT, WITH CROWNED PIGEONS IN THE FOREGROUND.

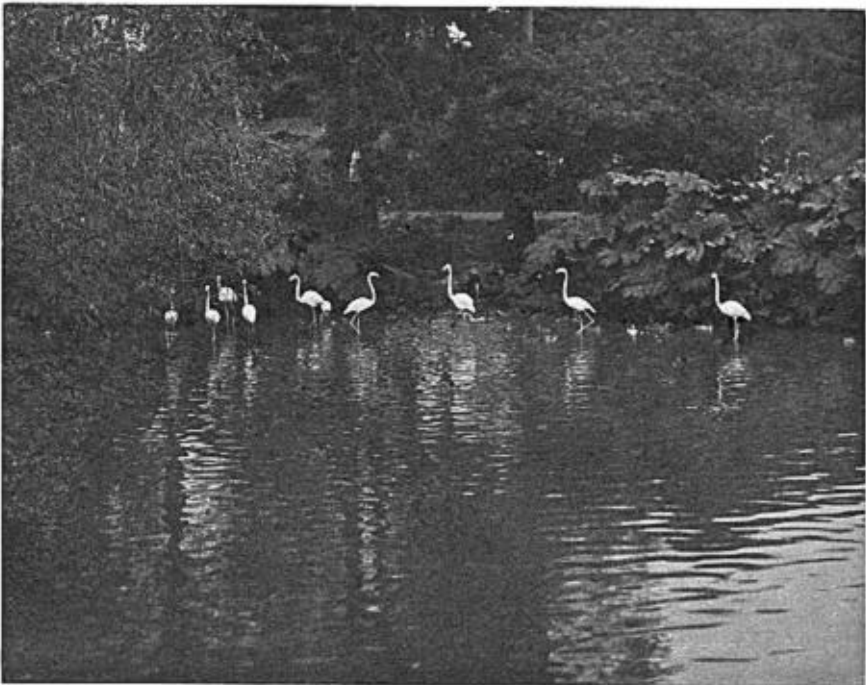


Fig. 6. FLAMINGOS AND DUCKS IN THE MOAT AT BRINSOP COURT. .

"Of course the aviaries must be kept scrupulously clean, the concrete floor being swept over once a week, and fresh sand with plenty of fine grit sprinkled evenly about.

"Not more than two people should ever be allowed within, namely the owner and the attendant.

"It is fatal for the birds' nesting arrangements if those that are strangers to them pry about amongst them.

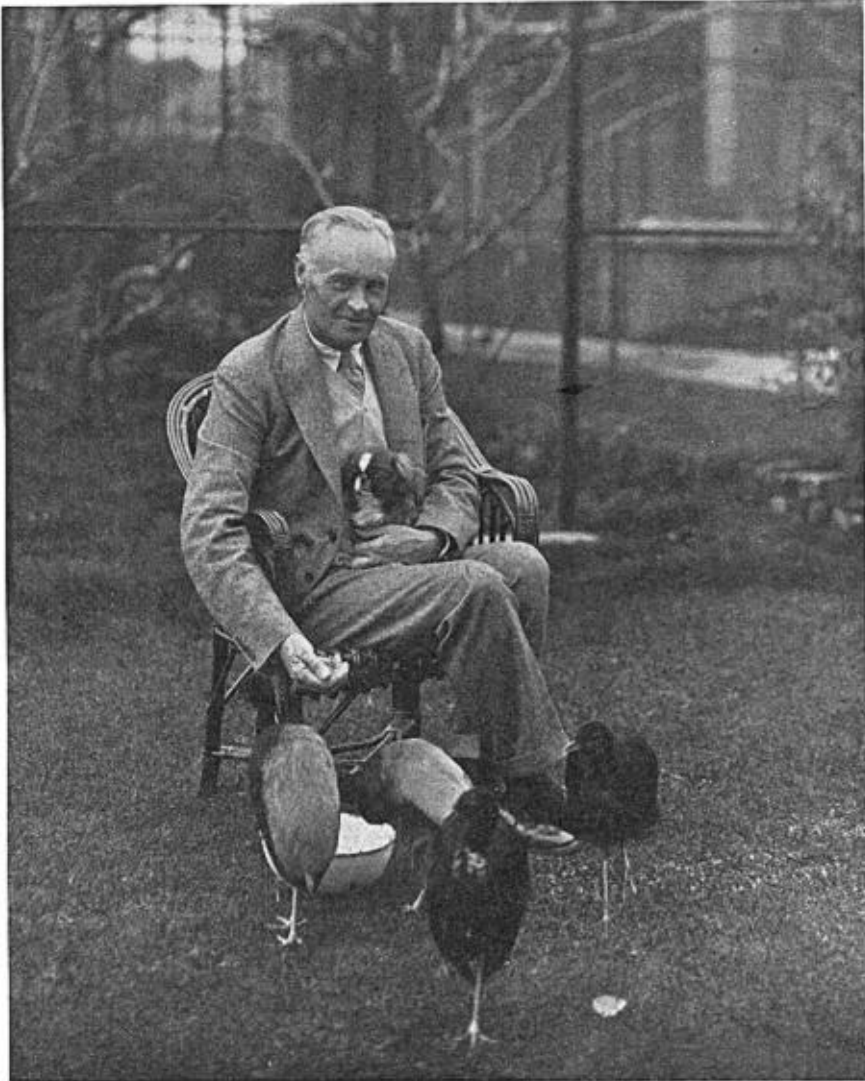


Fig. 7. THE BRINSOP COURT AVIARIES. MR. ASTLEY AND HIS PET TRUMPETERS.

"Birds are particularly sensitive to their presence, and will be quite timid and wild with those to whom they are unused, when they are perfectly tame with one or two whom they see every day, and whose movements, voice, and clothes they are familiar with.

"In constructing an outdoor aviary it is very advantageous to have the eaves of the roosting-house broadened out to such an extent that it forms a real shelter for the

birds when they are not within; and these eaves, which add considerably to the artistic appearance of the building, can be supported by posts fixed in the concrete floor of the flights. There can be quite a snug space immediately beneath them, where the projecting timber supports the tiles, under which nesting-boxes can be fixed.

"The space thus formed is all part of the flights, and gives shelter both from too hot a sun or from wind and rain.

"The height within is 10 feet to the point from where the roof springs; the two outside flights are 10 feet, with a flat roof of wire meshing reaching to the broad eaves, underneath which the height is increased . . ."

"On either side of them are, in one flight, the parakeets, larger finches, and a few foreign pigeons; whilst on the other are smaller finches and insectivorous birds, such as Pekin and blue robins, Australian finches, &c."

". . . It is a mistake to overcrowd, because many birds of various kinds are sure to disturb each other, and give less satisfaction in the end . . ."

"Have nesting-boxes to suit all shapes and sizes, and scour them thoroughly out after any families have vacated them. For the larger and smaller parakeets logs can be hollowed out by a carpenter, and the open end fastened up with a flat piece of wood about half an inch or more in thickness, cut from the same piece that forms the hollow.

"I say the open end, because only one will be so; for the log will be scooped out to a depth of a foot in a piece of wood fourteen inches long, leaving the bottom bowl-shaped, so that when it is placed upright there will be a natural receptacle for the eggs, which will not be able to roll to any edge.

"The bowl must be fairly shallow, always sloping gradually from the wooden sides to the centre.

"The piece of wood that covers the top (the roof) will be all the better if it projects a little, forming slight eaves, so that, if it be placed in the open, the rain has less chance of penetrating; and if it is painted, there is still more security in this respect.

"It can be fastened with a nail to the log, so that it will turn, as on a pivot, for the purpose of examining the nest when necessary, and for cleansing.

"Then a circular hole is cut in the side of the nesting-box, according to the proportions of the birds for which it is intended, and a perch can be fixed by it to afford easier entrance. At the back a smaller hole can be drilled, through which the head of the nail on which the log hangs can intrude.

"Parrots and parakeets naturally make no nest, but lay their eggs in some hollow of a branch or tree trunk upon soft chips of rotten wood.

"And other birds, too, such as blue robins and small finches, will appreciate these logs, and carry nesting materials into them.

"The entrance hole must be five or six inches above the inner base, where the eggs will be laid, or even more . . ."

XI. THE AVIARIES OF THE DUCHESS OF WELLINGTON AT EWHURST PARK

The ten buildings that house this famous collection, with their ample, decorated flights and remarkable shrubbery, are shown in the accompanying half-tones (figs. 8 and 9) as well as photographs can reproduce the originals. They indicate the beauty but do not show the extent of the provisions for sheltering the numerous rare and beautiful birds that occupy these unique aviaries. Perhaps the most noticeable feature about these ten bird-houses is the "sitting-room". Within, and forming one end of the flight, is an apartment floored and fitted with comfortable seats, even hung with appropriate pictures of birds, where one may sit at ease for the purpose of seeing, feeding and even closely examining (that is, making friends with) the feathered occupants of the aviary. In spite of the fact that there were three strangers with the Duchess, she was able to call almost to her feet and exhibit to us most of the birds in the flight nor did our presence seem to disturb or frighten them in any way. I attribute this result to the fact that we knew enough about birds in general to keep perfectly quiet in our seats, and to the further fact that the aviary was liberally supplied with tall, leafy shrubs, into which the birds were well aware they could

easily fly if they wished, thus giving them an added sense of security. At any rate, it seemed to us an ideal method of becoming intimately acquainted with one's birds, as well as of introducing them to one's friends without unduly alarming them.

The Duchess prefers for her aviaries the medium-sized and smaller birds, of which she has a large collection, too large for even a passing mention here. I did notice a fine Hyacinthine Macaw, two pet Toucans and several handsome Amazon and other parrots, but these were kept for "collateral" reasons. For example, *Anodorynchus* was a member of the avian family on account of his lovely blue plumage, Her Grace being very fond of blue. The Toucans were great pets, and given room because of their personal qualities and attractive appearance. One's attention was

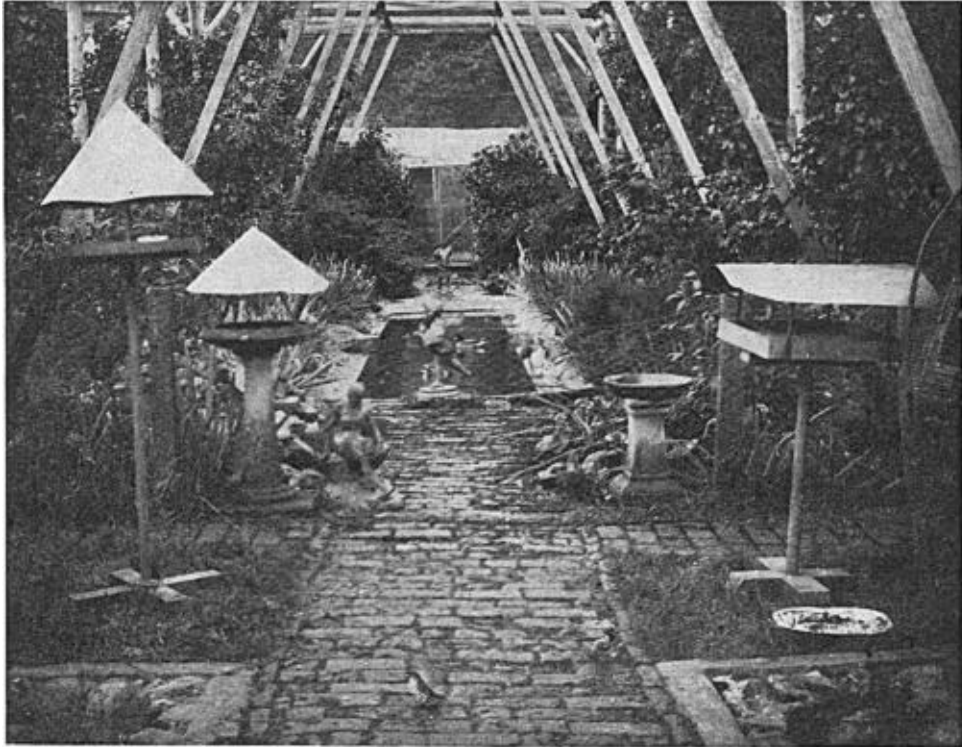


Fig. 8. VIEW OF THE "FLIGHT" FROM THE "SITTING-ROOM" OF THE DUCHESS OF WELLINGTON'S AVIARY AT EWHURST PARK.

captivated by a beautiful crested male Paradise Flycatcher (*Terpsiphone paradisi*) as he flew through the flight space, his long, central tail feathers gracefully waving in the breeze, like a blood-red banneret. It was my privilege to see this charming bird in the Ceylon jungle shortly afterwards, and I thought him one of the most attractive creatures, especially when on the wing, that I had ever seen. There were also Spree Starlings, Nonpareils, Indigo Buntings, Rainbow Buntings and dozens of other species to delight the eye. I learned that in this aviary Gouldian Finches had incubated without the aid of artificial heat.

The largest of the Ewhurst Park aviaries, containing 150 birds, is built over a still flourishing apple orchard, evidence that the occupants have been fed judiciously

and are not tempted to attack the leaves and flowers of the enclosed trees. Demoiselle Cranes and other large birds walked majestically over the lawns, while, for their use and for the delectation of other waders and water birds, a remarkable blue pool had been made. This appeared, at the first glance, to be clear water in a blue-tiled reservoir, but turned out to be a weak solution of ammonio-sulphate of copper in a deep basin. The Duchess assured us that the copper salt does not in any manner harm the bathing birds; and it certainly forms a charming background for white-plumaged waterfowl! It will be noticed from the illustrations that wood is used entirely in the construction of the Ewhurst Park shelters, and for the framework and supports of the flights. The chief purpose of the owner is to have not merely a house for her

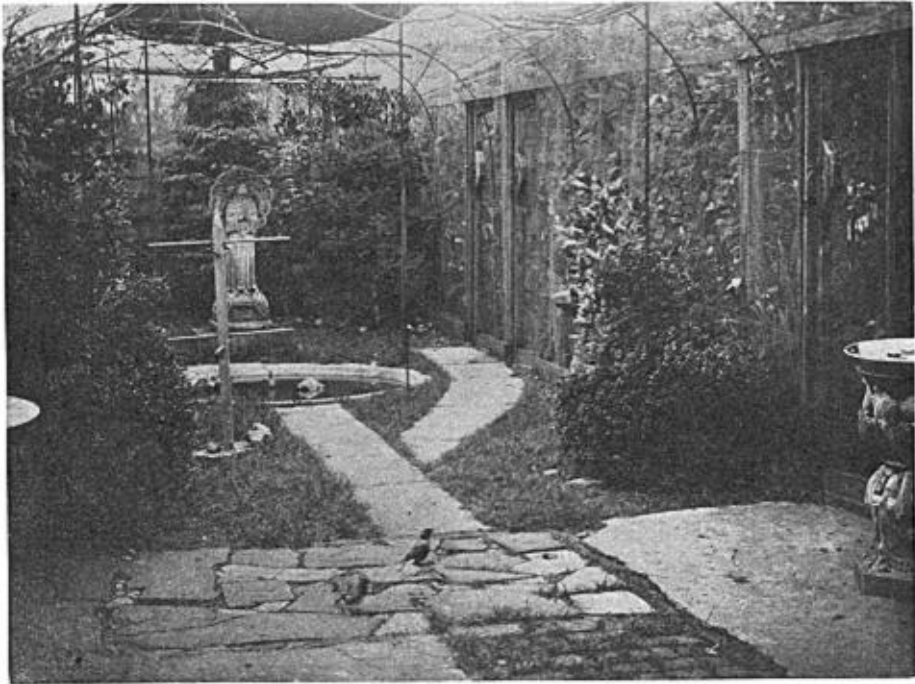


Fig. 9. THE ST. FRANCIS AVIARY AT EWHURST PARK. SPREO STARLINGS
IN THE FOREGROUND.

birds but an artistic home for them, a project in which she certainly has succeeded. One unusual feature of the several aviaries is the extensive use of a very decorative shrub, laden with what looked like our logan berries. These berries were largely consumed by the frugivorous birds in the aviaries, who seemed to be very fond of them. This shrub, the Japanese Winberry, grows readily in England, and does not demand much care. Why would it not be an excellent fruit for introduction into the Pacific States and British Columbia, not only for birds and aviaries but for gardens? Perhaps it is already well known to horticulturists in California, and can easily be procured there for outdoor aviaries.

XII. MR. SHORE-BAILY'S AVIARIES AT WESTBURY

The large flights attached to these bird-houses, as well as their contents, gave us great pleasure. Without attempting to describe all of them, the weavers' aviary is

50 feet square and is provided with a variety of flourishing shrubs, many of them at the time of our visit loaded with fruit. Of course, the chief attractions of this enclosure were the remarkable nests of the Weaver Bird, two of which are plainly shown (with the daughter of the house) in figure 10. One of the nests, completed, is 40 inches long, while the other is about half built. The architect is the small, oriole-like Baya (*Ploceus philippinus*), which I saw quite recently, as well as his wonderful nest, near a paddy (rice) field in the interior of Ceylon. The tough, closely woven, bottle-shaped nest hangs from a single point. The egg chamber, to hold two or three white eggs, is built within this flask, in which the female lays her eggs and begins to incubate quite a while before the nest is finished, the lower portion being woven by the male while the hen is sitting. Such a structure is safe from



Fig. 10. SHORE-BAILY'S WEAVERS' AVIARY, SHOWING NESTS OF THE BAYA OR INDIAN WEAVER BIRD, FINISHED AND IN COURSE OF CONSTRUCTION. THE HEIGHT OF THE FINISHED NEST IS 40 INCHES.

squirrels, snakes, birds of prey and other enemies. The birds fly up and into the opening in the base as if by magic, without pausing in their rapid flight. The extensive waders' aviary is still larger, and measures 180 by 60 feet. Behind the children in the photograph (see figure 11) is a pond 30 feet in circumference attached to an open shelter where Spoonbills, Ibises, Pheasants and other birds roost at night.

Of the many practical features of these aviaries is the banjo-shaped nesting box which Mr. Shore-Baily uses for his parakeets and larger parrots. Figure 12 plainly shows the construction of this box, including the movable cover of the egg-chamber, that allows inspection of the nest and affords a ready means of cleaning it. The owner told me that he attributes a large measure of his success in breeding different species of parrots to the efficiency of this box. The feeding-tables are mostly made of the end-quarter sections of flour barrels. These, when inverted, hold all kinds of

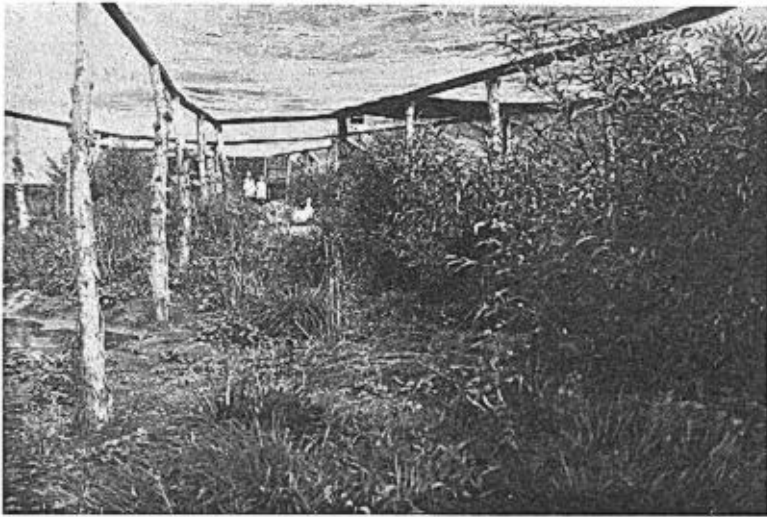


Fig. 11. THE WADERS' AVIARY AT BOYER'S HOUSE, WESTBURY. IT IS 180 BY 60 FEET AND ENCLOSES A POND 30 FEET IN CIRCUMFERENCE.

food very well, prevent waste and, when properly mounted on a central pole or stand, bid defiance to rats and mice. It may also be noted that Mr. Shore-Baily is a successful breeder of tinamous and rare pigeons.

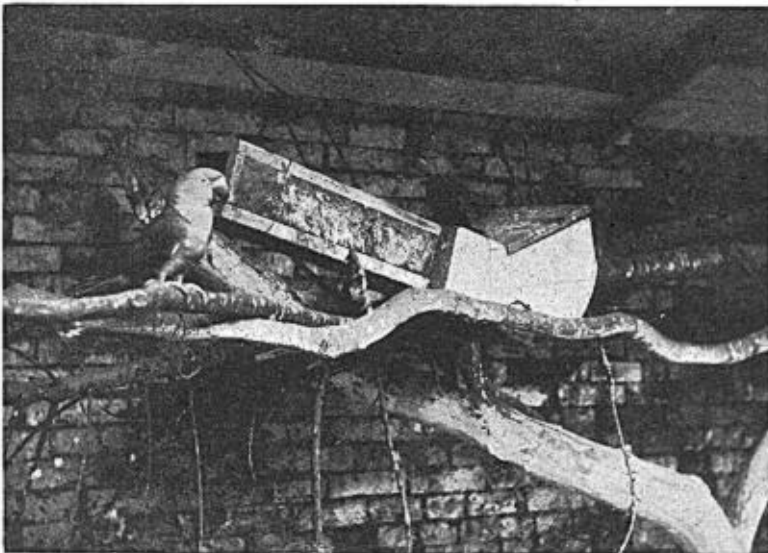


Fig. 12. ALEXANDRINE PARROT AND NESTLING, SHOWING "BANJO" TYPE OF BREEDING BOX USED BY MR. SHORE-BAILY FOR THE VARIOUS SPECIES OF PARROTS.

XIII. THE AVIARIES OF THE MARQUESS OF TAVISTOCK AT WARBLINGTON HOUSE

Lord Tavistock is well-known in England as an authority on bird culture and, among ornithologists, as the editor of the *Avicultural Magazine*. He is also an aviarist of originality and experience. He believes, *inter alia*, that aviary birds should be allowed as much freedom as possible, and also that not only should everything within the bird-houses be kept in apple-pie order and as clean as possible, but that as even the ground on which the shelters and flights rest eventually becomes infected, it is a source of disease and should be renewed. To meet the first requirement he, instead of building huge flights for his captives, permits many of those species that other aviculturalists keep in confinement, to fly in and out of the aviaries when they wish to do so. He relies upon restricting their range to his estate or its immediate neighborhood by plentiful feeding. The out-of-doors feeding tables are fitted with wire cage-traps, so that he can capture any bird at will.



Fig. 13. LORD TAVISTOCK'S AVIARIES AT WARBLINGTON HOUSE.

The Marquess had at one time a number of aviaries on the Isle of Wight, and there he had such a large and inexplicable mortality among the occupants of his bird-houses that he came to the conclusion, finally, that the high death rate must be due to infection not merely of perches and nesting boxes but of the very foundations and earth on which the aviaries were built. So he not only moved his whole establishment to another neighborhood, but constructed movable aviaries that once a year are shifted to new quarters, the old site being dug up and treated to a dressing of lime and salt.

That this wholesale removal may be the more easily effected, the floor of each compartment is made only of strong wire netting, through which the grass is allowed to grow, so that the entire building can be mounted on rollers and moved elsewhere.

As a further precaution against infection the nesting boxes after each incubation, and in any event, once a year, are treated to the blast of the acetylene flame, and the surfaces thoroughly scorched, thus removing old paint, etc. This procedure certainly kills every form of parasitic life.

It will be seen from the accompanying photos that the aviaries are of simple construction. The combined feeding tables are interesting. Three dishes are set in an elevated metal stand which, when outdoors, has a zinc cover. Two of these granite iron or similar receptacles hold food for both "soft" and "hard" bills; the other one is for water. All food is put into the aviary through a wall window, as little interference with the movements of the birds is the rule in this collection.

Of the many rare and beautiful birds we noticed at Warblington House, both captive and flying about the grounds, there is room to mention a few. Very attractive was a pair of magnificent Black Cockatoos, perched near their huge breeding box, a large barrel. A specimen of the Princess of Wales Parakeet (*Spathopterus alexandrae*) is also among the finest of the park birds; Lord Tavistock has bred (for the first time in England) this charming parakeet. In raising parrots, he believes in giving each pair an aviary entirely to themselves, and thinks that the privacy thus secured greatly increases the chances of a successful incubation.

But the avicultural scheme that is, perhaps, nearest the Marquess's heart is one that is to save, if possible, certain exotic species, especially parakeets, that at the present time seem sentenced to total extinction. There is, as every ornithologist knows, a long list of beautiful and often useful birds whose doom is near at hand unless some effective means are provided to prevent their extermination. As man is usually a potent factor in the death of these races, so should man come to their rescue. Lord Tavistock's plan, briefly, is to collect as many pairs of these threatened birds as possible and breed them under conditions and surroundings most favorable to incubation and permanent increase in numbers. In other words, to do for these vanishing species what has already been accomplished for the North American Bison and (on Little Tobago) for a race of the Bird of Paradise. The Marquess has suggested that California offers the best opportunities for accomplishing the desirable end. He points out that that state is nearer than any other available country to those lands whence the rare and delicate birds must be brought, that the climate is ideal for the purpose, and that a competent keeper could readily be found to undertake the care of the birds. In this connection, is not our own Carolina Paroquet a fit subject for such treatment, if, perchance, a solitary breeding pair still survives the crass stupidity of our bird murderers? Such an undertaking would have the sympathy and support of every aviculturalist in this country and abroad. The only question to be settled is, what good angel of an American (there is no money in England for even this worthy cause) will supply the funds?

Quite recently (March 15, 1925) I received the following from Lord Tavistock:

I am writing to ask whether any further steps can be taken with regard to my plan for saving vanishing species of parakeets? Further experience has still more convinced me that the plan is feasible in a warm climate, and impossible in ours. The hardy species, which unfortunately are nearly always the common ones in the wild state, even if rare in confinement, are doing extremely well in my movable aviaries, breeding and keeping free from disease. But the vanishing half-hardy varieties, though just as easy to find and just as willing to go to nest, are a constant source of worry and a very great expense, because of their tendency to develop chills in our changeable climate, where there is no month of the year when you can absolutely count on not having a sudden change from wet to dry or from warm to cold.

The necessity of wintering indoors is the greatest obstacle. Aviaries heated to withstand English winter cold must be fixed; and fixed aviaries always harbor disease

to a greater or lesser degree. If, on the other hand, the birds are continually caged the fertility of the males is permanently impaired, and the young do not develop properly after leaving the nest, when they should have flying exercise.

With great difficulty I have got together a stock of the beautiful Blue-winged Grass Parrakeet (*Neophema venusta*) of Tasmania, and although my birds are breeding, I know that I cannot possibly maintain them, either by myself or with the help of other aviculturalists in Europe, who fail to realize the extreme importance of the movable aviary; nor do they appear to be able to devote the necessary space to single species.

I quite think that the climate of California, though not, you tell me, as ideal in some regions as is sometimes asserted, would not prove too bad for the successful preservation of Blue-wings. A really safe, portable oil stove in the aviary shelter at night, or on bad days would, I imagine, be sufficient to keep the temperature not less than 60° even during the worst of the winter weather, because, where it is possible to grow oranges, you cannot have much hard frost.

The experiment could begin on a very modest scale, with two or three pairs that I am now able to spare, and I could send with them the fullest information as to the management most likely to insure success. I think that as a result of my years of experience I know pretty well everything that should and should not be done in dealing with this particular species. Americans show such energy and enthusiasm in preserving their native fauna that I feel sure someone could be found willing to take the time and trouble to assist in preserving beautiful and interesting exotic species otherwise doomed to extinction.

In the event of some avicultural society or aviarist accepting Lord Tavistock's generous offer, the Marquess has enclosed with his letter the following instructions for the management and preservation from extinction of the Blue-winged Parrakeet. With these directions, carefully prepared by an aviarist who is a world-wide authority on the subject, the scheme ought to be entirely successful if fathered by competent aviculturalists.

FOOD. Two parts canary seed, two parts millet, one part oats, one part hemp and one part sunflower seed. Also, plenty of green food and any non-poisonous weeds that the birds show a liking for. When the birds are caged the green food keeps fresh better if the stalks are put in a little pot of water. Plenty of clean water should always be provided for drinking and bathing.

BREEDING. The male Blue-wing is not difficult to distinguish from the female, as he is considerably brighter in color; the blue of the frontal band and of the wings is much more intense in the male. The female usually nests once a year, laying four eggs. Adult pairs must always be kept separate throughout the year, as they fight rather savagely. As is the case with all the larger parrots, Blue-wings are monogamous and pair for life. A female introduced to a strange male should be watched, as if she does not approve of him she may kill him. Trouble of this kind does not often develop, and the behavior of the two birds at their first meeting will indicate if there is danger of serious quarreling. The period of incubation lasts over three weeks, and the young are fed by both parents. This species begins to breed when twelve months old. Unless adult birds have plenty of flying exercise the fertility of the male is impaired, and the growth of the young is stunted and their stamina lowered. In the same way, young birds should be allowed to fly about. Otherwise, though to all appearance healthy and well grown, they are generally useless for stock purposes.

MOULT. Blue-wings moult late in the year, and special care must be taken not to expose them to sudden changes of temperature, or to very low temperatures, while they are shedding their feathers. Young birds, before they have completed their first moult, are more delicate than adults.

HOUSING. Each pair of Blue-wings should have a separate aviary not less than 28 feet long, 8 feet high and 8 feet wide. The aviary must be so constructed that it is possible to move it bodily at least once a year to a new location. Moving can best be done by the aid of rollers. At one end of the aviary there should be a closed shelter, well lighted, into which the birds are gently driven at night, and in which they are kept on cold days. The nesting boxes should be placed in this shelter. The floor of the shelter should be covered with a thick layer of sand, and it must be carefully and

regularly cleaned when the birds are not nesting. It is absolutely necessary to provide a false roof of canvas, fixed a few inches below the true roof of the shelter (or below the top of the cage, when the birds are caged). The top and end of the aviary flight must also have a false roof of string netting, kept taut, some inches from the wire. If this precaution is not taken the birds will fly against the wire, when alarmed (often at night), and fracture their skulls. To prevent the birds from biting holes in the string netting of the aviary flight and getting between the wire and string netting, smooth boards about a foot wide should be fixed along both sides of the aviary immediately below the string netting. In the construction of the aviary, all ledges in the framework should be on the outside, so as not to collect droppings. Arrangements should be made to feed the birds without entering the aviary or disturbing them.

The windows of the aviary shelter should be protected with both wire and string netting. Cages for newly arrived birds should be made entirely of metal, as they are less likely to harbor disease, and are easier to clean and disinfect than wooden ones. The perches should be of arbor vitae or other hard wood. These cages should also each be provided with a sliding zinc tray that must be kept well covered with clean sand. If desired, models of these aviaries and cages will be furnished. If the ground on which a movable aviary has once stood is to be used a second time, it must first receive a liberal dressing of common salt, followed after several weeks by a dressing of lime. Lime alone is useless except as a soil purifier. It is a good plan to accustom newly imported birds to the presence of their nest box by hanging it in the cage they occupy while recovering from the fatigue and other effects of their journey. If the future nesting place is not thus introduced to them the female may drop her eggs from the perch or lay them elsewhere than in the proper place.

These instructions may sound rather elaborate and may appear difficult to carry out, but as a matter of fact Blue-wings are less trouble to look after than barnyard poultry, provided the weather is not too changeable and severe. The essentials for the rearing and successful breeding of these beautiful parrakeets are: (1) for each mated pair a large, *movable* aviary; (2) canvas and string netting as additions to the wire; (3) green branches on the roof of the aviary when the day is hot and sunny; (4) shutting the birds in the shelter when the weather is decidedly cold.

SICK BIRDS. It is desirable to have a hospital, a little room or shed that can be heated to, and maintained at, a temperature of 85° to 90° F. day and night, for the treatment of these patients. Birds kept in proper, movable aviaries, as described, should never suffer from infectious disease. If housed in the ordinary, fixed aviaries, they often develop septicaemia and tuberculosis. As regards treatment of sick birds, chills are best met by keeping the patients in the sick room at a uniform temperature, between 85° and 90° F. A sick parrakeet ruffles its feathers and partly closes his eyes, which look dull and blurred. The eye of a healthy bird is bright and clear, is wide open, and looks absolutely round. A bird that sits with its "head under its wing" and both feet on the perch is certainly ill. If only one foot is on the perch and the other tucked up, it is merely resting.

Newly imported birds should be quarantined and kept apart from the other occupants of the aviary for several weeks. For some months additions to the aviary should be carefully watched, and if one of them shows an inclination to close or rub one or both eyes the bird ought to be isolated at once, as it may be suffering from a contagious and practically incurable form of conjunctivitis. On the other hand, eye diseases rarely occur among properly kept, acclimatized birds. Blue-wings are liable to sunstroke if exposed to the rays of the hot summer sun, and they are rather stupid about exposing themselves until the mischief is done. That is the reason for the advice to place leafy branches on the top of the aviary flight to break the force of the bright sunshine in hot weather. I am not in favor, however, of erecting the aviary under the shade of trees. Parrakeets recover very slowly from sunstroke. Birds so affected should be kept in a cool, dark room.

XIV. THE AVIARIES OF MR. ALFRED EZRA AT FOXWARREN PARK

In the extensive grounds of this beautiful country house there were many elaborate aviaries, some of them in course of erection. On the lawns walked gracefully about both Abyssinian and Stanley cranes; in the woods, at the rear of a line of aviaries, we saw lovely Impeyan Pheasants. The principal aviary terrace had a dozen units

with elaborately heated houses of refuge and nesting resorts. The flights were large and well planted with hardy trees and shrubs. This long row of bird houses Mr. Ezra plans to make still more extensive, for the accommodation of additional birds for show and breeding purposes. A feature in several of his movable aviaries (then under construction) was that the flights were covered one-quarter with galvanized iron, to give the occupants ample protection. There were many extremely rare specimens captive in this collection, among them a blue Alexandrine Parakeet and a white (albino) Mynah. *Spreo superbus* was bred (as a captive) for the first time in avian history at Foxwarren Park; this starling has laid eggs in other houses on several occasions, but without incubating.

XV. MISS CHAWNER'S COLLECTION OF OWLS AT FOREST BANK

Specializing in birds finds a successful exponent in Miss Chawner, whose outdoor aviaries are exclusively devoted to members of the world-wide order Striges. At the time of our visit to her the collection was housed in the garden of Forest Bank, and included thirteen species, several of them very rare as captives. Among these was a favorite pet, Edwin, who demanded much attention and kept calling until he was duly stroked and was allowed to perch on his mistress's finger. He was a fine specimen of *Ninox marmorata*, a wine-colored owl, fifteen years old, from West Australia. Another was a very large South American Owl (*Syrnium perspicillatum*), from Bogotá. Then there were curious Pigmy Owls, a pair of untamable *Scops leucotis* (the only ones ever bred in captivity), a *Bubo maculosa*, and a number of others. All these owls appeared to withstand the English climate well.

XVI. THE INDOOR BIRD-ROOM OF THE LATE MRS. DALTON-BURGESS OF HELSTON HOUSE

I have already given my reasons for preferring outdoor aviaries, equipped with as large flights as possible, to any other form, but, as I have also pointed out, birds of all kinds may be kept in a healthy state and even be induced to breed in a crowded indoor bird room. Perhaps the largest and most successful of these was in the

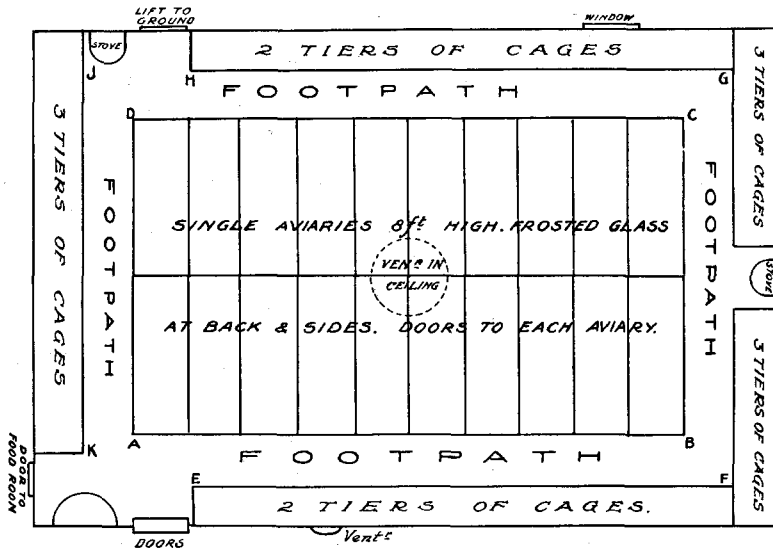


Fig. 14. PLAN OF MRS. DALTON-BURGESS'S BIRD-ROOM.

possession of Mrs. Dalton-Burgess who, at her death in December, 1924, had probably the largest private, indoor aviary in England. Her ambition, apart from the pleasure of collecting them and the cultivation of their companionship, was in the exhibition of her birds and in bringing them to perfection of plumage; breeding them was only an incident. Among the several hundred birds that occupied her cages during 1924 were three species of macaws, six species (nine individuals) of cockatoos, eighteen varieties (thirty-five individuals) of parakeets, six rare color-variants of Budgerigars (*Melopsittacus undulatus*), thirty-one Amazons and other true parrots, many conures, toucans, toucanets, tanagers, honey-eaters, etc.

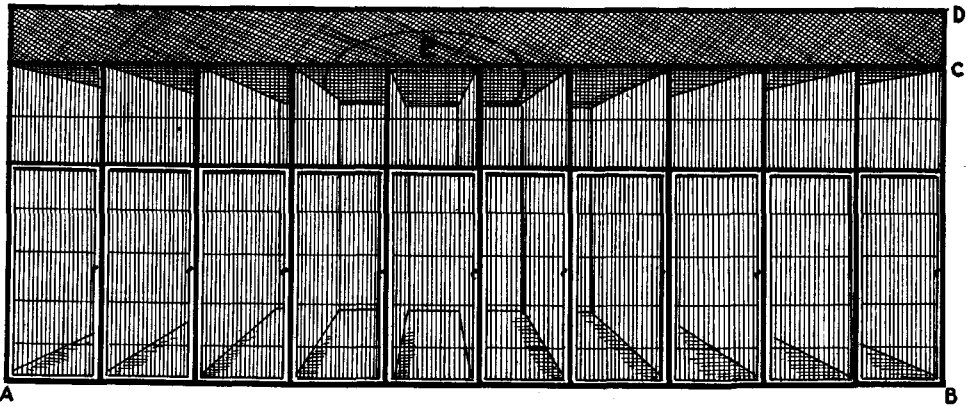


Fig. 15. MRS. DALTON-BURGESS'S BIRD-ROOM. SIDE VIEW OF THE CENTRAL AVIARIES.

At my request Mrs. Dalton-Burgess wrote a brief description of her bird-room and also furnished several plans that are here reproduced. The description of the aviary is as follows:

My indoor aviaries are housed in a large room on the top story of my town residence in Clifton. The floor and walls are covered with zinc. The backs and sides of nineteen of the central aviaries (see fig. 14) are of frosted glass, to prevent birds in neighboring compartments from seeing one another. Each compartment is provided with a separate door, the top of the cage being covered with wire netting. The upper part of the room is free of netting or other obstruction to the free circulation of air through the wire-covered glass skylight and the other ventilators. The perches, of wood, are made to resemble tree branches as much as possible. The cages are placed around the room against the four walls, in two tiers on the two longer sides of the room, and in three tiers against the remaining two walls. These compartments are all made of zinc painted with white enamel. Some of them have wire partitions, removable at will. Four hospital cages, placed near the two stoves that heat the bird-room, are for sick birds, provision that I find very useful. Increased heat properly applied has, I believe, saved many a bird's life. Two protected windows further regulate the temperature and the passage of air. The former was, day and night, kept at from 60° to 65° F. A lift provides the carriage of supplies to and from the bird-room. Double doors give entrance to the aviaries, and prevent the escape of any bird that may be flying around the room. A small room with a wire-covered window gives off the larger aviary, in which seeds, medicines and other stores are kept, where cages are cleaned and similar tasks completed. This smaller room is also covered, walls, floor and ceiling, with zinc, so that every square foot of it may be thoroughly disinfected.

The floor of the bird-room, as well as the bottoms of all the cages and compartments, are covered with "red-cedar litter", a coarse sawdust. This preparation has a pleasant odor, and is clean and absorbent; I have had the greatest satisfaction from its use. Every day the perches and interiors of the compartments and cages, as well

as the floor of the bird-room, are washed with a weak solution of lysol, a saucepan full of the same being kept continually at the boiling point on the two stoves, to supply moisture to the atmosphere of the room. I favor frequent bathing for my birds. Many of them take kindly to their daily bath. When they do not, I have them thoroughly sprayed, and I am persuaded they are all the better for this treatment. My birds are supplied with plenty of fresh, ripe fruit, and I give them only the best and cleanest seeds the market affords. Above all, nothing in the way of food that has the least suspicion of being stale or sour is ever allowed to enter the bird-room. A very little lime is added to the drinking water, which is frequently changed and kept as clean and as clear as if I had to drink it myself. As a result of all these precautions my birds are nearly always in good condition, and in remarkably fine plumage. Although I do not pose as a breeder of birds, yet I have had some satisfactory experiences in that form of aviculture. For example, the Black-cap Lory (*Lorius lory*) was, as a captive species, bred in my bird-room for the first time on record, and I have been very successful with the color-variants of Budgerigars, some of these having been bred by me for the first time in England. Among other successes, the Swainson Lory (*Trichoglossus*

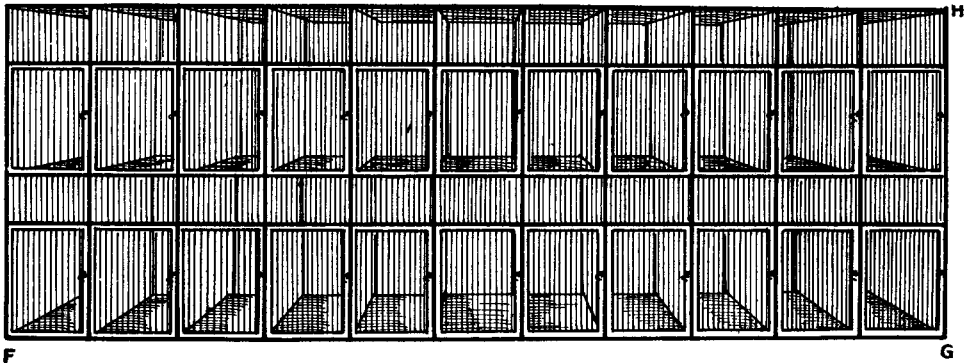


Fig. 16. MRS. DALTON-BURGESS'S BIRD-ROOM. VIEW OF THE SIDE AVIARIES.

novae-hollandiae) laid her eggs and successfully incubated them in one of my cages. Finally, I ascribe what measure of success I have enjoyed with all my more delicate, tropical birds to the uniform temperature and scrupulous cleanliness of my bird-room, to clean, fresh food, good ventilation and as much sunshine as the days afford.

I wish to add to the foregoing that, following the advice of her friends, Mrs. Dalton-Burgess, at her country house, Combe Dingle, had begun to convert her bird-room into outdoor aviaries. Had she lived, she would, doubtless, have made them even more successful than her celebrated indoor aviary.

VII. THE WHITLEY AVIARIES AT PRIMLEY HOUSE, PAIGNTON

I have purposely reserved until the last a brief description of this remarkable collection of birds, as it forms part of what is, so far as I know, the largest private zoological park in the world. Of a surety it surpasses the faunal exhibit in Golden Gate Park and might aspire to rank with the Washington Zoo not only in extent but in the variety and value of its contents. It is only the modesty of its owner that prevents this extensive zoo from being better known to practical zoologists. It was, of course, the aviaries that interested us most, and in fact they more than consumed the time at our disposal; most of the mammals and reptiles and many of the birds we never saw at all!

The shelters and flights of Mr. Whitley's aviaries are mostly of substantial build, brick on a concrete foundation. There is nothing special to be said about their furnishings, except that the owner believes in giving his birds plenty of clean, fresh earth,

not sand and grit, to eat, and he has noticed that they use it liberally. A number of the larger Australian birds (emus and cassowaries) are allowed to roam about in the paddocks provided for them, while several varieties of pheasants are given the freedom of the estate to nest where they will.

Of the many birds in the indoor collection, I was particularly interested, as was Mr. Whitley, in his fine array of rollers. Of these he had several species, in the breeding of which he has been very successful. In passing, I must note the pleasure I had in seeing, in both India and Ceylon, one of these, *Coracias indica*, perched on telegraph wires, and hawking insects. I am acquainted with no common, wayside bird in those countries that makes a braver show than this many-colored race, with its lovely shades of turquoise blue. Another blue bird (but blue-black) to be seen in the Primley House collection is the fruit-eating Raven (*Gymnocorax senex*); and to complete this mention of cerulean shades, I saw two unusually brilliant Hyacinthine Macaws, very gentle and tame.

I was much impressed by Mr. Whitley's statement that, notwithstanding the difficulties of climate, he was convinced that he could raise progeny from any normal pair of birds that could survive a reasonable time, a year, say, from the date of their importation. If such be the case, and ornithologists fail to establish a rescue station for vanishing species of birds, in California or some other favored locality, why not shift the task to Mr. Whitley?

Kandy, Ceylon, March 30, 1925.