

seen this bird take a pigeon on the wing and have heard of her killing Guinea fowl, but this is exceptional, and the common food seems to be rats and mice. Probably, if rats were not so common, these hawks would prey on birds, as their talons are very strong and were never made for mice. However, for the little time this grey hawk was in my possession, she gave me the impression of being very useful, but inclined to be slow and not to take enough trouble to try again should she miss her first stoop.

It must be understood that I had but little time at my disposal for this sport, and have only been able to make these few observations, but anyone taking the matter up more thoroughly and spending more time will, I am sure, be rewarded.

I have seen falcons passing overhead, but have not caught any, so am not in a position to make any remarks about them.

REARING AND TAMING OF WILD BIRDS

BY DR. V. G. L. VAN SOMEREN, M.B.O.U.

The subject introduced by Mr. Seth-Smith in the 'Uganda Note Book' is a very wide one, and one of absorbing interest.

I have, during the past two years, taken a great interest in the rearing and taming of wild birds. At different times I have had birds belonging to thirty-five different species—ranging from a Pelican to the small Finch commonly known as the 'animated plum.'

Mr. Seth-Smith mentions the Barbets. These, in my opinion, are exceedingly difficult to rear and keep, although one would not think so. I have had both young and adults, and the longest time any one of these lived with me was a fortnight. This was an adult caught off one of its sleeping-holes. I cannot account for this difficulty, for, as far as my experience goes, the chief food of Barbets consists almost entirely of insects and fruit, and the birds I kept were given a sufficient quantity of food and ate well. The mere fact that

they were confined seemed to have an adverse influence on them, and they appeared to droop from the first day.

I can corroborate Mr. Seth-Smith's observation on the tameness of these birds. Several pairs nested in my garden last breeding season, and at one of the nesting-holes I was able to procure several photographs of the adult birds. I stood alongside the camera, which was not more than three feet from the nest.

I must say, however, that tameness is not a common trait amongst nesting birds in this country. Sir Harry Johnston, in a review of a recent publication of ours—'Bird Life in Uganda'—remarked on the tameness of birds out here, and expressed surprise that the collection of photographs did not include some of the well-known species. I doubt whether the reviewer ever attempted to take photographs of birds at close quarters in this country. If he had, I am certain that he would have altered his opinion in a very short time.

Returning to the subject of Aviaries, the following is a list of those species which I have kept, and which, with the exception of those marked with an asterisk, have done quite well:—

<i>Hyphantornis Spekei</i>	* <i>Anthus trivialis</i>
<i>H. Reichenowi</i>	* <i>Lucinia lucinia</i>
<i>H. Fischeri</i>	<i>Elanus cœruleus</i>
<i>Vidua principalis</i>	<i>Turtur semitorquatus</i>
<i>Penthetria laticauda</i>	<i>T. damarensis</i>
<i>Serinus striolatus</i>	<i>Tympanistria tympanistria</i>
<i>Estrela phœnicotis</i>	<i>Chalcopelia chalcospilos</i>
<i>E. rhodoparia</i>	<i>Francolinus Granti</i>
* <i>Neisna nyanzæ</i>	<i>F. Schuetti</i>
<i>Lagnosticta brunneiceps</i>	<i>F. Hubbardi</i>
* <i>Spermestes cuculata</i>	<i>Pternistes infuscatus</i>
* <i>S. nigriceps</i>	<i>Coturnix Delagorguei</i>
<i>Pycnonotus Layardi</i>	<i>Limnocorax niger</i>
<i>Coracias caudatus</i>	<i>Balearica gibberieps</i>
<i>Lanarius humeralis</i>	<i>Pelecanus roseus</i>
<i>Corvus affinis</i>	<i>Strix flammea</i>
* <i>Barbatula sulphurosa</i>	<i>Pœocephalus massaicus.</i>
<i>Lamprocolius chalybeus</i>	

The list is fairly comprehensive, and contains most of the common birds which one would meet round Nairobi.

If one wishes to keep wild birds it is certainly false policy to have small cages. Those I have found most useful measure 10 feet long by 8 high and 4 deep. These cages, built on a veranda where there is plenty of sunlight and a fresh current of air, seem to suit the birds better than those outside. In any case the cages ought to be roofed, because of the intense heat of the sun and the heavy tropical downpours of rain which one has to contend with.

The wire mesh should be small, not more than $\frac{1}{2}$ inch, for in places frequented by genets or mungoses it is fatal to use wire of larger mesh, for through it they are able to kill and tear to pieces even large birds the size of a partridge. I have lost several in this way. Partridges and doves seem to have an extraordinary attraction for genets and mungoses.

One end of the run should be screened off on the outside, from about half-way up the sides reaching to the roof, to provide shelter from wind and driving rain. The floors should be well lined with gravel and sand, which should frequently be changed. Plenty of fresh water is absolutely necessary.

A few notes on different species of birds and their food may not be amiss.

Weavers do very well indeed. They are active and extremely interesting, and if not overcrowded will nest readily. They become tame quickly and are easily fed, doing best on a mixture of 'mwele,' a seed not unlike canary seed, matama and whimbi, and occasionally fruit, especially papaw. They are very fond of raw maize, greens such as lettuce, and chickweed.

The same food does for the smaller finches except those of the *Spermestes* and *Serinus* genera, which have to have plenty of fresh grass seeds.

To compensate for the loss of insect food I found it best to give finely minced raw meat once a week and larvæ of bluebottle flies, 'maggots' when obtainable.

Most birds are fond of white ants, and when these are abundant they should be given frequently.

As singing birds, the yellow-vented bulbul, *Pycnonotus Layardi*, and some of the *Cossyphæ* cannot be excelled, and

these can be kept easily, feeding them on fruit, bananas, berries, maggots, and minced meat once a week. Too much meat makes the birds pugnacious and scraggy in plumage.

Doves make good pets, but many folk object to them as they are not very active and spend most of the day preening themselves. As objects of beauty, however, I think it would be hard to beat the pretty green-spotted dove, *Chalcopelia chalcospilos*, or the white-breasted dove, *T. tympanistris*. The former has a note somewhat like *T. semitorquatus*, but much softer and more plaintive.

For colour, the long-tailed roller, *Coracias caudatus*, is an excellent bird, so also are plantain-eaters and glossy starlings. They are all easily kept.

All the birds mentioned so far are perching birds; to complete the runs one must have some ground birds, and one cannot do better than to procure a few Quail. *Coturnix Delagorguei*, a common species in the Kavirondo country, does splendidly. Those I have had for over a year have nested and laid several eggs, but owing to the crowded condition of the runs they did not sit.

A good bird of a different build and appearance is the little black crake, *Limnocorax niger*. These become tame in a very short while, and will readily feed from the hand. The drawback to keeping them is that one must have plenty of water, running if possible, and plenty of cover, such as long grass. With these the feeding is more complicated, but I found they did quite well on minced raw meat, boiled maize flour to which raw meat juice had been added, and maggots. The food was taken best if put in at the head of the stream and allowed to drift down with the flow of the water.

Francolins do well, but one really requires a large run to do them justice. They are best reared from eggs hatched under fowls or young birds in their first season. Adults do not tame easily, and, besides damaging themselves, frighten any other birds there may be in the run.

The most amusing bird I have kept is a pelican. It was obtained fairly young, just able to fly, and has been in my possession for nearly two years. It is fed on three pounds of

raw beef-steak per day. It is perfectly tame, and wanders all over the grounds and through the house.

The chief causes of death amongst aviary birds are pneumonia, avian tuberculosis, constipation through over-eating, and anæmia. If any bird shows signs of either of the former it should at once be removed.

THE ORGANIC CELL

PART IV.—ITS METHODS OF DIVISION AND STATUS IN THE PROCESS OF HEREDITY

BY E. WYNSTONE-WATERS, F.R.S. EDIN., &c., *Late Senior Demonstrator of Anatomy at the Royal College of Surgeons, Edinburgh.*

Mitotic cell-division ensures the continuity of life, and maintenance of the species, by passing on from cell to cell a counterpart of the chromatin which was the determining factor in its own organisation.

Cell-division runs in cycles, with a continual loss of energy. Rejuvenescence only occurs after the addition of material derived from the nucleus of another cell. The operation which results in this admixture is called fertilisation, and is the essential factor of sexual reproduction. The result of the fresh admixture of nuclear material is twofold:—the energy of cell-division is restored, and two separate lines of descent become fused in one. The actual reason why this double process should take place is unknown. One school of thinkers, represented by Herbert Spencer and Hertwig, believe that protoplasm shows a strong tendency to pass into a state of very stable equilibrium, and that in order to render it more responsive the addition of fresh nuclear material is necessary.

It has been pointed out that the life-history of the Metazoan is a parallel to that of the Protozoan, for in both of them, after a series of cell-divisions, a period of senescence sets in, which can only be prevented by conjugation. After conjugation