

FORWARD: BASH THIS BOOK!

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MINERALS AND DIET

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**FORWARD: BASH THIS BOOK!**

I guess you could call this a compiler's note, because I am not an author. These articles have been gathered from sources around the interwebs and written by people who actually know what they are doing. The purpose is to create a mobile reference that a pigeon fancier or wildlife rescuer could load onto a smart phone or PDA.

Most of the information was set out free of copyright, open to everyone with the time and search engine skills to find it. This is plagiarism in it's purest form, copy/paste of the finest Ctrl A + Ctrl C. In fact, I may have left in the original sources, or I may have lost the original sources and left off the the proper bibliographical references. If you read this book or were quoted in it and have something to add, complain, or mention, please email me. This is Philodice, a member at [www.Pigeontalk.com](http://www.Pigeontalk.com).

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Part 1:

**RINGNECK DOVE BASICS: HOUSING, PERCHES, AND BEGINNER'S TIPS:**

This article will help many of the first time fanciers of the Ring neck Dove who get the birds & then begin asking themselves, "What do I do now? How do I house them? What do I feed them? How do I tell male & female?"

Basically the Ring neck Dove, if in good health, is relatively hardy & can tolerate a lot of "dove stupidity" on the part of their new owners.

The first thing to consider is how to house the birds. A single pair of Ring necks can be housed very comfortably in a 2-foot square cage. This size provides enough room for the birds to exercise their wings & also provides room for young when they fledge the nest. Water & feed containers can be attached outside or inside the cage; depending on the fancier's preference. The nest container can be securely attached in a corner. A single perch (square or round) can be positioned in the center. Centering the perch keeps the birds from rubbing their tail feathers on the wire sides. Also, never place feed or water containers under any perch whether in a cage or walk-in flight.

What type of wire is preferred for the homemade cages? This is also left up to the fancier. Is the cage going to be inside? Outside? Inside of a large walk in flight? How is the water & feed containers going to be attached (inside or outside of the cage)? The wire used to build a homemade cage can be from ¼" hardware cloth to 1" by 2" welded wire. The larger "opening" wire will allow varmints to get into or reach into the cage. Using

"chicken wire" or plastic poultry netting is the cheapest & worst to use. Neither is very strong; the chicken wire can rust very quickly & a bird flying against it can find itself going thru the rusted area & becoming free. The varmints can tear the plastic poultry netting quite easily. Both need some type of frame to be attached to.

Store bought cages should be at least the size of a Rabbit or Cockatiel cage. A cage, which is longer than it is taller, is preferred for the doves. Doves do not climb the sides of a cage as the hookbills do.

If the birds are to be kept outdoors in a breeder cage set-up or walk-in flights a "top" covering the cage/flight with a 2" overhang on all sides should be considered. A solid top, of wood, tin or fiberglass panels protects the birds from the weather & keeps wild birds, which do carry diseases, from perching on the top of the cage & depositing their disease laden droppings into your bird's cage. There are a number of fatal diseases your birds can pick up from wild birds. Also placement of the cage outdoors should be considered so varmints cannot get the birds or at least disturb them.

For walk-in flights the flooring can be whatever the fancier desires. Drainage is a very important aspect; water should be drained away towards the outside of the flights. Standing water on the flooring can be cause for disease. Most outdoor flights have earth floors. If you choose earth flooring, be aware there are diseases, which if they get into your birds, their droppings will contaminate the soil & can remain for years. Birds put into these flights will eventually catch the diseases. Predatory or pests such as gophers, mice, rats moles etc, can tunnel into the flights. This can be avoided by burrowing a sheet of galvanized metal or fiberglass at least 18" into the ground completely around the outside perimeter walls of the flight. Mice can squeeze through ½" hardware cloth which might be used as the buried barrier – so it is not advisable to use it.

Cement can be utilized; cement or wooden floors should be covered with sand, small gravel, soil or wood shaving. What ever is used it will need to be removed & replaced when dirty & at least once per year. Platforms of wire can also be used as flooring, but some consideration should be made so that the area under the wire floor panels can be cleaned yearly or more often.

All outdoor cages/flights should be affixed with some type of "safety" door. This safety entrance will prevent any accidental escapes. The safety entrance is devised of two doors & a hallway; you enter the outside door & close it behind you before opening the door to the flight. Many fanciers have had that best bird fly past them to freedom, because they did not incorporate a safety entrance system into their flights. A simple screen door spring & hooks on the inside of the doors helps ensure the door comes closed & does not swing open if an inside latch is not used.

Perches: doves do not do well if forced to utilize small twigs, doweling, wire or rope. Doves perch with their feet flat. Metal perches should never be used; they can get too cold in winter & too hot in the summer. Wooden perches of about 1 ½" thickness are ideal. The perches can be lumber cut to size or large branches. The perches of this size

allow the doves to cover their feet with their feathers for warmth, preventing frostbite of the toes in freezing weather.

In the walk in flights, several perches can be used. Place them at different levels, remembering not to place them over the feed & water containers. The dominant bird or pair of birds will utilize the highest perch & allowing the less dominate birds to perch on the lower perches. Another good thing to remember is never a place perch above each other – for obvious reasons.

Ringnecks love to water bathe, providing a shallow container for the birds' helps keep their feathers clean & in good condition. A container of from 1" to 2" deep is best. It should be emptied or at least cleaned & refilled after the birds have bathed, as they will drink from this "water dish". Doves may bathe upwards of 3 times a day in the summertime. If adequate drainage is in the flights they will even sit under a lawn sprinkler placed so it sprays into the flights.

Another set of items is the seed & water containers. Many different styles can be used – from self-feeders/waterers to open dishes. Doves have no concept of cleanliness & will defecate into their feed, water & gravel containers. When these containers become soiled/dirty they can become a health risk to the birds, not to mention looking & smelling bad. With a little thought many ways can be devised for keeping the birds from contaminating their feed & water.

Clean fresh water is essential for all doves every day. Doves can go several days without feed, but only a very short time without water. One day with an emptied water container can be deadly for the birds in the hot summer. It is left up to the individual fancier on how to add multi vitamins/minerals to their birds diet. It can be done in the water or on the feed.

Birds kept indoors & not having access to sunlight will need the added mineral & vitamins. Also a good "full spectrum" light source needs to be utilized so the bird's body can utilize the mineral & vitamins. Note: sunlight coming thru glass is not beneficial except as a light, all the needed rays the bird needs are reflected by glass.

Most diseases that affect "pigeons" also can affect the doves. Utilizing the pigeon web sites for information, medicines & treatments will be beneficial. Several very good web sites are listed on the IDS LINKS page. Most will also accept phone calls & all are quite helpful & knowledgeable.

Doves do not "husk" their seeds as finches & hookbills do. Providing the doves with mineral/charcoal grit will aid in the digestion of the whole seeds eaten. Many may argue that the grit is not needed & has been studied. Most fanciers provide the grit for their birds. The brand name RED CROSS "pigeon" grit available at most feed stores, is the one most widely used. A good tip to follow on getting the right sized grit is to get one, which is about the same size as the seeds, which are fed. Grit too large will not be eaten & small powdered grit will be wasted.

Feeding the doves is quite easy, but usually depends on three factors: availability, affordability & the number of birds being fed. The "experts" say that a diet of between 14% & 18% protein with at least 4% fat is best. Some of the "Game bird or Turkey" starter feeds are 28% and may be too "hot" for the doves system. Feeding "hen scratch" by itself is also not a good idea.

If only a few Ring necks are being fed, then a "luxury" seed mix is not big problem. If feeding over 100 birds, then a well balanced, nutritional, cost effective no frills seed diet becomes essential.

Brand name seed mixes, which are blended for the doves, can be used, but are at times quite costly. A "pigeon pellet" can be utilized also, but size should be checked to ensure it is not too large for them to swallow. The seed & pellet diets can be combined & supplemental foods such as greens, breads, cheddar cheese, mixed veggies & diced fruits can be given if the birds will eat these items. Remember, begin with a clean seed mix & then add what you want. I use a wild birdseed mix, & add safflower.

The Ring necks are quite hard to sex visually. Many an "old timer" in the dove fancier will tell you "the only one who can accurately sex a dove is another dove & they sometimes make mistakes".

Average weight per grams - ranges from 140 to 215 grams. Using 160 grams for females and 180 grams for males is typical.

Many fanciers utilize the sexing of the Ring necks by doing the "pelvic bone" test. The bird is held upright & your index finger is run up between the legs to the vent area. For a male the two bones should be stiff, pointed & almost touching each other at the tips. In females the pelvic bones should be more curved, spongy, rounded at the tip & your finger should almost fit between the ends. This is not 100 %, as either scenario can be found on either sex.

Sexing the birds by visual signs is almost as difficult as the pelvic bone test & used as much as the pelvic bone test for sexing the Ring neck dove. Most times it is the male which does the typical bow & coo to another bird. However, many females do the same bow & coo to other birds & can fool even the best expert. If one becomes familiar with the typical male & female bowing & cooing one can usually detect a difference in the volume & intensity of the female who bows & coos as compared to a male. Many a fancier has set-up same sex pairs – either 2 males or 2 females. The female pairs usually do a better job of hatching fostered eggs (their own eggs will not be fertile).

A god tip to remember – two males will never lay eggs, two hens will eventually lay four eggs with no fertility & a male & female will lay two eggs & with incubation the eggs will be fertile. Ring necks can & will breed at 5 or 6 months of age; it is best to wait & pair birds of 9 to 12 months of age.

When a pair is set-up, be it a single cage or in a colony flight, be sure to supply a nest container of about 4 to 6 inches that is securely attached. In the colony situation supply two containers for each pair of birds. Place the containers in different areas & different heights. If no containers are provided for nesting the birds will nest in the seed or grit containers or even on the floor.

Nesting materials can be hay, straw, pine needles, thin pliable twigs, soft dried grasses, etc; of from 4 to 6 inches in length. Note: Stiff twigs can sometimes be positioned so that the ends poke or crack the eggs while the birds are incubating. Some excellent "pliable twigs" can be found on the ground under a pecan tree after the pecans have fallen & the tree begins losing its leaves. Never use any type of nesting string; yarn & such type materials "minute" strands can become wrapped around the leg or toe cutting off circulation & causing that limb to die - many times before the fancier see it.

Most times the pair will accept the nest container the fancier has provided for them. The pair may try to nest in the seed or grit container or even on the cage floor. They can easily be persuaded to utilize the provided container. If eggs are laid they can usually be moved to the container & the pair will cover them.

The male will sit in the nest & coo. He also "wing twitches" or "wing flipping" while cooing trying to entice the hen to his chosen spot. As the pair begins to "bond" they will "preen" each other about the head & neck areas. This strengthens the pair bond. This is called "allo preening". The male will court the hen bowing & cooing (courting mpeg) all over the cage or flight trying to get her to accept his advances so he can mate with her. When she accepts his advances they begin the mating process. They first begin by "billing" & preening each other in earnest & then the hen tries to get the male to "feed" her (picture). This scenario is repeated several times each day. After this is completed the male will mount the hen & they will mate. The pair will usually mate several times a day up until the hen lays the 1st egg.

In several unscientific tests I did, the fertility of the eggs laid can last as long as 6 days without incubation, then be put under a setting hen & hatched.

The clutch consists of two white oval eggs. The 1st egg is laid from 6 to 10 days after the pair has mated. From data collected over 25 plus years of dove keeping the 1st egg can be laid from early morning to late afternoon or early evening. The 2nd egg is laid within 26 to 46 hours after the 1st egg.

Both parents share incubation & chick rearing duties. Typically it is said that the hen time is from about 4 or 5 pm until about 9 or 10 am & the male sets the rest. Do not be alarmed if you see either bird on the nest or chicks at any time. I have seen the parents switch as much as 5 times during the daylight hours.

Incubation by the parent birds usually begins with the laying of the 2nd egg. Although the birds may set on the 1st egg, incubation or "brood" temperature may not have been started with the first egg. This allows for both eggs to hatch on the same day. Incubation

lasts 14 days – always give an extra day or two before tossing out the eggs. Incubation may not have started as expected. It may take the chick upwards of 24 hours to get out of the egg – so be patient.

From data collected on over 65 different species of doves/pigeons in my collection in the many years I have been keeping them – most times the eggs will hatch within 8 to 16 hours of each other; indicating that the hen begins "brood" temperature (incubation) before she lays the 2nd egg. I would say that in about 25% of the time both eggs will hatch within the same 8 hours & probably another 25% hatch a full day apart from each other. More than two days hatching difference can be devastating on the late hatching chick. The older chick is stronger & can beg for food more & can be fed quicker than the later hatchling. Within a short time the late hatchling does not have enough strength to compete with its nest mate & soon dies from malnourishment.

Both parents will feed the young on "pigeon milk" for the first few days of life. Each day thereafter the parents begin adding digested seeds to the youngster's feedings. At about 6 to 10 days the amount of feed fed to the parent birds can be increased. Water intake can also increase in the parent birds.

Young Ringnecks fledge within two weeks after hatching & can be taken away from the parents by 30 days. Always observe the young before removing them from the parents to ensure they are drinking & feeding themselves. If no interference is seen you can leave the youngster with their parents, even if the parents have gone back to the nest.

Sexing young Ringnecks is as difficult as in the adults. Close observations of the young many times will allow you to see young males "role" playing their sex by trying to bow, coo & even try mounting other birds.

Try to keep your cages/flights, whether indoors or outdoors as clean & attractive as possible. Keeping your cages/flights clean & attractive can promote or develop a more positive attitude from your relatives & friends who do not share your interest in this area of aviculture.

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#### RINGNECK DOVE HISTORY:

##### Ringneck Dove History

*Streptopelia risoria*

By John Pire

Dove fanciers around the world commonly keep the "RINGNECK DOVE". The "ring neck dove" was first described in 1758. It is also known as the Barbary Dove, Java or Sacred White Dove (white color phase) and Laughing Dove. In the circle of dove/pigeon fanciers when the term "ring neck" is used, most know which specie is being referred to.

I believe the "Ring neck" is the long domesticated form, some 2000-3000 years, of the African Collared Dove (*Streptopelia roseogrisea* \*). The original ancestor is unknown.

Most books and articles, which deal with wild dove/pigeon species, give the "ringneck" specific status under the name "risoria" in the genus "Streptopelia". Thus it is listed as: Streptopelia risoria.

In the days of pigeon/dove expert C.O. Whitman (1832-1910) the "Blond Ring neck" and "White Ring neck" were thought to be two different species/races of dove. They were even given separate Latin names; the "blond" was Streptopelia risoria and the "white" was Streptopelia alba.

The Posthumous Works of C. O. Whitman. C.O. Whitman did extensive research in the columbidae family; including studying a breeding population of Passenger Pigeons in captivity. The last living Passenger Pigeon "Martha" originated from a flock of C.O. Whitman's birds.

In Derek Goodwin's book; Pigeon & Doves of the World, 3rd Printing 1983; he states in his description of the specie: "wing & tail proportions usually as in parental form but often with proportionately longer tail. It is possible, but unlikely, that this may be due to past hybridization of domestic stock with Streptopelia decaocto". Further on in his description he states: " In recent years back-crossing to imported wild Streptopelia roseogrisea has resulted in "Barbary Doves" of the wild color being available. (Burger, R.E. & Hollander, W.F. 1971).

The "ringneck" was only known in the fawn and white colors up until the introduction of the African Collared Dove (Streptopelia roseogrisea). Once the African Collared Dove's wild coloration was introduced into the "domestic ringneck" many new color mutations began to appear. There are 40 plus known color mutations or patterns in the Ringneck Dove which are now know or accepted by the Dove Associations.

\*(S. roseogrisea is the African Collared Dove).

Personal thoughts from the author (J Pire) on the acceptance of which species was imported into the US and bred to the domestic Ringneck Dove.

Being interested in the Exotic species of doves/pigeons for many years I came to know many of the old time dove fanciers around the US. The story about the importation of the doves which were assumed to be Streptopelia decaocto and used to breed to the ringneck is told as the following. The big fanciers, J W Steinbeck, Sebastiani, Guy Hughes and others were always getting new birds from different sources. One importation included African Collared Doves (Streptopelia roseogriesea). Two of the three races were included in this shipment. The birds were brought in as RED-EYED DOVES. This name was listed on the shipment papers so that they could be exported form the place of origin. Here is the kicker - this name only applies or is used to describe a single "ring-necked" specie - the Red-eyed or Half-collared Dove (Streptopelia semitorquata). The Eurasian Collared Dove (Streptopelia decaocto) is not known by this name anywhere.

There can be no confusion between the two species, *S. decaocto* and *S. semitorquata*, they are totally different looking from each other (SPECIE COMPARISON). Size is also quite different, with the Half-collared/Red-eyed Dove being the largest of all the "ring-necked species". The *S. decaocto* also has a unique voice and calls; "spikes" on the underside of the tail; these two facets are not found in any other ring-necked dove species. Click the link for a pic of tail spikes unique to *S. decaocto*.

Hybrids between the *S. risoria* and *S. decaocto* show altered tail spikes. The major facet of the hybrids is their voices; the voices of the different parents are combined in the hybrids and is really screwed up in the hybrids. Hybrids of 3/4 and 7/8 back to *S. decaocto* can still have signs of the parent ringneck in their voices.

Another interesting fact is the "scream" of *S. decaocto*, whether it be male or female. This scream makes one take notice when it is heard. Both birds "scream" at the completion of the mating act. Males & Females "scream" when defending their territory, chasing other birds, alighting on top of a utility pole, etc. Even the hybrids with "risoria" screamed for the same reasons as pure ECD.

Males have a three syllable coo compared to the male *S. risoria*'s two syllable coo. Females also have this three syllable coo. (Visit the Calls page for the voices)

Having this interest in the different wild ring-necked species for over 25 years, combined with these points and many more I have observed of the differences between the two species (*decaocto* & *risoria*) leads me to believe the specie *S. rosegriesea* as the bird bred to the common Ringneck in the 1950's and 1960's. It was the specie imported.

I used personal experiences with the *S. decaocto* to make the conclusion I reached. I personally do not think these unique features of *S. decaocto* could be overlooked - on a new species being introduced into the fancy for the first time. The common ringneck (*S. risoria*) was only known in two colors (blond and white); this new specie was a different color, was much larger, had a different voice, had a unique undertail pattern and does not do well in small confinement. Hard facts to not notice or describe.

*risoria* & *decaocto* comparisons

Excerpt: British Birds, number 5, Vol. XLVI, May 1953; James Fisher -author.  
COLLARED TURTLE DOVE IN EUROPE  
The Barbary Dove

This small, pale form of a *Streptopelia* species appears to exist only in domesticity. It was first described by Linnaeus in 1756 as *Columba risoria*. It is often known as the "Collared Dove" and its superficial similarity to *S. decaocto* in the field has led to confusion, though the distinguishing characteristics are clear (apart from voice, size and colour, the distribution of black on the rectrices is quite different, and the blackish primaries of *S. decaocto* are diagnostic and a good field-character). The origin of *Streptopelia risoria* is not certain. Authorities such as I. Geoffroy Saint-Hilaire\* (1860,

1861, quoted Oustalet) and Oustalet (1901) -- favoring decaocto and others like Shelley (1883) and Hartert (1916) roseogrisea; but is probably derived from *S. roseogrisea*, brought across to Italy and other countries of Europe from the Sudan via Egypt as a domestic house-bird in the second half of the sixteenth century (see e.g. U. Aldrovandi, 1599; Adametz and Stresemann, 1948), Schwenckfeld (1603) records it as imported to Silesia at 2 guilders a pair. In Italy particularly, but also in other parts of Europe including south England, Barbary Doves have established themselves in gardens and parks in a semi-domestic, semi-wild state. A. E. Brehm, the Italian edition (1898) of whose *Leben der Vogel* (first published in 1861) is quoted by E. Moltoni (1950b), writes of a great number at liberty in the gardens of the Castle of Miramar, near Trieste; and F. Arnold (1897) mentions some "lachtauben" on the islands in Lago Maggiore which from his description are clearly Barbaries. Already by 1792 or 1793 semi-albino *S. risoria* has been introduced by the Dutch into Bouton Isle in the Tonga group. Pacific Ocean (Oustalet 1901) which led to the belief, entertained for some time, that the species originated in the Pacific.

Taka-Tsukasa and Hachisuka (1925) record that albino *risoria* were introduced by the Chinese into the Pescadores Islands, off the western coast of Formosa and have become quite common in the feral state, no coloured forms occurring.

\*I. Geoffroy Saint-Hilaire thought that the turtle doves kept as a table bird by ancient Romans was *S. risoria* and that it was therefore most likely to be of Asiatic (thus decaocto) origin. But the Romans' birds did not breed in captivity and were most likely ordinary Turtle Doves (*S. turtur*).

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#### ADDING DOVES TO YOUR COLLECTION:

I have received many questions from people who keep pigeons about adding doves to their collections. So when I was asked if I would be interested in writing an article for the Los Angeles Pigeon Club, I thought this would be a great time to address this topic.

Like many of you, I started keeping pigeons when I was very young. My love and interests grew for the birds as did my desire to keep different species. I raised Homers, Tumblers and Rollers and learned that methods of keeping varied between these types of pigeons. I also discovered that I had to provide differently for the pheasants I added to my collection. Even more differences were found when I wanted to add Ringneck doves, Diamond doves and now the many species of Exotic doves to my collection.

If you already have pigeons, you know the basic needs in housing, feeding, watering, and possibly breeding your birds. I will not attempt to detail each process from start to finish. My goal here is to bring up points that I feel are specific to the care and keeping of doves and how they may differ from your present practices in keeping pigeons.

The biggest problem I find that people have when adding doves to their collections is "Not Being Prepared" before the birds arrive. If you are interested in adding doves, do some research first. Talk to people who already keep the birds you think you want. Yes, I

said "think you want," because you may change your mind as you learn about the different species. Keep an open mind. With all the species of doves out there, there is one that will probably work well within your desires and abilities. Read all you can about the birds you want. Learn about their behavior in the wild and about their habits in captivity. I have found that most people keeping doves are very willing to take the time to help someone who shows an interest and willingness to learn. Check as many sources as you can. No one is an expert, especially when it comes to living things. By talking with and reading many sources, you will find many tips and methods that may work well for you and your situation.

Overall environment is probably the largest factor to deal with. Know your area well, noting the extremes that temperatures can reach, the amount of wind, rain and sun you can expect. Some of the larger doves, like Ringnecks, Wood Pigeons and Australian Crested Doves, can tolerate freezing temperatures and harsher weather. However, many of the dove species cannot. If you are unable to provide protected or even heated areas for the colder months, you will want to avoid the more delicate and less cold-tolerant species. A good example in higher management needed is in the raising of Cape or Masked doves. They are originally from the arid regions of South Africa. Capes can be fairly easy to keep as long as they are managed well. They are not cold tolerant at all. The hens tend to be rather delicate and a chill can harm them quickly. I have raised Capes for years here in Maryland, but I must bring them indoors in the Fall and cannot bring them back out until late Spring. I am fairly successful in breeding Capes, but it takes much more management and resources due to the environment in Maryland. In talking to others around the country who raise Capes, I find even when I have had a good year with mine, those living in more arid areas are even more successful. Maryland is very humid through the Summer. It seems the Cape dove does best in areas that are very hot during the day and have low humidity. So, take into account your overall environment, yearly temperatures, humidity, rainfall, winds, and direct sunlight and your ability to alter or manage these when researching the types of doves you would like to keep.

Housing requirements can also be very different for doves. Where many of the varieties of pigeon can be kept in the same coop, many of the species of doves cannot. Some doves get along very well while others can be very destructive to any other birds in the same flight. I follow a few rules, which I have found to be generally true. Species that live in different levels of the environment tend to get along. For example, a ground dwelling dove will generally get along with a dove that spends most of its time in the trees. I also find doves from different regions of the world often get along, where species from the same area (often competing for the same resources) do not get along.

Construction is also a consideration. When I was flying Homers and Tumblers, I had a single large door to my coop and cannot remember a pigeon flying past me to escape. Do Not try this with doves! If pigeons do escape, you often have a good chance that it will stay in the area and allowing you a chance to catch it. Though there are always exceptions, generally doves that escape will fly away and not be able to survive for long in the wild. I do not know of an exotic dove that can be free-flown and return with any regularity. Some will say that Ringnecks can be free-flown, but I have yet to see a

successful program. Doves can be very flighty and will fly upwards towards open light when startled. I recommend building a Man-Trap into all of your outdoor pens or buildings that will possibly have doves in them. A Man-Trap is an enclosed area that you can walk into and completely close behind you before you open the door to any area holding birds. This way if a bird does get by you, it can go no further than the Man-Trap and you can easily retrieve it. I have even seen people build and use portable Man-Traps that they can wheel to the entrance of the desired flight and enter safely. If a Man-Trap is just not possible in your situation, I have found that lower doors do much better to reduce escapes. Build doors narrow and as low as possible that you can still stoop through.

Ceiling requirements can also be different for keeping doves. The escape instinct of most doves is to fly up and away quickly. Many dove keepers find that stretching a small holed plastic netting about six inches or so below the ceiling of a coop or the welded wire of a flight greatly reduces scalping and more severe injuries from startled doves. Many doves also seek the highest areas of a coop or flight to roost in. I have heard of birds choosing to roost high and exposed to the elements rather than low and under the cover. They do not always do what is best for them when following instincts. Because of this, if the pen has an open wire flight area as well as a covered area for protection, it is better for the covered area to be taller inside than the wire flight. Provide safe perches in the taller areas or the birds may be putting themselves in awkward positions to roost high. Looking at the lower level of your pen, many doves spend a great deal of time during the day on the ground, searching for seeds and bathing in the sun. Some species even nest on the ground or very close to it. It is important to provide clean, dry areas on the ground available to direct sunlight for your doves. My last point on overall housing is on plantings. I rarely see pigeon coops or flights planted with live vegetation. With doves, having potted or planted vegetation often means the difference between a successful program or not. The plants serve a number of purposes with doves. They provide a more natural surrounding, more variety in perches, greater sense of security in cover to hide in and obstacles to slow down a driving male.

With pigeons and doves being in the same family, they do eat much of the same food. The size of the seeds often correlates with the size of the birds. If you put a good quality pigeon mix in front of smaller doves like Zebra or Diamond doves, the larger peas and seeds will be left while the millet and grass seeds will be gone. Research is still the key. It is important to know the natural diet of the birds to be kept. But, it is equally important to know what the birds have been eating at their last home. It is often too great a shock for doves to completely change their diet, especially when combined with the stresses of changing environments and homes. Be sure to have the last owner send feed along or tell you the last diet they were fed. If you plan to switch diets, do it gradually over a period of time. It has been proven that many doves do not need grit to survive; however, many do seem to enjoy having it available. Generally it is good to have a fine, starter sized grit available at all times. I also like to mix a little fortified red mineral salt in with the grit. Fresh water is a must at all times. It is very helpful to know where they are used to finding water in their last flights. Present water in as close to the same area as possible. With new birds, I provide water in many different areas of the coop or flight and gradually remove or move the sources towards the final location. Many of the dove

species benefit from other forms of feed as well. I provide a variety of soft foods. From time to time, I offer steamed rice, cornbread, mealworms, chopped fresh vegetables and hard boiled eggs crushed shell and all. They may not take to the varied foods at first, but quickly learn to seek them. With some doves, diet is very complex in comparison to feeding pigeons. The digestive system of Fruit doves requires completely different things to be prepared and fed. They are not set up for and cannot digest a regular seed diet. These are very high maintenance birds to keep and are not recommended for starters.

You will also need to approach breeding doves differently than pigeons. Where many pigeons will breed together in a large coop as long as nests are available and some territory can be established, most doves will not. Very few of the doves will breed in colonies unless very large areas are provided. Many doves are not comfortable going into an exposed box or closed compartment to nest. They often prefer open basket style nests that are well hidden. They generally are poor nest builders, so bowls or platforms with edges are very helpful. I try to provide at least two nest sites per pair of birds in the flight. I position the nest baskets in varied locations and heights throughout the flight. It also seems more important to provide some form of cover to help hide the nest location for doves. For example, Golden-hearts tend to be difficult to get to nest, incubate and raise the young without abandoning at some time. If you visit a friend of mine that I find to be very successful at raising these birds, you will wonder if there is any room left in the Golden-heart's flight for the birds. The flight is so overgrown with vegetation, that it is wonder he ever sees the birds. They surely must feel safe, secure and well hidden. They breed and raise young for him on a regular basis. I also mentioned previously that plantings and cover could be helpful during breeding. In some species of doves, the male can be rather aggressive, even harmful to the female. Cover and obstacles can be helpful to the hen in escaping and hiding from the male during this time. Some doves breed and raise very well in captivity. For those that do not, setting up foster parent pairs might be necessary. This added process should be taken into account while looking into what doves to keep.

So, if you are currently successful at raising pigeons, chances are you will also be so with doves. As long as you research the types of doves that will best fit your situation and make a few adjustments in your flights and management practices, you should get great enjoyment from adding them to your collection. To find more information on doves, their keeping and other contacts visit the American Dove Association at [www.DoveLine.com](http://www.DoveLine.com), 7775 Montgomery Rd., Apt. 15, Cincinnati, OH, 45236 or my website at [www.DiamondDove.com](http://www.DiamondDove.com), P.O. Box 4063, Frederick, MD, 21705. I will try to answer any specific questions you may have or direct you to someone who can.

Jeff Downing

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FEEDING RINGNECK DOVES AND PIGEONS

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Preffered seed mix and diet for Ringneck Doves:

The food is mostly seeds. In one major study by McClure it was found that more than 40% of the food by weight consisted of hemp seed from July to October. He attributed the high production of doves during a three year study in Cass country, Iowa, to the then abundance of hemp seed. Wheat and waste (cracked) corn are important in their diet, but the "natural" food is weed seed. The doves really eat large amounts of weed seed including foxtail, pigweed, etc. They may pick up 20-50 seeds per minute while feeding. Doves spend a great deal of time in nature walking around looking for seeds. Unlike the hookbills (keets, parrots, etc.), they do not husk their seeds. They swallow them whole. This makes it easier to tell when they need more food. They leave no trays of empty hulls as parakeets will.

Specific Seed mixes:

Nature's bounty mix:

Wheat, milo or kaffir, rice, millet, cracked corn, vetch, chopped peanuts, safflower and little black sunflower (high in oil) can be given.

Commercial box blend:

Mix 1/3 cup of each:

Parakeet seed

Wild bird seed

Canary seed

Fortified pellet blend:

Mix 1/3 cup of each:

fortified finch seed

parakeet seed

Cockatiel pellet

Ringneck dove Safflower mix:

millet, milo, wheat, black sunflower, canary grass, safflower and cracked corn.

Commercial millet mix for ringneck doves:

60% - German & Brown Top Millet

20% - Japanese Millet

10% - Black Sunflower (Peredovik)

10% - Penngrain DR or WGF Sorghum

Feathered Friends millet-wheat mix:

White Millet,

Red Milo and/or White Milo,

Wheat

Safflower,

Canola,

Oat Groats

## Buckwheat

### General Feeding Tips:

A dove's metabolism is very active and can starve to death in as little as 24 hours if it does not eat. Doves only eat off the top of what is offered, so be sure to check the food daily. They are ground-feeders, so are most comfortable with dishes placed near the bottom of the cage.

Some birds sweep their beaks through the seed looking for choice tidbits, so be prepared to vacuum under the cage often. Change the food and water every day, and keep the cage bottom clean. Soiled feed on the ground may spoil and cause illness. Ringnecks will also eat a wide variety of human table food. Some people say the wider the variety of food provided, the healthier will be the bird. We feed our ringnecks pellets on the advice of a veterinarian who maintained that once he convinced clients to convert their birds to pellets, they never had to bring their bird in for illness again. One of our birds, Brownstone, is now at least 16 years old and as far as we can remember he has always remained in perfect health. But then ringnecks are known to be a hardy bird and are rarely sick if kept inside. However I have noticed that birds fed entirely on pellets often weigh much less than those fed on seed. Recently I was keeping the ringneck in my apartment and weighed it when my daughter first brought him over. He weighed 150 grams which is on the low side of the range of 150 to 200 grams given by Danny Brown. After having been given the opportunity to eat seed for 11 days he reached a weight of 175 grams.

### Pelleted Foods:

Pigeon pellets or the smaller game-bird pellets (20 percent protein), or "crumbled" poultry feed, if reasonably fresh, are good for supplementing grain. The pellets will supply vitamins A and D3. The D3 is necessary if direct sun is not available. Purina pigeon chow and commercially prepared pelleted foods designed for parrots are acceptable pelleted diets for pigeons and doves. Since pigeons cannot crack seed they usually cannot break down large pellets either. Pellets must be able to be prehended and swallowed whole by the birds. Most pellets fed to cockatiels fit this size requirement.

Mazuri Small Hookbill, Zupreem Cockatiel Blend, Pretty Bird Pellets, Lafeber's Small Hookbill Pellets, and Kaytee Exact Cockatiel Pellets are all acceptable. If you can't find dove food, the best alternative pellet is vitamin-fortified parakeet food. Doves will switch instantly to pelleted foods.

### Supplements:

Doves like extra calcium (crushed eggshell, or oyster shell, or "granular F"). Granular livestock salt with trace elements such as iodine, cobalt, manganese, etc. is also useful.

This extra mineral supplement is especially necessary if the doves are raising young. Deep green leaves are often desired by the doves, such as dandelion leaves, but they are not necessary if pellets are given. Be sure that the leaves have not had herbicide sprayed on. Powdered vitamins can be lightly sprinkled on the fresh food, but putting it in the water can encourage bacterial growth.

Treats. Of course doves enjoy a change of pace in their diets. Keet foods have quite a bit of variety in them, but doves will appreciate different treats – even a little bite of bread or cracker. Greens, bits of fruit, and other little snacks go down smooth.

Spray millet and/or Mega millet (sorghum, milo) may be offered as a treat once weekly. Grated carrots, zucchini, etc., and dark leafy greens such as kale spinach, endive, chickweed cut into very small pieces should be offered daily. Whole wheat bread can be offered as small fragmented pieces and mixed into the seed mix. Doves appreciate deep green leaves, such as dandelion, but they are not necessary if pellets are given. Welcome treats include crumbled whole wheat bread, millet sprays, crumbled hardboiled egg yolks, fresh greens, small pieces of grapes and watermelon. Some birds are pickier than others, so keep experimenting.

Offer chopped dark green and yellow vegetables and a variety of fresh fruits in addition to a protein source like mature legumes, hard cooked chopped egg, and grated cheese. Remove fresh fruits and vegetables within 2 hours of offering to prevent spoilage. If the bird gets too much liquid from the fresh fruits and vegetables, the droppings could become runny. Stop the fresh food for a day to see if this is the reason.

Insects. In the wild, doves come upon and devour an occasional insect. They like bugs. In captivity, crickets, mealworms, and dried flies fill the bill. But their main food is seeds.

Grit. Because they eat their seeds whole (with the husks on), ringneck doves may need grit. They use it to grind up their food in their gizzards. Sprinkle a little bit of grit on their floor or provide a small cup of it -- as opposed to mixing it in their food. Let them decide how much grit to consume. Actually, they get along quite well with no grit at all. However, calcium grit will help put calcium into their system. Egg-laying females need extra calcium. You can have a cuttlebone to supply your dove with calcium and prevent beak overgrowth. Wild doves either find an outcrop rock containing a calcium source or else they supplement their diet with snail shells for this important mineral. Offer "8 in 1" oyster shell grit for canaries/finches daily. This should be placed in a separate bowl. Doves also like extra calcium (crushed eggshell, or oyster shell) in their grit.

#### A NOTE ABOUT MINERALS AND DIET FOR DOVES

by

Wilmer J. Miller

ADAN Nov/Dec 1987 p. 5

Doves need calcium for egg shell production and for feeding squabs, which need it especially for producing bones rapidly. I've been told that parents physiologically will

remove calcium from their own bones in order to give enough to their progeny. If this calcium is not replenished, reproduction will cease until the diet can re-supply the need; usually a matter of months.

The drain of calcium without supplement allows about two clutches to succeed before cessation of the breeding cycle. Rickets in squabs and soft eggshells are intermediate symptoms of calcium deficiency.

Salt too is a necessary mineral. Probably there is enough salt, per se, in the diet for normal needs. But the trace elements such as iodine, manganese, cobalt, etc. deliberately added to salt for livestock are also very good for doves. Granular fortified livestock salt (salt+) is what I use. While it may come in several colors, red is the usual color.

Given these two minerals, doves may reproduce continuously year round -- year after year. Calcium and salt+ consumption goes up greatly while the squabs are in pinfeathers (perhaps about day 7) until they are nearly independent at 3-1/2 to 4 weeks old.

I use "Granular F" made specifically for laying hens in commercial production. It is 98% calcium and sized just smaller than BB shot. It costs approximately \$2.50 per 50 lb. bag. Livestock salt+ is similarly priced. About 4 pinches of Calcium to 1 of salt+ is the basic ratio that I use in treat dishes. A reproducing pair of doves may eat all this amount in 1 day, if they have not had any for 1-2 days previously. My doves get it every other or every 3 days, while reproducing. Those in holding get it about every two weeks.

#### Grit And Sand Are Not Necessary

A mineral often cited as necessary is granite grit. It supposedly is necessary to enable the doves' gizzard to grind up hard seed. My doves at the University had no grit nor sand for 19 years and remained healthy and reproducing. Also for 6 years more at home they had none. I did note that they would avidly eat grit when it was offered to those going out of the colony -- until I started using Granular F. Then I found that the doves ignored the grit after trying 1 or two pecks. Although chick size oyster shell is adequate as a calcium source, it left a "craving" for grit. This is not so for Granular F!

My doves get the "soft" pellets, either Purina Chow Checkers, or the smaller Glenco pellets for 25-50% of their diet. Grain supplements of cracked corn and milo are available daily. Weekly supplements of the small oily sunflower seed and safflower are very much desired, but learned, food supplements. The first time or two offered, they are not much eaten.

Sporadically I also give spilled or recovered millets and canary seed from my finch cages. Others say peanuts are a good learned food item also, but I have not tried them. Dandelion leaves are taken as greens too. Well, this may be too soft a diet to need grit. Anyone out there with a contrary experience?

The mineral supplements I use also work for cage birds -- finches of several species, allowing continuous reproduction in Zebra finches, society finches, silverbills, canaries, etc.

Water:

Doves drink water like pigeons in a continuous draught. Morning and evening drinks is minimal with young, but at liberty is much better. Doves require fresh water each day. Wash and rinse their water cup out thoroughly prior to adding fresh water to reduce bacteria growth.

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**BREEDING:**

A Young Dove's Age Using Feather Molt of the Wings  
Dead in Shell Youngsters  
Diseases Transmitted to Eggs  
Leg Banding Procedures  
Hand Feeding Baby doves  
Ringneck dove care sheet  
Sexing Tips for Foreign Exotic Doves & Pigeons  
Shipping Doves 2004  
Suspending Incubation of Pigeon Eggs

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Tell a Young Dove's Age:

This article was written back in 1987, it is being rewritten so that interested breeders may calculate the age of young doves not close banded they obtain. It is based on the reading of books, articles on sport hunting of the native doves/pigeons in the US and personal data I did with birds in my personal collection.

The subject, which piqued my interest, was the studies experts have done on being able to determine the age of young doves taken in any given year. This data was derived from wild caught and captive raised birds under one year of age. I took the proven data and applied it to young birds in my collection.

The studies were done on "wing molts" of doves and pigeons in several different areas of the US. From these studies data emerged which showed a definite "molt pattern" that could be used to determine age of young birds – up until the time they molt their last "primary flight feather" on each wing.

One thing I noted while applying this to my young doves was; the first set of primary flight feathers of juvenile birds could be distinguished from the "adult" primary flights.

The first set of primary flights of a juvenile have a light colored edging not found in the adult primary flights. See Comparison Picture

The chart used averages the length it took each primary feather to be completely molted in. This average is 13 days. In most cases you can date the young birds close to the date it was hatched by comparison with the table. Remember this chart can only be used or applied to birds under one year old. GO TO CHART

A little knowledge about molting: Doves & Pigeons go thru a complete feather molt once per year after attaining one year of age. It is generally believed the molt is a continuous process, involving a few feathers at a time; but mainly occurs May thru October. Any time bald spots appear rapidly during the molt may be a sign of something affecting the bird, such as lice or mites or an accident.

Beginning at about 30 to 40 days of age, the youngster begins the first full molt. Each of the feathers is completely replaced in about 10/15 days. Roughly in about 150/170 days or about 5 or 6 months a young dove will have completed its "post juvenile" molt. For all practical purposes, from then on the feathers are the same as those of an adult bird.

All doves and pigeons have 10 primary flight feathers on each wing. These feathers are counted from the middle (bend of the wing) outward to the farthest primary feather from the bird's body. Each numbered feather on one side corresponds with the same feather on the other wing. In the molting of the primary flight feathers each wing will molt the same "numbered feather" at the same time and in the same sequence.

To count the primary feathers and locate the #1 primary flight feather; hold one wing outstretched, begin at the innermost feather at the "first bend in the wing" and count outwards to the last primary flight feather. A very simple way to locate this 1st feather is to begin counting from the last or outermost primary flight feather and go in towards the body. The 10th counted feather, will then become the NUMBER 1 feather.

This does not mean you will not find two different primary flight feathers being molted at the same time on the same wing. For example: say that the #3 & the # 8 primary flights are being molted at the same time. The simultaneous molting of feathers that far apart would definitely be out of natural sequence. In all probability one or the other was lost due to an accident or injury.

An accident would not necessarily affect both wings, so the #3 primary flight might be molting on both sides & the #8 on one side. Since the accidentally lost feather is replaced at the normal speed, the next question to ask is: Would this feather (#8) be replaced when it's respective turn in the primary flight molt succession comes due in the current molt? Logic says it would not be re-molted, but this has never been studied and proven or disproven.

One interesting facet, which came to light from the studies is that you can tell which feather had just recently molted or which feather is next in succession. To determine this

look at the primary flight feather covert feathers. These are the small feathers right above & cover the shaft of the primary flights. Each one of these primary coverts is molted prior to the corresponding primary flight feather being molted. Example: If the #5 primary flight is being molted look at the primary covert over the #6 primary flight – it should be molting also.

I applied the chart to many different species of doves and foreign pigeons I had in my bird collection. It calculated reasonably close to any young bird I applied it to. From my understanding most bird species replace their juvenile feathers at about the same length of time as the doves & pigeons. I am sure this chart could be applied to other species of birds, given the known time of juvenile to adult molt.

Author: Dr Colin Walker Title: Dead in Shell Youngsters

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With breeding now in full swing I receive regular calls from fanciers that fertile eggs are failing to hatch i.e. that the embryos these eggs contain are dying through the incubation time. Many fanciers immediately think of Salmonella when they see this, when in fact all infections together including Salmonella account for less than 5% of all dead in-shell youngsters.

And so just why do these youngsters die? Most youngsters that die in the egg usually die either in the first few days of incubation, or alternatively the last few days of incubation. In the first few days embryo death is usually due to either inadequate incubation leading to too low a temperature to keep the chick alive, excessive jarring of the egg that either fatally damages the chick or yolk, or alternatively, a genetic problem affecting the chick which is incompatible with life.

Towards the end of incubation, chicks usually die as a result of problems associated with hatching. As incubation ends the chick has to shift from getting its oxygen through the membranes that surround it, to breathing air and also re-absorb its yolk sac (which supplies it with both food and immunity). If the temperature or humidity is incorrect at this time these processes fail to occur correctly and the chick can die.

Between the beginning and end of incubation the chick is essentially just growing and it is here that nutrition and infection become more important. If the young chick is lacking a nutrient it needs for growth or becomes infected it dies.

This year has been a particularly good breeding season for me in that I have not failed to wean a single fertile egg i.e. every egg that was fertile has hatched and been weaned. I have now weaned 50 youngsters. Although pleasing this situation is unusual despite the best of care. I did however, have one fancier mention to me last week that he had had 30% of all fertile eggs fail to hatch. He did not seem overly concerned and appeared to think that nothing could be done. This is far from the truth. An embryo fatality of 5% could be regarded as normal. Anything more than this should arouse suspicions of a problem.

For those of you having a problem with dead-in-the-shell youngsters, let's have a look at the potential problems that can arise with each of these periods of incubation in more detail, so that hopefully the problem can be solved.

#### Embryonic Death At The Start Of Incubation

Deaths early in incubation can be detected by opening the egg and seeing that it is in fact fertile, but that the embryo is only poorly developed. As mentioned earlier, the usual cause is poor incubation leading to the egg becoming cold after development has started. Possible causes include improper nesting material, over interference by the fancier, inadequate control of nest bowl mites or pigeon flies, failure to provide second nest bowl for next pair of eggs, too many birds in a section, older arthritic birds, poor nest box design, competition with other birds within the loft, poor parenting, nest box too hot or too cold or poorly ventilated, disturbance outside loft etc. Also as mentioned earlier, eggs are very vulnerable to vibration type injuries early in incubation. Shaking or jarring can kill the developing embryo either directly or by rupturing the yolk. This is of particular relevance when eggs are being transferred for fostering. The effect of thunderstorms is a total myth. Embryos that are unlucky enough to have genetic abnormalities usually also die early in incubation. Genetic problems are more likely to occur with in-breeding.

#### Deaths From Day 4 To Day 14 Of Incubation

This is the longest period through incubation and yet is the time when least deaths occur. The embryo is simply growing. The growing chick receives its nutrition from the yolk and deaths here can reflect nutritional problems in the hen. Hens that are correctly fed produce nutritious yolks that support healthy embryos. The effect of stock bird nutrition is very underrated. By simply feeding a blend of 2-3 grains and grit it is not possible to prepare the stock hens well for breeding. Fanciers who believe they can do this often accept an elevated embryo death rate or several weak chicks in the nest, as normal.

Although embryos can die of infection at any time through incubation, it is at this time of growth that they are most vulnerable. Certainly there are some infections that can be carried by the hen such as Chlamydia and Salmonella, that can infect the ovary. These can be incorporated into the egg at the time of its formation, and subsequently infect and kill the embryo as it grows. Infection can also pass through the oviduct wall into the egg. These types of infections, that enter the egg prior to laying, are in the minority however. Most infections that embryos develop are caught after hatching in the nest. Nests that are dirty, poorly ventilated or excessively humid lead to egg- shell contamination and movement of infectious agents into the egg. Egg quality is also important here. Cracked, thin, mis-shapen, rough eggs allow easier entry of infection and are more subject to trauma. Poor eggs can be due to oviduct disease, but are more often associated with a nutritional deficiency in particular calcium deficiency. Some fanciers will have noticed eggs with translucent clear lines running around the outside of the egg, showing the eggs rotations, as it was passing down the oviduct. These thin areas can be an early sign of calcium deficiency.

#### Embryonic Deaths At The End Of Incubation

Through incubation a membrane called the chorioallantois develops around the chick. The chorioallantois acts a bit like a human placenta, in that it delivers air to the embryo after it diffuses through the shell. At the end of incubation the chick must swap from a chorioallantoic respiration to breathing air. It does this in two stages. First it internally pips. This involves cutting a small hole into the air chamber at the end of the egg and starting to breath the air it contains. At this stage vibrations can be felt in the egg and chick will sometimes vocalize. After another 12-24 hours the chick then cracks the shell and breaths external air. While this is happening the last of the yolk sac (the chicks nutrition during incubation) is drawn into the navel (and eventually ends up as a tiny sac in the wall of the small intestine called Merckels diverticulum which lasts the whole life of the bird). Interestingly, during this time, the chick also drinks the clear fluid around it called the amniotic fluid. This amniotic fluid, and also the yolk sac contain the antibodies that protect the chick from infection in the first few weeks of life.

While all this complex physiology is going on the chick is vulnerable to problems. Too high or low temperature or humidity during this time will adversely affect the chick. The usual problem, is however, too high a temperature, or too low a humidity. This combination causes the shell and shell membrane to become hard and dry. This can lead to even a healthy chick becoming exhausted. In addition to this, the chick quickly becomes dehydrated. I am sure many of you, myself included, have helped these chicks hatch only to find them dead later. These chicks die because they are dehydrated. Such chicks if given small drops of water will often suck them down greedily and survive. These dehydrated chicks are called sticky chicks because of the way they stick to the dry shell membranes. They are often found dead after hatching  $\frac{1}{4}$  to  $\frac{1}{2}$  the way. If removed from the shell they often have unabsorbed yolk sacs and there is often dry, gluggy albumen still in the egg. For consistently high hatch rates, it is vital the stock birds have access to either rain or a bath around this time. If not possible the underside of the hen and also the eggs can be lightly misted with water from a spray bottle. Ideally the nest box should have a temperature of 20-25 degrees celsius, and a humidity of 70%. If unsure, a thermometer and hygrometer can be placed in the nest box.

In summary, in most lofts hatchability can be dramatically improved by three simple steps:

Improving stock bird nutrition in the months prior to breeding.

A fresh nest bowl for every round, and ongoing nest box hygiene.

Access to rain or a bath around hatching.

If attending to these matters does not help, your avian veterinarian will usually want to test the hen for infection, or alternatively do an egg autopsy.

Dr Colin Walker

BSc, BVSc, MRCVS, MACVSc (Avian health)

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DISEASES TRANSMITTED TO EGGS

Early embryonic death, blood ring, dead-in-shell.....these terms frustrate and confound aviculturists, novice and professional alike. The reasons that embryos die are many, and diagnosing the specific cause of death can prove elusive in some cases. The serious aviculturist, whether a hobbyist or one who makes her living from bird breeding, should seek to work with an experienced avian veterinarian who can help with all facets of aviculture. Every egg that dies prior to hatching should be examined by an avian veterinarian who can perform an egg necropsy and any other tests that may help to determine the cause of death. Often, histopathology (microscopic examination of tissues) will prove diagnostic, if the embryo has recently died. Bacterial and fungal cultures, stains of egg membranes, viral isolation and DNA PCR probes for specific organisms may help in diagnosing the cause of death.

There are many infectious organisms that can be transferred from the hen to the egg that may cause the egg to die. In some cases, the infectious organism may infect the egg, yet the embryo may continue developing, and may even hatch, carrying the organism at hatch time. If an organism is passed from an infected hen directly into an egg, and then into the developing embryo, this is called vertical transmission. The term vertical transmission is also used to describe transmission of an infectious agent from a parent to an egg during fertilization, during egg development in the oviduct of the hen or immediately after oviposition. Once the egg is laid, some infectious organisms can pass through the eggshell upon contact with contaminated feces, urates or bedding. This is also considered vertical transmission if infection occurs immediately after laying. Some organisms are transmitted from the ovary to the egg, and this is called transovarian transmission. Infectious organisms harbored in the oviduct can also be passed into the egg prior to the shell being formed. Some organisms can infect eggs if contents from the cloaca contaminate the surface of the eggs, and then penetrate the egg. The other method of transmission of infectious organisms is by horizontal transmission. Some ways that horizontal transmission occurs are by preening, inhalation, copulation, insect or animal bites, ingestion, contact with contaminated equipment or fighting.

It seems obvious that prior to the egg membranes and shell being applied to it, the egg would be susceptible to infection by numerous infectious organisms. Even though the eggshell appears solid, it contains microscopic pores that can allow liquids and organisms of small enough size into the egg. The pores allow the transfer of gasses, as well.

#### Bacterial Diseases

*Chlamydia psittaci* is a primitive bacteria that can be vertically transmitted from an infected hen through the egg to the embryo. Depending on the pathogenicity of the strain and the number of organisms that are passed into the egg, the embryo may die during incubation, or it may actually hatch as a baby bird with chlamydiosis. It should be noted that transovarian transmission of chlamydiosis has not yet been confirmed by researchers, so it may be that the eggs are contaminated with the organism by some other vertical method.

One avicultural client of mine with over one hundred pairs of large psittacines was having a problem with a pair of blue and gold macaws. They pulled all of this pair's eggs

for artificial incubation, and several eggs in the incubator had died about half way through incubation. During the egg necropsies, I tested for chlamydiosis by sending in a swab for DNA PCR testing. I also tested the adult breeder pair for chlamydia, using the University of Georgia tests, which include DNA PCR testing of the blood, DNA PCR testing of a choanal and cloacal swab, plus a latex agglutination titer, which is run at the University of Miami. The eggs were positive for chlamydia, as were the parent birds. I recommended that the breeders remove from the incubator those eggs from the blue and golds, and place them in a small incubator alone. There were five remaining eggs that were in the early stages of incubation. To increase hatchability of the potentially infected eggs, we began a course of egg injections, using injectable doxycycline, which is an excellent drug for chlamydiosis.

The eggs, much to our surprise, all continued to develop, and all five actually hatched on schedule. As soon as the eggs hatched, I instructed the owners to begin medicating the hatchlings with oral doxycycline, which would be continued for 45 days total. Because all baby birds receiving antibiotic therapy should also be prescribed antifungal medication to prevent infection with *Candida* sp., we also started the babies on a combination of oral nystatin suspension and fluconazole. The babies were also prescribed avian lactobacillus and acidophilus to give them some normal, good bacterial flora.

The five baby blue and golds all developed normally and weaned on schedule. Subsequent testing showed that these babies showed no signs of chlamydiosis. It should be noted that testing is not always 100% accurate, and although treatment is often curative, some birds may never clear the organism from their system completely, resulting in asymptomatic carriers. However, these macaws all have thrived and I have followed several to adulthood, and all have remained healthy.

Bacteria of the genus *Salmonella* can also cause embryos to die in the shell, or if the egg is contaminated by a very small number of bacteria, *Salmonella* can cause weak hatch babies that may die shortly after breaking out of the egg. The bacteria may cause yolk material to coagulate in the egg, and dead embryos may show hemorrhagic streaks on the liver. The spleen and kidneys may be congested. Pinpoint areas of the liver may be necrotic. Inflammation of the pericardium may also be seen. *Salmonella* are motile bacteria that can penetrate the eggshell and can be transmitted vertically. Culture of the infected embryo will prove diagnostic.

Some *Staphylococcus* bacteria can kill embryos. The avian embryo can be resistant to some strains of staphylococci, but can be highly susceptible to other strains. Infected wounds on parent birds can infect eggs, as can staph infections found on the hands of aviculturists, if the egg comes in contact with lesions. Artificial incubators will grow staph readily, and it can spread horizontally in this manner. An embryo can die within 48 hours of exposure to some strains of staph, especially *Staph. aureus*. The older the embryo is at time of first exposure to staph, the less chance of embryonic mortality. Hemorrhages may be found on various internal organs. A laying hen can develop an ovary infected with *Staph. faecalis*, which can contaminate the forming egg.

Contaminated eggs will have up to 50% mortality. Culturing the egg is important for diagnosis.

*E. coli* is a common bacteria normally found in the GI tract of mammals, and some birds, as well. It can enter the egg from an infected reproductive tract of a hen. *E. coli* can also penetrate through the eggshell if the egg is contaminated with fecal material. *E. coli* commonly causes yolk sac infection, causing the yolk sac contents to appear watery and yellow-green or yellow-brown. Dirty nests and cages can serve as sources of contamination to eggs. The use of water bottles can reduce the amount of *E. coli* that builds up in the GI tract of birds. In my experience, aviaries that use a watering system and not water bowls will have fewer problems with sub-clinical bacterial infections in their breeder birds and their offspring.

Many embryos infected with *E. coli* will die late in incubation or shortly after hatching. If an *E. coli* infection is acquired during incubation, the hatchling may develop an umbilical and yolk sac infection (omphalitis) and they may have poor weight gain. Cracked eggs are more easily infected and may serve as a source of infection for other eggs in the incubator. Cracked eggs should be repaired as soon as the damage is discovered, or they should be discarded.

#### Mycoplasma

Mycoplasmatales are one order of microscopic organisms that replicate by binary fission. They have no cell wall, but have a three-layer membrane. They are more primitive than bacteria, and must live and grow inside the host. In the environment they live only for a short time. Although we have much to learn about mycoplasmas, they can be involved in problems with cockatiel conjunctivitis and respiratory infections, and also respiratory/eye problems in other species of pet and breeder birds. The organism is spread by the respiratory excretions and by the gonads of both sexes, and infection in the air sacs can lead to contact transmission of the ovary and developing follicle. Transovarian transmission can occur. *Mycoplasma* can spread to the egg from an infected oviduct or from the semen of infected male birds.

It is possible to treat eggs infected with *Mycoplasma* infections. Tylosin is injected into the air cell at the start of incubation. A combination of lincomycin and spectinomycin is also effective for egg injection. Dipping the eggs in antibiotic solutions is effective in reducing the incidence of disease, however I have never used this method personally.

A third treatment that has been useful in breaking the transmission cycle of *Mycoplasma gallisepticum* and *M. synoviae* involves elevating the temperature in a forced-air incubator to 46 degrees C for 12-14 hours before incubating the eggs normally. This technique inactivates the *Mycoplasma* organisms, but it will reduce the hatchability by 8 to 12 %.

#### Viral Diseases

Several important viral diseases are vertically transmitted in birds. Psittacine Beak and Feather Disease, (PBF), has been demonstrated to be vertically transmitted, since the

virus is found in the blood of infected birds. It has been shown that artificially incubated baby birds from PBFD-infected hens will consistently develop PBFD. So, attempting to control PBFD by pulling eggs for artificial incubation is futile.

Avian paramyxovirus 1, (Newcastle's Disease or PMV 1), is one of a group of nine distinct serovars (with several more yet to be characterized) of the virus that are dangerous to birds. Although paramyxovirus is theoretically vertically transmissible, this mode of transmission is considered unlikely because infected hens will generally stop laying eggs when they are viremic. Eggs contaminated by virus-laden feces immediately after laying could contaminate an incubator, and can serve as a source of virus for recently hatched neonates.

Herpesviruses, most of which are quite species-specific, include Pacheco's Disease Virus, Amazon tracheitis virus, respiratory disease in *Neophema* sp. and *Psittacula* sp., wart-like or flat plaque-like lesions on the skin of psittacine birds, budgerigar herpesvirus, pigeon herpesvirus (infectious to budgies and cockatiels), falcon herpesvirus (infectious to budgies and Amazon parrots), and Marek's disease (suggestive lesions in budgies). It has been theorized that some hens latently infected Pacheco's Disease virus can pass the virus (and antibodies to the virus) to their eggs. The resulting neonates would be latently infected carriers that might not develop detectable levels of antibodies. Herpesvirus of European budgerigars causes feather abnormalities (referred to as "feather dusters") and is thought to be egg transmitted, and has been demonstrated in dead-in-shell embryos and is considered a major cause of early embryonic death in affected flocks, resulting in decreased egg hatchability.

Proventricular dilatation disease, PDD, is an enigmatic disease that is being diagnosed with increased frequency. Although we have much to learn about this disease, my personal experience indicates that PDD may be vertically transmitted. I am working with an aviary that has a pair of severe macaws whose eggs were taken for artificial incubation because the parents often damaged the eggs after being laid. The eggs were placed in a brand new incubator, and the babies were the only ones in the nursery while they were being hand-fed. The owner had problems with the babies from day one, as the crops were slow to empty, and they did not gain weight properly. The babies had to be given antibiotics, antifungals and motility enhancers (cisapride) to get them to digest their food at all. One baby died when it was six weeks of age, and histopathology showed all the classic PDD lesions. The second baby died shortly after weaning and once again, histopath confirmed PDD. Histopathological examination of tissues from a dead bird (especially the proventriculus, ventriculus, crop, small intestines, and brain) is the only way to confirm PDD in a dead bird, as grossly, many diseases can look like PDD. When the PDD tests that Dr. Branson Ritchie at the University of Georgia is developing are available, we will be very interested in testing the parent birds of these two babies. At this time, barium radiographs may render a presumptive diagnosis, and biopsy of areas of the gastrointestinal tract may prove diagnostic if positive, but once the new testing becomes available, it will be much easier to screen for this terrible disease.

Some adenoviruses, REO viruses, and reticuloendotheliosis viruses can be vertically transmitted. Influenza A may be vertically transmitted, as well.

#### Parasites

Oddly enough, some parasites have been documented to occur within eggs. Adult ascarids (roundworms) have been found within eggs. These worms get into the egg by moving from the cloaca up into the oviduct, where the eggshell is then placed around the aberrant parasite. The fluke, *Prosthogonimus ovatus* can be found in the oviduct of Galliformes and Anseriformes, and may also be trapped within an egg, but the flukes are more likely to result in abnormal eggshell formation.

#### Conclusions

As our knowledge of avian medicine and theriogenology grows, we may discover other organisms that can be vertically transmitted. But with the information that we have today, it may be possible to save some eggs that have acquired an infectious agent. Egg injections are routinely performed in my practice, and this has greatly increased the hatchability of infected eggs. And by testing for the infectious organisms that we can treat the parents, as in the case of many bacterial or chlamydial infections, resulting in healthier baby birds.

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#### Leg Banding Procedures

The best time to band your baby birds is when they are between 5 and 10 days old. You can tell if they are ready by looking at the ankle joint and at the size of the band. Remember to use extreme caution when handling young birds. Hold them firmly, but DO NOT squeeze them or they will not be able to breath. It is recommended to do the whole banding procedure over a table in case the bird wiggles free from your grasp. Start by holding the leg to be banded with your thumb and forefinger.

Be sure to have the band, a toothpick and some lubricant ready BEFORE you begin. It will make it easier on you to put the bands on right side up, this way you will be able to read them more easily once on the bird. Put the tips of the three front toes into the band. Make sure you don't have the back toe in just yet.

Banding your baby birds just before their parents go to roost in the evening will prevent them from picking at the band. By the next morning they will have forgotten about it. Slide the band up over the back toe. If the ankle joint (the joint where the toes come together) is a bit large for the band, use a bit of lubricant to avoid any discomfort for the baby bird. If you wait too long to band the baby bird, the ankle joint will be too big for the band to pass over it. DO NOT try to force the band over the joint.

Make sure the band is near the tip of the back toe. You can usually pull the back toe out of the band with your fingers, but this is where you can use your toothpick to pry it out from under the band. After this point, the band should be in the proper place between the ankle and the elbow joint.

Now that wasn't so hard, was it? The only thing you need to do now is to check on the babies in a couple of days to make sure the bands haven't fallen off and make sure there are no scrapes or irritations on the foot or leg.

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Hand Feeding Baby doves.

Quite often I will have to hand feed young doves and pigeons. Sometimes from the parents abandoning them or a young pair that has not had experience raising offspring. I often like to have bonded birds as they make excellent pets. Parlor Roller Pigeons are known to accidentally knock their young out of the nest so I will have to step in and hand feed and care for them. It is not as hard as you think but it takes time and practice. In the picture you will notice the syringe on the top has a piece of fish tank tubing attached to the end. I use this one only when there is an emergency and the young need water, electrolytes or is just not eating at all. I will gently insert the tube into the mouth and into the throat and down just enough to pass the breath hole. Then you can push in the warmed electrolyte - water into the crop. **DO NOT OVER FEED!** The young will aspirate moisture into the lungs and die or become sick later. Be very careful as the back of the throat is very easy to tear or damage. I only use small soft tubing. I got this syringe at my dentist's office and the tubing can be found at pet stores. But make sure it's the soft, flexible kind.

The best feeding method I have found is by using a Syringe with a rubber eye dropper. Cut off the end making an opening for the birds beak. You can find syringes from most feed stores and vets. I use a small 3 cc syringe so the food does not get cold too fast. The rubber piece is from Wal Mart in the baby section. Drill out part of the inside of the syringe so the food can flow through smoothly. I just use the rubber part of the dropper. Cut out a hole in one end and attach onto the syringe. After a short time the plunger will start to stick so I have started applying a small amount of cooking oil on it so that it is lubricated and will move smoothly.

As you can see here they can make quite a mess. I use a warm wash cloth to whip the access food off of the young. This little Shakh Sharli Pigeon squeaker was neglected by it's young parents. You will notice that the baby bird formula in the container is setting on a large sock that is full of rice. I sew the end together with string and warm the rice sock in the microwave for 3 min. It keeps the formula warm. If the food cools it can be very bad for the young.

I usually do a big feeding in the am as they are quite hungry and the crop is empty. Then another smaller feeding around noon and one more before bedtime. At around 3 weeks of age I will place them on a white cotton towel with small bird seed. (white millet mostly) and introduce them to seed. It might take time but using your finger you can pick or peck around the seed as if you are a bird eating. If you have other young that are tame you can just have the younger ones watch the older ones and soon they catch on. but you will still have to hand feed. At this stage I start making my mix a bit more runny so they get more water with what little seed they do eat.

If they have started to eat mainly seed you will have to show them water. Use a small water dish. I use a Gerber's baby glass jar as the little ones can not knock it over as easy. Dip their beak into the water to show them where it is. It will take more time to teach this and may take days for them to catch on. I always check the babies crops to see how much seed to water ratio is in the crop. If it feels thick and hard they will need some water.

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### RINGNECK DOVE CARE SHEET

courtesy of Mary Ellen Robinson

Ringneck doves need a cage big enough for them to flap their wings without touching their wing feathers and tail feathers on the cage bars. A large cockatiel cage would be suitable. For ringnecks, the larger width and depth size is more important than height. 1 or 2 perches per cage is enough...The cage sizes I have in my aviary for breeding pairs are 18x18x24, 20x20x30, and 24x24x32...

My Ringnecks are accustomed to eating their food and drinking water out of open bowls placed on the bottom of their cage. Avoid placing their bowls under perches, or the food and water will get soiled.

My Ringnecks do well on a good wild bird seed mix, or a small hookbill mix. They also need a small dish of grit and oyster shell available at all times. Ringnecks swallow their food whole, and the grit helps them grind the food up internally for better digestion. The oyster shell is added for the calcium, important to an egglayer's diet...

Fresh water is essential to the health of all birds. Occasionally you can offer your doves an additional large bowl of water to bathe in. They are comical to watch while bathing...Ringnecks are generally very clean birds...You can also mist them with a light spray of water from a clean spray bottle, in place of a full bath...

Ringnecks LOVE treats! Some like to nibble on greens pinned to the bars of their cage, or eat them when chopped in a treat bowl. They also enjoy spray millet in their cages. Cornbread or whole wheat bread crumbled, are also big favorites. They enjoy cooked and cooled mashed sweet potato, cooked and cooled couscous, cottage cheese, shredded cheese, shredded carrots, and a hard boiled egg, cooled and mashed with the shell included! (More added calcium!) Offer these a few times a week, and only a spoonful per bird. Be sure to remove the leftovers (if any) after a few hours, so that the food doesn't spoil...

Ringneck doves are sweet natured and naturally tame. Give them a day or two to settle into their new home, and begin to finger tame them. Talk to them and let them get used to your voice and movements. Coax them onto your finger inside the cage, and then gently take them from their cage. They will fly around the room, but will not fly for long and will settle down quickly. Patience and time will pay off, and soon you will have a wonderful new friend...

## Recommended Resources

### Websites:

The American Dove Association Website- If you own doves, I encourage you to join today! <http://www.doveline.com/>

The International Dove Society is a wealth of information for anyone interested in doves... <http://internationaldovesociety.com/>

Dr Wilmer Miller has long been recognized as an expert in Ringneck genetics and development. <http://www.ringneckdove.com/>

The Dove Page-Another website absolutely packed with information on doves. <http://www.dovepage.com/>

Diamond Doves-a website devoted to these very popular small doves.

<http://www.diamonddove.com/>

A personal favorite! A website devoted to Raising Pet Doves. This site is wonderful! <http://www.petdoves.com/>

### Recommended Books

Not much is written on doves in book form. (That's why this e-book exists.) But I highly recommend these two books...

DOVES: A Complete Pet Owners manual by Matthew M. Vriends, Ph.D. This book is put out by Barron's Books

Diamond Doves: A Guide to Color and Care, by Jeff Downing. This book can be ordered on Jeff's Diamond Dove website listed above, or by email at: [djds@erols.com](mailto:djds@erols.com), or call 1-800-878-9501

This is a recipe I bake at least once a week, to feed my breeding and pet doves. It is very simple to make, and is relished by all my birds here.

### Homemade Bird Bread

#### Ingredients:

2 boxes(8 1/2 oz each) corn meal muffin mix

3 eggs

2/3 cup milk

1 packet or tablespoon brewer's yeast

1/4 cup high protein baby cereal flakes

1/4 cup raw wheat germ

grated carrot, sweet potato or yam. (I usually use 1 or 2 carrots)

Mix all ingredients and pour into a greased 9"x13" cake pan. Preheat oven at 400 degrees and bake for 10-15 minutes or until done. I usually let the cake cool, and cut it up into squares, and freeze them, so that I have a piece of cake whenever I need it. Just take what you need out of the freezer and let it thaw, and you've got a fresh baked, healthy treat for your birds. I offer this to pet birds a few times a week, and to parent birds that are feeding their young every day. Just crumble a bit of the cake into a treat bowl and watch them gobble it up!

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Sexing Tips for Foreign Exotic Doves & Pigeons

By John Pire

This article was found in a folder while cleaning out several boxes of "dove" junk. This article was handwritten, back in 1992. It is on the sexing techniques I found, tried and documented as being accurate on adult and juvenile foreign exotic doves and pigeons. Some of the differences are quite noticeable and some are very minute. Some of these tips work on the juvenile birds and other tips only prove out when the juveniles has attained their adult plumage.

Many dove fanciers will never make the close observations I point out in this article. Then again, reading what is written here may entice you to try and observe the techniques I am about to describe. The sexing techniques I documented were tested and proven on more than the birds in my collection. I have been keeping Foreign Exotic Doves and pigeons for 24 plus years. I had well over sixty different species from 1986 through 1992. I needed a way to sex the non-dimorphic species. In my collection I commonly kept at least three unrelated pair of each species. Many of these tips were also tested on birds from different collections and birds I saw for sale at bird sales or shows.

These tips are presented as an aid to the fanciers. If in doubt about any of the birds in your collection do not hesitate to have them S/S (surgically sexed); DNA sexed or Chromosome sexed.

For example, the tips on the Australian Crested Pigeon were done on 20 birds in my collection over the 5 years I kept them. I also used the techniques on about 30 + Crested not in my collection.

Australian Crested: I first learned of the sexing tip for the Australian Crested after I had bought three pair from different breeders and only ended up with one true pair. This was at a time before the USPS allowed shipping of "pigeons". Airfare was a bit costly so getting a "true" male and female pair was essential. The "true" pair came from a breeder in Northern California. Needless to say I questioned the other fanciers I had gotten the "pairs" from and was told I got what I asked for – a pair of Australian Crested. A pair equals two. I called the breeder I had gotten the "true" pair from and asked if he had any extra hens he could sell or trade me. He said yes, he had an extra hen and a deal was struck. I promptly purchased the hen. That was back in about 1987. Through conversations, with this breeder, about the Crested back then, I learned how to sex the birds using the "wing shield patch of color". He had learned this technique from several "old timers" in the dove fancy. From that beginning I observed another difference in the sexes of the Australian Crested Pigeon.

The "wing shield patch of color" of males and females look the same; but there is a difference in this patch of color which will determine the sex of the bird. This tip only works on birds that have attained adult plumage or are at least one year of age. The best situation is to have your birds banded with plastic bands or marked in some way. Without knowing the sex I would use a black and red magic marker to mark the individual birds. You can use any mark you want to identify each bird you're are going to sex. After sexing, bands can be placed on the proper legs to indicate the sex of each bird. With the bird held in your hand and facing the same way you are the male is banded on his right leg and the female is banded on her left leg.

This tip utilizes the secondary flight covert feather. These feathers contain the reflective patch of color. To make the best comparison you must pull the same feather from each bird. I hold the birds' wing open and select the feather having the greatest amount of color in it. Take these two feathers into the direct sunlight. Pulling these feathers and holding these feathers in direct sunlight gives the best light reflection. It is also easier than trying to hold both birds to do the comparison. It does not hurt, the bird, to pull a feather. As you hold the two feathers in the sunlight you will see a purplish and blue coloration patch in each feather. Both colors are present in males and females. The greater amount of either color will identify the sex of the respective bird. More of the blue color indicates the bird to be a male. More of the purple will indicate it is a hen. Do you remember which feather came from which bird? You should have marked the feather with the same color marker as you marked the bird you pulled it from. If no difference is noticeable then the birds are of the same sex. When you finally find two feathers showing this difference in blue & purple you will have gained an important sexing tip for the Australian Crested.

I went another step further; if this applied to adults then there might be a tip for the juvenile birds. I tried the "wing shield color patch" tip on the youngster after they had

fledged and again after their next molt (the 2nd molt is not the adult molt). Each time these two feathers grew in completely I pulled the same two feathers. No differences were seen until the third or fourth time the same feathers were pulled and compared together. More often it was the fourth time being pulled and re-grown and pulled for comparison that they then could be sexed. Young Crested ten to twelve months were tested and it was noted that pulling the feathers one time and checking for a difference was about 5% accurate. The accuracy increased when the new feathers, which were re-grown are pulled and checked.

In doing this research I began to notice that the "iris color" of the sexes were different. The eye color is only accurate in adult birds. The "iris" in males will have a bright orange color ring at its edge. Female's lack this orange ring or may have just a trace of it. It will be duller when compared side by side with a male. Her "iris" may also be a greenish gray color lacking any other color.

These two techniques work opposite in the juveniles, the feather comparisons show all the young to be hens. In the eye comparison, the eye color shows all the young to be males.

The feather comparison technique is also accurate in the plumed dove – except the colors are gold and green instead of blue and purple. I have not done any eye comparisons in the Plumed Dove. A well known California breeder of Plumed Doves, who has since died, taught this tip to a select few. He was known for having quite a lot of Plumed Doves.

Sexing juveniles of dimorphic species is quite easy. Some of the dimorphic species are; Ruddy Ground, Ruddy Quail, Blue Ground, Dwarf Turtle, Tambourine and Cape Doves. The juveniles of these species, except the Cape, have plumage similar to the female. The juvenile Capes have a dappled or spotted plumage. This tip can be applied while the young are in the nest or when it fledges. In all but the Cape and Tambourine pull a few feathers in the wing shield, chest or back. If a male; the new feathering will come in showing the male's adult coloration. For the Cape, pull a few feathers in the area where his "mask" extends to the chest area in the adult male. If the feathers come in black it is male, if they come in brown it is a female. On the Tambourine pull a "patch" of feathers on the chest, if they come in "white" the juvenile is a male.

The Black-billed Wood Dove can be sexed as adults. It is a bit hard, but close observation of male & female will show the small difference. The area under the chin of both (at the base of the bill) shows the difference: the hen's dull breast coloration extends to the base of the bottom bill. In the male, his head and neck coloration extends around to the underside of his neck. This is a slight difference and was noticed in two adult pair & four young when they attained the adult feathering. I never owned the Red-billed Blue-spotted or Emerald Spotted Wood Doves, so I cannot state whether this tip will apply to them. I did see a few pictures of a pair of the Red-billed Blue-spotted Wood Dove. It might be possible this sexing tip could apply to this species.

Sexing the juvenile Common Bronzewing is easy: as the juvenile bird begins to go thru the juvenile molt the feathers on its forehead attain adult colors. If the "ochre" coloration is retained with the new feathers it is an indication the bird is a male. If these "ochre" forehead feathers are replaced with gray colored feathers this is an indication of the bird being a female. This begins at the base of the forehead by the bill and molts towards the back of the head. If you want, a few of these forehead feathers can be pulled & they will come in the adult coloration as described when the young fledge. The pulling of forehead feathers was tested on only two young Brush Bronzewing. The sex was indicated when the new feathers grew back in.

Senegal Doves: the males are usually much brighter across the backs than the hens. The male has a solid dark eye, looks almost black. The female has a brownish "iris" ring and a dark pupil. Of interest – the hatching hair is a sexual dimorphism facet I just recently finished documenting in the seven breeding pair of Senegals in my collection. This aspect has proved to be accurate for the sex of the hatchlings. I am in the process of writing this article for publication (2/01). Article was finished 6/01. Yellow-Eyed Mutation Dimorphism

Green-wing Doves: a dimorphic species. The easiest tip for sexing the juvenile Green-wing while they are in juvenile feathering is to look at their tail feathers. Even the nestling can be sexed (see details below). There is "no" deviation in this fact. The tails feathers of the young are the same color as what they will be in adult plumage. All males will have the dark or blue-gray outer tail feathers. All females will have a "chestnut" coloration in the outer tail feathers. I have not found this fact mentioned in any descriptions of young in any book. The book on the birds from New Guinea (I purchased it for the Imperial Pigeon information) noted the "chestnut" coloration in the adult female Green-wing. In Derek Goodwin's book, Pigeons and Doves of the World (3rd printing) there is no mention of this obvious color difference in either the adult hen or the juvenile.

The nestling bird in its "barred" plumage can also be sexed. The nestling Green-wing has a red-brown and black "barring" effect. The red-brown feather tip is the indicator of the birds' sex. One can see this difference when comparing the young. If no difference is noted then the birds are of the same sex. The width of this red-brown tip is what you want to compare. You do not need to pull any breast feathers from each nestling, just look at the two young next together and compare the width of these feather tips. These tips have been measured and the sexes have a different width. The thinner "red-brown" tip is a male. The thicker "red-brown" tip is the female. This can be used before the tail feathers grow in enough to sex the youngster. "Using the tail feather difference is the best and easiest method to use for the Green-wing Dove."

Stephan's Green-wing Dove: I personally observed the two pair of imported Stephan's Green-wing Dove. One pair had raised a single youngster and it was off the nest. I drove two hours to view this specie and the youngster. I was hoping the owner would allow me to collect some feathers from the adults and the youngster. The owner would not allow me to handle any of the birds or enter the flight cage. At the time I did not own a camera and had forgotten to borrow the son's 35 mm before leaving. This was the first time this

specie had been bred in the US and he did not want any unnecessary intrusions. (G. Scott 1990)

White-crowned Pigeon: sexing adults is easy, typically the male has a white crown and the hen has a dirty white crown. Some hens show the pure white crown; she will still have the characteristic brownish overcast or suffusion across her back and wing shields. The male has a "clear" dark gray almost black coloration on the back and wing shields. Sexing adult White-crowns from the front (even with the hen having a white crown) compare the chest and belly areas. There is a difference. This is best done on a comparison of the birds side by side. The male has a uniform color from bill to vent, The hen looks like she has two gay colors meeting at about the middle; with the lower area seeming a bit lighter than the top half.

Sexing juvenile White-crowns can also be done. The juvenile is similar to the adult hen. First year WC sport a dirty white "half crown". At the base of the top bill the first feathers may be "white". If so, it is a male. If these first feathers are "dirty" white it is a hen. The "eyebrow" feathers will also indicate sex. If "white" it is a male; if they are "dirty white" it is a female. You can also pull a "patch", the size of a dime, of the juvenile feathers on several places. I prefer to do each wing shield and two places on the back. If they come in and you cannot see any color difference the bird is a female. If a male, the feathers will be a "clear" dark color and will stand out against the brownish suffusion.

Luzon Bleeding Heart Pigeons & Bartlett Bleeding Heart Pigeons: eye coloration in male and female are different. In Luzon's, males have a "bluish" iris. Females have a "purplish" iris. This eye color difference is also noted in the young when they begin to attain adult plumage (J. Croce 1989). Many fanciers have said this iris coloration is not present in their birds or birds they have seen. I cannot refute their statements. I have seen S/S pairs the owners said this difference was not present. Upon seeing the birds & pointing out the differences they also saw it. I even received a S/S pair that the fanciers adamantly said the iris color was the same. I noticed the bluish & purplish color upon taking the birds from the shipping box. The man who told me and others about this tip suggested taking the birds into a darkened room & using a small penlight or flashlight and shine the light on the bird's eye. The purplish & bluish coloration will be seen. I personally have not had to use a darkened room yet.

Mountain Witch/ Crested Quail Doves: Jacob Hadomi has sent in a tip for sexing this specie of "quail dove". The link to the picture shows a very definite coloration difference between the sexes on the vent regions of the birds. Many times the differences are not this pronounced, but if close observations of the vent regions can be done and one knows what to look for, then even minute differences can be seen.

(Tip from Jacob Hadomi in Israel)

Pinon Imperial Pigeon: sexing tips done on six imported adults and four captive raised young. The "iris" color difference was noted in the adults, males had a lighter colored "iris" when compared to the hen's "iris." The width of the white "tail bar" or "tail stripe" also indicated sex. The male had a wider "bar". The vent region also showed coloration

differences in the sexes. Males have a light cream and maroon vent area and the hen sports a dark maroon vent region.

**Olive Pigeons:** Olive Pigeons are not considered to be a dimorphic species. However, as the birds mature the males and females tend to obtain some slight dimorphism. When the males attain 3 or 4 years of age the eye cere begins to obtain an orangish red coloration. With more age this coloration tends to increase a bit. There is also a tendency of the head area to be somewhat darker in the adult hens when compared to the adult male. This coloration is not 100% accurate though. One fancier sexed his Olive Pigeons by the cere coloration and was correct in 7 of the 10 birds before he had them surgically sexed. (Tip from Jacob Hadomi in Israel)

**Ashy Wood Pigeons:** This species has a coloration difference between the sexes. It is best described as the male being a brighter color than the hen. Check out the picture of the pair to see this difference. (Tip from Jacob Hadomi in Israel)

In the fruit doves/pigeons I kept, which were and were not dimorphic, differences were noted in "iris" ring color differences. The juvenile fruit doves/pigeons I raised had feathering which was similar to the hen's coloration. Pulling a few feathers, in the areas which corresponds with the adult male coloration indicated the bird's sex when the feathers came back in. A note was also made that some of the juvenile "iris" color was different from either adult bird and at about four months would begin getting the color of its sex. The male's "iris" color if the young was a male and the female's "iris" color if it was a female. These two tips were utilized in the Black-naped Dove and Pink-necked Green Pigeons. The "iris" coloration difference of adult birds was noted in Pink-necked Green Pigeons, Spotted Imperial Pigeons, Pink-headed Imperial Pigeons, Pinon Imperial Pigeons and Black-chinned Fruit Doves. NOTE: in nestling Pink-necked Green Pigeons (Treron vernans) the pin feathering along the back area looks to be an indication of the bird's sex.

In closing I ask that everyone take a closer look at the species of doves they keep in their collections and apply the tips I have described here. It is hoped that you can learn some of these and apply them to your birds. When you sell your birds to an interested fancier you will be able to guarantee they have a "true" pair (male and female). I would also hope that you impart your sexing tips to them so that they can apply the tips to their birds and pass along the information. It is asked that if you know of other tips for sexing foreign exotic doves and pigeons please drop me a note about it (describing the details). I would also ask that if anyone does have any tips to please share them with other dove fanciers.

Please don't write me with sexing tips using the well known "thread and needle"; "pencil and string"; "pelvic bone sexing"; the "up or down tail position sexing tip" or any other "old fancier's tip" – these are ONLY 50% accurate. Although, these types of sexing tips become 100% accurate when a known sex is required by a potential buyer. I am not saying the "pelvic" sexing tip does not work. It is the most widely used sexing technique in many species of birds not only for the doves and pigeons. I know many fanciers who

have the "knack" for this type of sexing and their "sexed birds" have been verified as correct by producing young.

If you have any tips for sexing your dove/pigeons please share them with IDS, so that other fanciers can benefit. Just use the email link below and send your tips & articles.

J. Pire – rewritten 2000 & updated 2001. Thanks to the fanciers for sharing their sexing tips of the birds in their collections. This article will be updated whenever tips are received and verified as working as they are stated.

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#### A New Experience- Shipping Doves

by Mary Ellen Robinson

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Whenever I start to think about doing something new, I always spend so much time thinking about the "what if's" (like-WHAT if things go wrong?) that it tends to hold me back from doing it in the first place. In hindsight, I now see how smooth and easy it was to ship my birds, and I wanted to share my experience with all of you who are contemplating shipping too. Of course, this is my own personal experience, and you may have a different one when you do decide to ship. However, everything went pretty much the way I was told it would, and the outcome was very satisfactory! In my case, it was necessary to think of shipping my birds, as there are very few dove enthusiasts around my neck of the woods to buy my extra birds. This is something I am hoping to change, by getting my birds out there and showing people how wonderful doves really are. But in the meantime, shipping was becoming a necessity. The one thing that really pushed me to ship, was the fact that my website somehow got added to a search engine, and whenever people typed in Doves or Cavies in the search box and hit go, a link to my website popped up! This is GREAT news for business, except most interested people were many states away from me. So, I decided to take a deep breath, and start studying. First, I wrote to my friend John Fowler, and asked him for advice on where to get shipping boxes. I had had birds shipped here from him, and he had walked me thru the process of waiting for the birds to be delivered and explained that the process was pretty much the same in reverse. The company he sent me to for shipping boxes was Horizon, and the boxes can be found on line at: <http://www.hm-e.net/> John suggested I order the PetPort boxes and then buy the additional micro fiber filter paper to paste inside the box myself. The cost of these boxes is very affordable. I chose, however, to order a few of the more expensive boxes, called NEST boxes, simply because I wanted to be totally SURE I did this the first time the right way. These boxes cost almost twice as much, but already have the micro filters attached, and have a special "peek hole" for the postal inspectors to look in and see what is inside. After 9/11, and living in New York, I decided better safe than sorry! Next time, however, I am going to try the PetPort boxes. After I ordered these boxes, I wrote to Jeff Downing, who kindly sent me TONS of excellent information on what to do, step by step, to make sure that my birds would get safely from point A to point B. So, after reading the notes over and over again, I called my local post office. Surprisingly, they were at a loss as to what to tell me to do! I live in a small city, and they NEVER ship live

animals out of their facility. As a matter of fact, my birds sent here from John Fowler, and then later from Dr Miller, were the first ever anyone had seen arrive down at the local P.O.! They suggested I call the bigger Main Facility, in downtown Albany, who also suggested I call the Express desk at my local Airport to talk to them directly. I was getting shuffled around and started to feel like no one wanted to deal with me and my birds. But I did not let this deter me. I called the Airport (Albany International Airport) and they connected me to the desk of the Express Shipping Center. There I met another very patient person named Bill, who helped me immensely. He told me that both the local and Main offices of my local post offices SHOULD have known more about shipping and was going to call them personally and "fill them in on the basics of shipping poultry" for future inquiries. (gulp) He then told me that he did see many birds shipped out from his desk, and could help me each and every time I needed him. First, I was to figure out when I wanted to ship my birds, and call his desk the day before I planned to ship them out. I also needed the town, state and zip code of the recipient. As soon as I had my first customer set, I called Bill at the Express desk. He told me that I could bring the birds directly to the Express desk at the airport, (only a 15-20 minute drive away from my home) but as the flight out for the birds destination was leaving at 4:15am the next morning, he suggested I wait as late as I could before bringing them up there. I had printed out a sample shipping label at home with all the info I needed to bring with me. For information on what info is needed, go to:

<http://www.usps.com/shipping/expressmail.htm> and see what a real shipping label looks like. It will tell you what information is required to ship your birds correctly. I then lined the bottom of my shipping box with newspaper, which seemed like it would be more absorbent than the cardboard floor, packed the birds up, and left for the big adventure! (note: As suggested to me, I did not include food or water for the birds. When the box is closed, it is quite dark inside, and the birds seem to settle down as they would for a long night's rest) When we got to the Express desk, it was so easy and quick I couldn't believe it. The woman there weighed my box, and told me how much it would cost to ship two birds plus the box by weight, and I paid her there. (You can actually open an account on line at the USPS web address above, and pay for the shipping of your birds ahead of time if you care to do so) Then I filled out the recipients address, the senders address, our phone numbers, and the birds were off on their way! It was SO easy, that I couldn't believe all of the energy I wasted worrying about the task at hand! On the receipt they give you at the counter, is a tracking number. You can actually go the USPS website, and type in the tracking number, and see where your birds are in transit at any given moment. Two days later, I got an email from the buyer, telling me her birds had arrived first thing that morning at her local post office, and they were just fine! Now that I have successfully shipped my birds, there is no stopping me! I am feeling better about letting them breed a bit more, knowing that the whole country is out there as a possible customer for my birds! Looking back at all the worrying I did, I thought it would be a good thing if I could write about my experiences and try to help anyone new at shipping to go ahead and do it yourselves. For me, the most important aspect of successful shipping is to ask questions, and to build a good relationship with the people you will be dealing with at the shipping end of the business. Many thanks go to John Fowler, Jeff Downing, and all the good people on the dove and pigeon list. They are an incredible source of advice, wisdom and knowledge. Go ahead! Try it! If I can do it, anybody can!

## Suspending Incubation of Pigeon Eggs

This is a description and outcome of an experiment to learn how long pigeon egg incubation can be suspended under optimal conditions

Began experiment Jun-28

A small refrigerator was acquired exclusively for the purpose of this project and adjusted it to the lowest setting

-- measured temp 48-49 °F / humidity 68-70% -- w/ bowl of water at bottom

( ... compared to standard refrigerator measured temp 38-43 °F/ humidity 50-70%)

Four sets of breeders were paired in individual boxes

Jul 7 - 17

Collected eggs as soon as they were laid so they did not begin incubation

-- each egg was marked with a pencil for tracking, then stored in random orientation in a sealed Ziploc baggie in the refrigerator

Eggs were not deliberately turned -- only moved as additional eggs were collected

Jul 18

Breeders were separated

Jul 28

The four sets of breeders were re-paired, same as before

Aug 9 - 16

Collected a 2nd round of eggs from the breeders and refrigerated in the same manner

As each pair laid the 2nd egg in the clutch, they were replaced with eggs FROM the refrigerator

Eggs were returned gradually to room temperature in their sealed container at least 6 hrs before fostering

The breeders were allowed to sit on the eggs naturally

After 5 full days the eggs were candled

Aug 20

Concluded experiment

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Results & Observations

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Detailed notes were kept on each egg (ie., dates, pairs, round, clutch order, foster parents, success/fail)

In summary, there were eight eggs in the first round

-- in this group, incubation was suspended -- ranging from 27 - 35 days

... outcome -- 100% were NOT viable

There were seven eggs in the second round (... one was damaged)

-- in this group, incubation was suspended -- ranging from 1 - 6 days

... outcome -- 100% were SUCCESSFUL

In conclusion, incubation of pigeon eggs can be successfully suspended by refrigeration for up to a week

Beyond 27 days, hatchability dropped to ZERO

There is a remaining question about how long they can be kept within the window of 7 - 26 days

It does demonstrate that the length of time pigeon egg incubation can be suspended is up to a week -- and maybe somewhat longer, but not much

Rodney POWELL

8-2007

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Diamond Doves Contents:

Diamond Dove Basics

Flight Breeding versus Individual Cage Breeding

Color Explosion in the Diamond Dove

## The Diamond Dove – The Easy Breeding Bird

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American dove association guide to Diamond dove care.

### Diamond Doves

#### Flight Breeding versus Individual Cage Breeding

by John Pire

July 2001

#### Part 1 – Flight Breeding

This article was first written by me back in May 1987. The article dealt with my experiences, observations and the conclusions of ten years experience in keeping the Diamond Doves in a "Flight Breeding" and "Individual Cage Breeding Situations". I have kept the Diamond Dove for over twenty-five years now and they are still one of my favorite species of exotic doves and pigeons.

I use these two terms, "flight breeding" and "individual cage breeding", in this and several other articles. The meaning I associate with these two terms are as follows: FLIGHT BREEDING is a situation where more than one pair of the same species of dove are kept in the same flight or aviary for the purpose of propagating them. This situation can also apply to pairs of different species of doves kept in the same flight or aviary. INDIVIDUAL CAGE BREEDING is a situation where only a single pair of doves is kept in a flight or cage for the purpose of propagating them.

What is considered a flight cage, aviary or cage? My interpolations are: a flight or aviary, are "cages" which someone can walk into. A cage is "cage" which someone cannot walk into. I have friends, each having a different type of set-up: one friend in PA keeps her Diamonds in a mixed "aviary" indoors & allows the birds free flight when she is present; another friend in CA utilizes a side of the mountain as one side of the flight. The flight is as large as a football field and houses many different species of doves/pigeons, including 10 to 15 pairs of Diamond Doves; another friend in New Zealand has outdoor flights & allows all her doves "free flight" in her garden and surrounding "bush".

Lets get into the sexing of Diamond Doves. The observations and statements are from personal experiences with Diamonds kept in outdoor and indoor flights/cages. This information should help so that you set-up "true" males and females and not same sex pairs. The Diamond Dove is considered to be a slightly dimorphic species when referring to the wild "blue" Diamond Dove.

I will not delve into the different color mutations now being bred. With the advent of the many colors being bred in the Diamond Dove the body color of the bird is no longer as useful in identifying the sex of the bird. Although there is a color mutation, rarely seen now, which is a true dimorphic color. Meaning that males are one color and the females are another. It is the Dimorphic Cinnamon and was first imported from Canada into the US by Bill Rees of California. The Yellow Diamond also has a bit of color dimorphism

between the sexes. Bill can be credited with bringing into the US a number of the new color mutations from Europe or Canada in the 80's and early 90's.

The first importation of wild caught Diamond Doves from Australia occurred about 1925. All the birds in the shipment were the wild color or as they were called "Blue Diamond Doves". Sexing was quite easy; hens had much more of a brown coloration across the back & neck area than the males. Two more shipments of Diamond Doves arrived from Australia. These shipment contained the first known color mutation seen in Diamond Doves. About half of the birds in both of the shipments were a "light grey" color. This first color mutation quickly became known as the "Silver Diamond Doves". All of the shipments arrived in Los Angeles, CA. The first shipment was said to contain about 100 Diamond Doves, the last two shipments combined contained about 100 birds.

Since importations/arrivals of birds back then were quite different than they are now most of the actual documentation or records of these arrivals were lost. To date (2001) these are the ONLY two known shipments of Diamond Doves directly coming from Australia into the United States. With the ease and willingness of these first "imported" birds to reproduce it was not feasible to bring them into the US any more.

Yes, there were further shipments of Diamond Doves into the U.S., but these originated in Europe and Canada and eventually the color mutations made it to the US. Many of the newer color mutations being developed in Europe were brought into Canada by the renowned dove fancier Don Adams, who shared these beautiful new colors with other Diamond Dove fanciers. Another fancier, Garrie Landry imported several of the color mutations into the US and propagated them. Perry Candianides is credited with developing the Yellow Whitetail Diamond.

Sexing Diamond Doves consists of simple observations and comparisons of the "eye ceres". This is the bare skin surrounding the eye of the bird. There are exceptions to these "rules". Conditions, feed, surroundings, etc can all be factors in the growth and physical appearance of the bird and thus may not follow these observations.

Trying to determine the sex of the birds is best when they have attained at least 6 months of age or have gone through the juvenile to pre-adult plumage molt. Between 6 and 12 months of age is when the male's cere begins to enlarge. Remember outside factors, as stated above, may affect this cere development.

Click on this link to view pictures of the "eye ceres".

Most mature adult male Diamond Doves will have larger, fleshier looking and many times a brighter colored eye cere than the adult female Diamond. Females with large brightly colored ceres do occur, as do males with small dull colored ceres. The coloration of the eye cere cannot always be accurate for sexing males from females. The cere coloration can vary greatly from one bird to the next regardless of sex. These facets can be due to breeding lineage or even outside factors as stated above. A male DD kept indoors, with full spectrum lighting and everything else the bird needs when kept indoors,

for a year will have a different looking eye cere than a male kept in an outdoor flight with access to the direct sunlight etc., whether they be from the same parents or not. Older male and female Diamonds do sometimes grow quite enlarged eye ceres. These enlarged ceres can become infected.

The "flight cage" or "aviary" can be of any size which suits your tastes and available space. One thing I have learned, build the flights to your needs to facilitate cleaning or any other chore you may need to do within the confines of the flight. The birds will adapt to what you supply them to live in.

I often tell fanciers who build outdoor flights to cover the tops of the flights. This keeps wild birds from perching on the open tops and leaving their dropping inside your flights & thus exposing your birds to many diseases the wild birds may carry. Also, doves have a "predator instinct" in which they fly straight upwards with great force. If the tops are not covered the "wire" may become invisible when the birds take "flight" in this instinctual behavior. The birds can be severely injured and death can also occur from broken necks in these headlong flights.

All my outdoor flights are made from treated lumber and covered with ½" hardware cloth wire. This size keeps a great many varmints out of the flights. If I build any more flights I will utilize the ¼" hardware cloth wire instead of the ½" size. Mice and small snakes can go through the ½" wire.

Utilize many different sizes for the perches within the flight. Make sure the perches are firmly secured and that none are directly over any feed or water containers. Perches can be wood dowels, thick ropes (doves do not utilize the rope perches much but any finches in the flight will), branches, ripped lumber of varying sizes. Even homemade wooden platforms can be used. Rough perches are much better than smooth or slick perches.

If several pairs of birds are to be housed in the flight it is a good idea to supply a couple of feed and water containers, with each being in a different location. This cuts down on the chances of a dominant bird or pair from keeping other pairs or young from obtaining feed and water.

Diamond Doves will utilize most any type of container for laying their clutch of eggs and raising their young. They do prefer to use open top containers. I have used such things as: tea strainers, plastic and wicker Canary nests, clean tuna or cat food cans, the typical hanging seed cups, homemade wire baskets or wooden platforms, even the removable bottoms of the 2 liter soda water bottles. The Diamonds have also used 6" wicker baskets for the larger doves in the flight. One pair, in my planted flight, even built the typical "dove" nest of a few twigs in the privet bush and raised their family.

It is best to provide at least two containers for each pair of birds in the flight. This cuts down on interference and gives the pair a second nest in which to begin the next clutch while the previous young are still in the old nest. There is not a height preference; each pair will pick a suitable area and defend their territory from others. Place the containers

are different heights and areas of the flight. Ensure that all nest containers are securely attached and that they remain level during the nesting process. The wicker type Canary nests do not have very good wire hangers and soon begin to sag under the weight of the nesting birds. Providing some sort of support under these types of nests is advisable. Click on this link to see my "nest supports"

Supplying the Diamond Doves with nesting materials is simple; many items can be used. Soft dried grasses, hay, straw, soft pine needles (white pine needles are ideal for the Diamonds), small pliable twigs etc., can be given in sizable amounts where all the nesting pairs can select what they feel is needed. Not all birds will make the ideal nest, some will use too much material and others will only use a few pieces.

I utilize the Flight Breeding system on several of my Diamond Dove pairs. I feel the flight situation is beneficial to them. They have flight room to exercise. I like to see several pair interacting as they might do in the wild. It is a wonderful sight to see a pair raising their family or sunning themselves in the sunlight. One thing I do advocate is the removal of the young Diamonds when they are on their own. If left in the flight they soon mature and can cause interference with the established pairs.

I promote this system for those fanciers who are not concerned with developing a color mutation or needing to keep accurate records on the birds. I have listed my pros & cons of this system below.

**PROS:** plenty of flight room for strong bird; less cleaning time for the fancier; watching the interactions of a Diamond pair and their offspring; watch the beautiful courtship displays of the males; many times the young males can be sexed before they finish the "ten week" molt. The young males tend to show or try their breeding prowess with other young or their parents.

**CONS:** there is no control over which male breeds which hen. Yes, females will allow another male to breed them in this type of breeding system. Many times the bonded pair male will not allow this male to share incubation or rearing of the chicks, but the hen may accept this different male's advances while she is off the nest duties. If a new color mutation appears there is no way to accurately say which birds are responsible. Multiple eggs are laid in the same nest, thus causing the different pairs to fight over the right to set the eggs. Eggs or young can be knocked from the nest in such fighting. The possibility of two eggs remaining in such chosen sites and hatching is compromised. Eggs can be abandoned after a pair is chased from the chosen nest site. Hatchlings can be trampled by adult birds squabbling over the nest.

In closing this article, adapt the basics found here to your personal situation in your quest to propagate these beautiful doves. Part two of the article discusses the Individual Cage Breeding experiences with Diamond Doves.

Diamond Doves  
Flight Breeding versus Individual Cage Breeding

by John Pire

## Part Two – Individual Cage Breeding

In part one of my article I dealt with the "flight breeding" of more than one pair of Diamond Doves in a cage or flight situation. In this article I will deal with my experiences over the last twenty-five plus years of keeping these small doves in an individual cage breeding situation.

The individual cage system consists on a single pair of Diamond Doves set-up in any size flight or cage the fancier wants to house them in. This can be from a "double Canary breeding" cage to a walk in flight of any size. The thing to remember is, ONLY a single pair of breeding DD are housed in each situation.

When you set-up the individual cages you have all the control. Which birds will be paired, how many clutches they will be allowed to raise, placement of perches, feed & water cups etc.

One thing I try to stress is if more than one of the breeding cages are set up next to one another it is best to put some type of solid partition between the cages. This will keep the birds from being disturbed by the pair in the next cage. This type of distraction can be cause for neglected eggs or young. It can also lead to the male's aggression to it's own young or his mate.

I prefer keeping individual pairs of Diamond Doves in the breeder cages or flights. I use cages from 18 inches wide by 18 inches high by 30 inches long to 5 feet by 8 feet by 10 feet. Each of the walk-in flights house other species of birds or doves.

I use the wicker Canary nests for the nesting Diamond Doves. One does not have to use these types of containers, in fact many times the birds will choose the seed cup as their chosen nest site. Most any type of open top container can be used for a DD nest. A word of caution: ensure that any container used is securely affixed to the cage and remains as level as possible.

A sagging or loose nest can be the cause of eggs or young knocked to the floor. I have seen Diamonds build the front of a sagging nest container to over 1 inch above the rim, trying to make the nest as level as possible. The eggs were completely covered with the added nesting material. I know what you are saying – limit the amount of materials & then the birds cannot add any more. This is not always possible in a flight with other nesting birds. In a small breeder cage, yes it is possible to control the amount of nesting materials.

The point is – if this keeps occurring then the eggs become chilled & the embryo will die, as the eggs are not incubated properly. So, begin doing things right – secure all containers as level as possible. This may necessitate adding some type of support under the nests. Pictures of some typical DD nests & nest supports.

Placement of the feed & water containers in any situation should be in the open & not under any perch or ledge where the birds can defecate into them. Perches should be of varying sizes and placement.

At least one perch should be affixed secure enough for the birds to mate on. One explanation for infertility in the birds is the male is not making good contact during breeding. Many times the cage is too small & the sides of the cage interfere with the breeding ritual. Also many times in these situations the pair will try & breed while on the floor of the cage. This also hampers the effectiveness of the male to make contact & fertilize the hen's eggs. Yes, some fertility will occur but the end result if the situation is not improved will be reduced.

The facet of eye cere thickness & coloration for sexing males & females is not 100% accurate. Diamonds kept indoors with artificial lights or full spectrum lights can have the eye ceres condition affected for color and thickness of both sexes. Body coloration can also be affected to a certain degree.

I need to stress another factor here! A good record keeping system needs to be utilized! If good record keeping is not done, closely related birds can be paired & the result may be something you did not expect. There are now computer programs to aid the fancier in this chore. There is also the old pen, pad and ledger for those not into computers. Which ever suits your taste, please utilize it & keep the records. Visit [DiamondDove.com](http://DiamondDove.com) and you can download some very useable forms to keep your records on.

After you have selected the pair you want to breed, introduce them to their new home. Give them a few days to become accustomed to the new surroundings. Sexing of adult Diamonds was discussed in the first article. Sexing young Diamonds takes a bit of close observation by the fancier, but can be done fairly accurately.

One must remember birds do not always fall into any one description. Not all males have larger, thicker & brighter eye ceres than the females. This is the believed standard, but exceptions always exist. Each line of Diamond Doves can vary from each other, even to the point of birds in the same lineage varying.

Sexing juvenile Diamonds can be done if one takes the time & close observation of the birds. One of the easiest sexing tips of the young male DD is after they have fledged and are about three months old. These young males will try & imitate their father. You will see them climb on top of their parents (either sex) & imitate the "quick jump off ritual" performed by the male before the act of mating. I have never seen young female perform this ritual. Record this information along with your band information for this particular bird.

Another tip for sexing young DD is to look closely at the eye ceres of the youngsters – there is a difference in the actual shape of the cere. If you look at adult male & female you will see a marked difference in the shape of the cere towards the back side. One is

rounded & one is pointed. This shape is also present in the youngsters, before it begins to thicken & color up. Many say they do not see this difference, but with more observations and comparisons the difference can be seen. Now, remember – the difference may not be very pronounced, but it does exist.

The genetics of the Diamond Dove is relatively non-existent, when compared to the genetics of the Ringneck Dove. I know of no sex-linked color mutations being bred in the Diamond Dove. The "whiterump gene is dominate – or may be considered co-dominate with the Wild type or Blue color. This means only a single visual whiterump bird is needed to reproduce this visual mutation in offspring. The "whitetail" gene is a selective situation of the "whiterump gene"; no color should be present in any of the tail feathers. The "whiterump" gene is the basic gene, coloration can be found in any of the tail feathers. Both have the typical "whiterump". Jeff Downing's book on Diamond Doves is a good source for the color mutations being bred in this small dove. It can be obtain from his web site (DiamondDove.com) or the ADA.

Utilizing the single breeding units for Diamonds gives the fancier more control over each pair of birds. Certain birds can be paired together; close observations of eggs, young and adults can be done. Record keeping is easier then if using a flight breeding system. Working to unravel the genetics or develop a possible new color is better controlled. Can control or limit the number of clutches for each pair. If for some reason the bird becomes sick it can be treated easier & no other birds are infected, as would be in a flight breeding situation.

#### "FARBEXPLOSION BIEM DIAMANTTAUBCHEN"

(Color Explosion in the Diamond Dove)  
Oppenborn,G. 1985 Geflugel-Borse #18 p 11

This article was received from D. Rinehart in Ohio back in 1985. It was translated; from the original German article; by W.F. Hollander & printed in the IDS bulletin. Since this article more color mutations have appeared and some understanding of the genetics has occurred.

"In recent years the Diamond Dove has become so popular, and with some new mutations, that a write up has become needed.

In it's native Australia the 19-20 cm. dove loves the sun, therefore it can't be considered winter hardy here (Germany).

The first introduction to Europe was in 1868, and into Germany in 1875. In the same year, Dr. K. Russ succeeded in getting the first breeding. Since 1890 they have been bred continuously at the Berlin Zoo. Breeding is relatively simple, and the doves take almost every opportunity to nest. Incubation is 12 to 13 days and the babies get out of the nest at 11 or 12 days. Rearing is usually no problem.

The recognized colors are wild color, silver and brilliant. A new mutant in recent years is the white-rump. The white-rump can be with each of the main colors. Some mixed colors have resulted from unsuitable mating and have been given some unsuitably fantastic names. But such mixed colors should be weeded out because they can't be successful in shows.

Further, there are white-tailed and white-flighted birds, usually along with the white-rump and in all three colors.

The Isabel color is now fixed and some Isabel birds have a beautiful reddish appearance. Isabel is inherited dominate over brilliant.

All of the above color classes have the normal wing markings, that is, two white round dots on each feather, but there may be instead, tips and lacing.

Then there are pied birds but not yet well marked. They should be fifty-fifty.

Brown (cinnamon), grey, and even yellow varieties are said to exist, but so far only in the rumors – kitchen!

Also so far no pure whites exist. Birds that approach it (white) are only very light brilliants, with red eyes, and their wings still show faint markings.

The diamond dove breeders or at least some of them should be coaxed to prepare a breeding textbook. Then the whys and wherefores could be better understood".

Post script by the editor (Reichenbach): Mixed colors or intermediate patterns or color types result from the combination of non-allelic mutant genes or by selection of changed color types, e.g. the brilliant. Each mutant should be tested with wild type to see whether the segregation occurs according to Mendelian laws, or whether it is irregular.

Post post script: White rump birds have a somewhat lighter ground color than self-colored birds.

Note by W.F. Hollander: silver = dilute?, brilliant = milky?, cinnamon?"

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The Diamond Dove – The Easy Breeding Bird  
by David D Smith

This article was reprinted in the IDS newsletter. It originally was printed in the ACBM (American Cage Bird Magazine) back in the mid 1970's.

Anyone who has seen the Diamond Dove will agree that it is an attractive bird. The books all say that the Diamond is completely sociable with other birds, except possibly with other small doves, and that this dove is a very easy bird to breed. The impression

one gets from the books is that one could hardly prevent them from breeding – even by withholding nest bowls – "they will nest in the seed dishes."

For nearly three years I could not have agreed less with such assessments. I bought Diamond Doves – waited – bought new ones – waited – and waited again. No eggs even. Since that time I have raised many dozens of Diamond Doves. Now I must agree that the book writers are correct. The Diamond Dove is a very prolific bird; indeed, a healthy, true pair can hardly be prevented from breeding.

Why was I – and many others I have talked with – unsuccessful? After discussing the Diamond Dove in general, I will conclude with some thoughts on the probable causes of failure with these birds.

Native to Australia. The Diamond Dove ranks as the most popular bird of Australian origin after the Budgie, Cockatiel & Zebra Finch. Like these others it is thoroughly domesticated. All imports from Australia have stopped so long ago that the bird you might buy has been in captivity for dozens of generations.

During a visit with Dave West of Montebello, California, in December, 1971, I learned from him when the ancestors of our Diamonds must have arrived. West says that the first shipments of Diamonds (normal colored birds) were imported from Australia into Los Angeles about 1925. They fetched a fancy price in the neighborhood of \$125 a pair. Not many were ever imported since they proved to be so prolific that the demand was soon met by Los Angeles area aviculturists. Unless there were East Coast importations that we know nothing about, this means that the many thousands of Diamond Doves in the country today, and perhaps those of Europe as well, are all descended from these original shipments imported some 50 years ago. The silver-colored mutation of the diamond was first imported from Australia some 20 to 25 years ago. Dave West recalls that only two shipments were ever received, some months apart; a total of only 40 to 50 birds. The price ran about \$70 a pair. In one shipment the males had very prominent and fleshy rings around the eyes. In the other the males had eye rings not much more developed than the females. In one shipment the silvers were reputed to be simple recessive to the normal colored bird. In the other the silvers were supposed to be recessive & sex-linked. West is not aware that this sex-linkage was ever proven out by breeding experiments. Should anyone have other information on importations of Diamond Doves I would be very interested to hear of it.

Maintenance of the Diamond Dove is very simple. Drinking water & grit are essential, of course. Dave West feels that providing broken-up pieces of cuttlebone is also an essential. Small millets seem to be the favorite seed. I provide a wild bird mix with no sunflower seed, which has a variety of small seeds & a little milo. A finch mix is satisfactory but more expensive. Diamonds definitely will eat greens (Romaine lettuce, in my case) especially when feeding babies. They have been observed to eat soaked bread & corn on the cob which has been provided for Cockatiels.

Whereas I have never seen a Diamond take a water bath, sunbathing is a passion. Birds kept indoors will be deprived of this, and might benefit from cod liver oil to supply the vitamin D the bird might have gotten from the sunbathing (assuming, perhaps incorrectly, that birds can absorb this vitamin as humans do).

Housing is not a problem since Diamonds can be kept with the finch collection. I have never noted Diamonds to be aggressive towards other birds than their own species, or other small dove species. The problem is more likely to be the other birds bothering the Diamonds. They are quite compatible with Cockatiels, for instance, but a Cockatiel's idle chewing can make short work of a Diamond's nest!

The Diamond should, in my opinion, be considered an aviary bird. They are not active birds – not given to flitting from perch to perch – and it might be anticipated that they would grow too fat if given no opportunities for free flight at all. I have no doubt they could, and are being, cage bred; but considering that this bird is given to swift & direct flight, they would appear to be better provided for with at least six feet of flying room. Probably an indoor cage four feet long, with perches only at opposite ends, would serve.

So far as temperature is concerned, the Diamond is surely as tough as the hardest member of your collection.

Breeding the Diamond Dove is rather predictable. The main feature of courtship is the male bowing & cooing before the hen, with his crop moderately inflated with air; he spreads his elevated tail with each bow & coo.

Virtually any nesting receptacle will serve. I presently use plastic berry baskets from the market. The basket is mounted on an L-shaped bracket, such that the basket is held about four inches from the wall. This protects the tail of the sitting bird. The basket is provided nearly full of dried grass, or with a folded & shaped piece of burlap. Higher nests are preferred to lower, and if a branch or piece of palm can hide the nest from direct view, so much the better. In a planted aviary, wire netting platforms secured in the bushes might serve as bases for nests.

A pair that is ready to nest will persist whether suitable nests are available or not. I have noted birds to crawl into finch boxes (whose holes had been enlarged by chewing Cockatiels) where they could not turn around. One pair nested in a bowl of sunflower seeds. This year a pair nested successfully atop a clump of grass, barely seven inches from the ground.

Two pure white oval-shaped eggs will be laid; the second two days after the first. The adults cover the eggs from the start, but do not sit tight before the second egg is laid, causing both eggs to hatch together on the thirteenth day. The blind, down-covered babies grow rapidly & leave the nest about two weeks later. The parents who share in all phases of the breeding operation, are quite attentive to the youngsters after they leave the nest & will feed them for a week & more thereafter. Fidelity to their fledgling babies

makes the Diamond valuable to the foreign dove breeder as foster parents, since many foreign doves neglect babies that have left the nest.

By the time one clutch leaves the nest it is likely that the hen will be laying again. Some pairs will produce two babies a month with great reliability; skipping only a month or two during the year. The silver Diamonds, depending on the strain, may be very likely to produce only one baby in a nesting, the other egg being clear. Because the silvers seem less robust in general, most breeders mate silvers to split-silvers (normal colored birds that had one silver parent), which mating will produce 50% silvers & 50% split silvers. The cooing of these doves – especially maturing & unmated males – may at times become fairly persistent, but to me has not been unwelcome. It is not likely that the neighbors would object.

Colony breeding: My experience has been that with more than one breeding pair per pen there will soon appear four or more eggs in a nest. Even though there are more than enough nests to go around, two or three hens choose to lay in the same nest; more eggs result than can be covered (even though two birds may sit at the same time) and each egg is chilled in turn before it can hatch. For this reason I have found colony breeding about useless & prefer to keep one pair per pen. Given a superabundance of nests perhaps this can be avoided. Even then, unless banding is resorted to (budgie bands are just the right size, by the way) you will shortly lose track, or perhaps never know which birds produced which babies.

Fighting will be observed when more than one pair are kept together, but no real harm ever seems to come of it.

Babies left with their parents become breeding pairs with amazing quickness. I have recorded hens laying at two months; though four or more months is more likely.

Colors of the Diamond Dove. The original, or normal-colored Diamond Dove is mainly a grey blue above with pearl grey undersides. The silver mutation is grey above, without the blue tints of the normal, but with the same light grey undersides. There are silvers seen occasionally which are significantly lighter in color than most – approaching a white. I am not aware that these lighter shades have been established as a true breeding strain. Yet, it is noted that certain European bird sellers offer a "new mutation" of the silver (variously called "scintillating," "glittering" and "brilliant") for stiff prices. In color transparencies, they appear to be simply light-colored silvers. Several other color mutations have been seen.

Dave West once bred a pure white "silver" (but not an albino), which died before it could be reproduced. The late Bob Dalton of Arrow Bird Farm, Fontana, California told me of being shown a white Diamond.

Paul Norine of Citrus Heights, California reported (March 1972, ACBM), with an accompanying picture, a light buff colored, pink-eyed "albino," bred in his aviaries from

normal colored parents. At last word (letter dated 3/9/72) Norine has not been able to breed from this bird.

Recently I have heard of a strain of pied Diamonds that existed in the Los Angeles area, but I have not been able to assure that they still exist. These were normal colored birds splotted with white.

It seems inevitable that many other variations on the basic silver & normal colored Diamonds exist in unknown private aviaries.

Sexing the Diamond Dove may or may not be easy. Mature males are likely to have a more prominent & fleshy eye ring than any female, but not all males are so equipped. In the normal colored Diamond the female will generally be more brownish across the back. A hen in fine laying condition will have the pubic bones spaced an eighth of an inch or more apart. The mature male will have no space between the pubic bones, ordinarily. Immature birds may have these bones move about a good deal from day to day. A bird which coos a good bit is probably a male. If it displays, it certainly is a male. The size of the diamond spots has been mentioned as useful in sexing, and while these spots do have variable sizes at times between birds, I have never been able to correlate this with sex. It should be stressed that all observations will fail if the birds are immature or much out of condition. For sexing purposes I consider a bird much less than a year old as immature & likely to fool me.

Why aren't your Diamond Doves producing? Naturally you have made sure the birds are healthy & well fed & protected from undue disturbance. If your Diamonds are not breeding the most likely reason is that you do not have a true pair. Incompatible pairs that breed slowly, or not at all, are found but are very rare. Consider this test: Very young birds will have eye rings of a greyish orange color. Reasonably mature birds, unless badly out of condition (when their ceres fade to a pink flesh color), will have a bright red eye ring. If your birds have nice red eye rings, and have been that way for, say six months – and still have not bred – they surely must not be a pair. Should you live in colder climates & keep the birds inside for part of the year, perhaps you need to be more tolerant of slow developments and wait for one full summer after you are sure the birds are fully matured.

This further advice has been offered to me. If your non-producing "pair" is not heard to coo much they are both hens. If much cooing is heard but no eggs result, they are both males. Two males will display to each other whereas two hens will not.

Another problem may be that the birds are "over the hill." One breeder I spoke with said he bred his doves continuously until the production began to decline, and then sold them off. One could end up with such "exhausted" birds; not that Diamonds are short-lived at all. Dave West has a pair of Diamonds that he had ten years ago, and which still produce; only now they have more of clear eggs & single clutches than before.

Two pairs maintained at all well should produce. If yours do not, while getting reasonable care, why not replace them with other stock that might find your care more to their liking?

Maybe I should be more cautious & admit that unidentified chance events may help or hinder in quiet ways when the timing is right. Let me refer you to the words of Mr. Jean Delacour, an aviculturist of world renown, writing in the Avicultural Magazine (Jan-Feb 1972, p 32); "Luck plays a great part in bird breeding successes. One cannot make a poor pair nest; but of course it is easy to stop a good one from doing so."

The Diamond Dove requires less "luck" than many other birds.

The Diamond Dove  
(*Geopelia cuneata*)

This article was printed in the IDS newsletter in the 1980's & was sent in by Piel Voets who was Chairman of AVIORNIS INTERNATIONAL (Holland) which is an association for Dove, Pheasant & Waterfowl Breeders.

## HISTORY

The first import of the Diamond Dove was in 1869 by the London Zoo. This zoo also had the first breeding result. On the Continent the first breeding was by Von Hagenbeck & Russ in Germany. Both of these gentlemen were breeding the Diamond Dove in 1875. Because of the increase in numbers imported & their steady breeding you can find these doves in most aviaries & I snow quite domesticated like the Zebra Finch. There are now many mutations of this dove like Fawn, White-tailed, White-rumped, Yellow-wing, Red, etc. The Red & Yellow-wing coming from breeders in South Africa. And it is possible that the range of color will go on increasing.

## DESCRIPTION

**ADULT MALE:** The head, neck & breast are light blue-grey; the upper & back are brown-grey; the abdomen is creamy-white; the tail & central feathers are brown-grey; the next outer pair of tail feathers is tipped with white, the others whole distal half is white; the wing coverts & scapulars are brown-grey, spotted with small irregular white spots with black edges; the primaries, leading edge & tin are brown-grey, the remainder is chestnut; on the underside of the wing, the chestnut primaries have brown-grey tips; the secondaries are blue-grey. The bill is dark grey; the iris is orange with bright orbital skin; this skin color intensifies in the breeding season; the legs & feet are pink.

**ADULT FEMALE:** The female is similar to the male but has more brown suffusion on all grey parts; the orbital skin is less bright.

## DISPLAY

The bowing display is similar to those of the other members of this genus but is delivered more vigorously. The display is usually preformed on the ground but is also given in trees or perches. In the bowing display the male bird stands with body raised & neck erect, wings & tail closed. The breast is lowered suddenly so that it comes close to, but does not touch, the ground. The body & tail swing up to a vertical position. As movement proceeds, the wings are raised & partly opened & the tail is fully fanned so that the feathers stand out separately. Then the bird returns to the position of rest.

## HABITAT

The Diamond Dove covers the whole of Australia with most in the center & north. They live in arid savannahs where the temperatures reach 50 degrees Celsius.

## CAPTIVITY

The Diamond Dove is at the moment one of the most common numerous doves that appear in aviaries. The reason is that this Dove is very docile & it is easy to breed them. It is even possible to breed these doves in individual cages. It is always better to keep pairs separate or they tend to squabble when there are several pairs, resulting in disturbed incubation & broken eggs. The Diamond Dove can be kept outdoors but I prefer to ensure that during the winter that they have frost free accommodations. The nest of the Diamond Dove is very flimsy, the best way is to provide small baskets (like Canary baskets). Nesting material can take the form of coconut fibers or coarse grasses. The female lays two white eggs. The cock sits during the day & the hen sits the evening & night times. Incubation period is 13 to 14 days & the young leave the nest after about another 14 days. This dove makes excellent parents & breed quite regularly. When young leave the nest they have stripes across the breast but these disappear during the first molt. When the young are self supporting it is advisable to remove the young or the cock bird can become aggressive. All the young ones from different pairs may be housed together without any problem. The Diamond Dove will provide three or four nests a year.

Addendum: J. Pire: The "iris" color of the male & female Diamond Dove is red not orange as stated in Piel's info. The eye cere can be from light orange to coral red in color. The environment the birds are kept in captivity does affect the size & coloration of the eye ceres.

The following article was written back in 1987 and was published in the IDS bulletin. It deals with the questions being asked pertaining to the color mutations being bred in the Diamond Doves. At the time of this writing the newest color available to US fanciers was the Yellow or Yellow Wing (Canada). Not much genetic work was done or was ongoing at this time. Check out Jeff Downing's web site and purchase his book on Diamond Doves. It has some information on these mutations and the newer colors now being bred in these beautiful small doves.

Color Mutations in the Diamond Dove  
by John Pire

1987 (rewritten 4/2001)

Over the past three years I have been asked many questions pertaining to the different colors being bred in the Diamond Doves. Since this specie was my preference of the many dove species, I was quite interested in the colors also. I made up a form and published it in the ADA, CDA and several major bird publications. The form asked for any information Diamond Dove (DD) fanciers were willing to share. Having read article on Ringneck genetics by Dr. Wilmer Miller in the dove associations bulletins I contacted him with the information I had compiled. I had compiled information on some twenty-six colors or patterns being described by the different fanciers who responded with information.

I sent Dr. Miller the information and asked him for his thoughts and comments. Dr. Miller was very helpful in answering the questions I had posed to him. He also enclosed some information he gave to his students at the Dept of Genetics at the Iowa State University. He also enclosed some charts, which could be followed for the testing of the color mutations. NOTE: these charts are assumptions and have not been proven; further testing and results accurately kept will accurately set these charts as to which color mutants are dominate and recessive.

Question: After reviewing the information on the different colors/patterns can you make any comments as to the inheritance of them?

Answer: More specific analysis would be possible if more detailed information was available. By more specific details I mean: the results of crosses of each mutant form with wild-type (Blue in DD) and those "F1" inter-mated (same single mutant involved) to yield an "F2" or else test crossed to the mutant parent if "F1" are blue or to the "blue" parent if "F1" are mutant type.

Question: Many of the colors and patterns may be variations of the same color or patterns, such as Yellow White Rump, Yellow White Tail; Cinnamon White Rump; Silver or Blue Big Spot could these be considered separate mutants?

Answer: To better understand the situation I need to make some comments to better handle this question. Twenty-six colors or pattern mutations is quite astounding. Many items need to be clarified, such as, are many of the colors that different from each other or are they just shade variations? Does each mutant breed "true" for that mutant for at least five generations? Are there shade or color variations within the same clutch? Many things have to be proven before a mutation can be considered a mutant type. I hope that the colors/patterns can be reduced to a few basic (single) mutations and their interactions to yield other colors or patterns. In Ringneck Doves (*Streptopelia risoria*) any of four (4) basic color mutants may interact to yield over twelve (12) color types. Example: Peach is a combination of Blond (fawn) with Rosy.

Question: In the quest to produce the "WHITE DIAMOND DOVE" many breeders' state that as they breed to obtain the "white" DD, the birds become "weaker". They show signs of poor flight or poor eyesight. Can you comment on why this might be occurring?

Answer: The TRUE WHITE DIAMOND DOVE probably awaits the proper mutation to occur. The near white that breeders are getting now is a combination of the mutants that lighten color. The combinations of related mutants often weaken the possessor phenotypically in pigeons, according to Dr. Hollander. Often, however, it could be that inbreeding is usual to get such combinations and that other deleterious genes combine to show their effects concomitantly, yielding so-called "inbreeding depression".

Questions: Could you show a simple chart or genetic layout to be used to analyze the different color mutants currently found in Diamond Doves?

Answer: You probably won't think it simple, especially since the "next step" depends on prior results. I've included my appendix 4 & 5 (Generalizations in Pedigree Analysis in Classical Genetics & How to Solve Breeding-Data Problems) that I give to my students. I also drew a couple of DIAGRAMS in which to follow. Since there has not been much research done on any of the colors, these diagrams are only SAMPLE RESULTS and not exactly what you will produce until you obtain results and apply them to the charts. To begin: to better analyze the mutants you must remember that the wild type (Blue) is very important in your analyses. Each description of the mutant should emphasize how they DIFFER from the wild type.

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#### Part 4: KEEPING PIGEONS

##### THE FERAL PIGEON (*Columba livia*)

Pigeons and doves belong to a large and successful family of 289 species, ranging in size from the Diamond Dove which is approximately 12cm long, to the Crowned Pigeon which is as big as a female turkey, and in colour from the many-coloured Fruit Dove to the soft grey Wood pigeon. Our familiar feral pigeon of the streets has been known by man for 6000 years. They were sculpted on Egyptian tombs, carried messages for King Solomon, helped Julius Caesar conquer Gaul and won many medals for bravery in both world wars. Several poets including Shakespeare have written about the qualities of pigeons. To many they are a symbol of Peace and Love. Pigeons are gentle, beautiful birds who need and deserve all our kindness and respect. They are truly amazing birds, for they can;

- live everywhere except Antarctica
- suck water the way we do
- navigate up to 1000 miles
- sense the Earth's magnetic field
- fly as fast as 75 miles per hour
- hear ultra-sound
- see colours including ultra-violet

- feed their babies •milk• even if they are male

These adaptable and intelligent birds (along with doves) have one common ancestor, the Rock Dove (*Columba Livia*). The normal life span of a feral pigeon is 5-7 years though fancy breeds and indoor birds kept as pets can live longer than 15 years. The mother has an incubation period of 17-19 days and the young leave the nest in 40- 45 days. The bird is about 83 cm in length and weighs between 280 and 560 g - average about 350 g. Its plumage can vary considerably, from a close resemblance to that of the original rock dove (with blue-grey plumage, double black wing bars and a white rump) through various •blues•, •reds• and chequered types, to almost pure black. There are no visible differences between the sexes. Male pigeons are usually slightly bigger in size and have bigger beaks and wattles (white part of the beak). They also have a much bolder, larger head than the females. Sexing pigeons is hard and can only be achieved through practice and comparison. Females are smaller and have flatter heads too and are often seen on the nest more than the males.

Feral pigeons build their nests in or on buildings and other structures, where they are usually found on ledges or in hollows - often under eaves or on girders. Grass, twigs, feathers or any scraps, such as plastic and wire, may be used in the construction of nests, which are frequently rather flimsily built but, when used for successive broods, may become well-defined structures.

Pigeons in the wild breed all the year round but the peak is from around March to September if the weather is warm. They chase each other for 10 days and then the female lays 2 eggs in the nest, one day apart. They then sit on these for 18 days and they hatch into two squeakers (babies) which are covered in yellow down hair. Gradually the familiar grey feathers replace the yellow down that covered the newborn pigeon (or squab). They rear their young until about 4 weeks old and then they leave the nest and go wild themselves.

Feral pigeons normally feed in flocks and for most of the year rely mainly on spillage at food premises or on scraps, including bread, cake grain and bird-seed, given by the public. In some localities birds may fly to nearby arable farmland during spring and autumn to feed on sowings and stubbles.

Loading and unloading of grain, at places such as docks and mills, provides a source of food from the abundant spillage that normally occurs.

### Feeding

The pigeon is herbivorous. As seedeaters, these birds must obtain all their essential nutrients from ripe and unripe seeds, cereals, and legumes.

### Carbohydrates and Fats

In relation to their volume, pigeons have a large surface area. To maintain their high body temperature of 107.2 F (41.8 C), they require an enormous amount of energy produced

from carbohydrates and fats. Fats produce 2 times as much energy as carbohydrates but those not burned up by activity will be deposited in the pigeon's muscles and body organs, making it obese and lethargic. A low fat diet is therefore recommended.

### Proteins

Proteins are necessary in the diet for the growth and repair of cell tissues and in the production of enzymes to aid in the digestive system. A large proportion of proteins are obtained from legumes (about 16-23%), and also in cereals (around 11%). However, the amino acid compositions are different in the various legumes and cereals, so a mixture must be provided in order to ensure a balanced diet. The plumage is also composed mainly from proteins and a good supply of these nutrients is necessary before and during the onset of winter. The pigeon's milk, which is produced from the crop lining, must be as rich in protein as possible. Pigeons that do not receive a varied supply of amino acids will not be able to provide an adequate diet to their young through crop milk.

### Minerals

Mineral salts such as calcium and phosphorous play an important role in the forming and maintenance of bones. These minerals are not contained in sufficient quantities in the normal diet, so must be given in the form of grit. Water

Water is necessary to lubricate and soften the food, to regulate body temperature, and to serve as a transport system for digested food. Pigeons should have free access to fresh, clean water at all times.

Food must not smell musty, or show a trace of mould. Grain, seed, and legumes should have moisture content not greater than 17%. If higher than this the nutritional quality, including the vitamin content, will be diminished. Damp grain can cause digestive problems. Under normal conditions the moisture content is well under 17%. All ingredients must be kept dry and protected from rodents.

### Cereals

Cereals are excellent food for pigeons. Grains have a high starch content (40-75%) and are easily digested and provide a good supplement to the legumes.

### Barley

Barley is an excellent food with a starch content of 62.5%, a protein content of 7.5%, and a low fat content of 1.2%. The fibre (roughage) content is 1.3%. It has vitamin B, vitamin D and mineral content.

### Maize(Corn)

Maize has the lowest protein content of the cereals (7.1%), but a high starch content (65.7%), and a fibre content of 1.3%. It has the highest fat content of grains of grains or legumes (4%). Maize is avidly consumed by pigeons and, because of its high fat content; it should be given sparingly (maximum 20% of the diet). In intense cold weather it can be increased to 30% so that the pigeons can compensate for heat loss.

#### Wheat

Wheat is an excellent food for pigeons. Its digestible protein contents are somewhat higher than that of other grains: 9.7%; the starch content is 63.5%; fat content, 1.2%; the raw fibre content is low at 0.9%. Wheat should form a maximum of 20% of the diet. Too much wheat can cause digestive problems.

#### Oats (Dalia)

Oats stimulate the nervous system and are particularly useful in preparing for the breeding season.

The drawbacks of oats are a high fat content (4%) and a higher proportion of fibre than other grains (2.6%; double that of barley). Dehusked oats, with no loss of quality, are more acceptable to the birds. Because of the high fat content, oats should not be more than 5% of the diet. The protein content is 9.3% and the starch content 44.8%.

#### Paddy (brown rice)

Paddy is a valuable food because of its high vitamin B content. The vitamin is contained in the husk and in the germ, and is more or less lost in dehusked rice. Brown rice has a fairly high fibre content. Its protein, starch and fat content are lower than in other grains but this is compensated for by the vitamin B content. An adequate amount of brown rice is 2-3% of the food mixture.

#### Sorghum (jowar,jai)

Sorghum is a small grain that comes in various sizes and colours, from white to reddish brown. White sorghum is the largest and is probably the most nutritious. It is easily digested and has high starch content. The protein content is low. It is not especially valuable as a pigeon food, but 2-3% can be added to give the diet more variety.

#### Legumes

Legumes, or pulses, are an important part of a pigeon's diet. They have a greater percentage of protein and minerals than grains and many seeds, and have low fibre content. They are necessary to provide a full range of amino acids.

#### Pigeon peas (tuvar/arhar)

Pigeon peas are the best-known legumes used in the pigeon's food mixture. They contain a high proportion of digestible protein (20%). The calcium and phosphorous content is fairly high at 0.14% and 0.45% respectively. 5- 10% of pigeon peas can be included in the diet.

#### Green peas

Green peas are the most suitable protein rich legumes for our pigeons. The protein content, at 19.4%, is lower than that of pigeon peas, but green peas are very nutritious and more easily digested. In addition, the various vitamins are better represented than in other legumes. Green peas have a good vitamin B content, and contain vitamin E and carotene. Green peas should form 50% of the leguminous part of the diet.

#### Seeds

##### Linseed (til)

Linseed has about the same protein content as green peas but a much higher fat content (about 35%). Linseed may be given only in very small quantities. It helps the growth of young birds. Moreover, linseed gives the pigeon smooth and silky plumage.

##### Hemp ( bhang )

The pigeons eagerly consume hemp. It is high in fat and protein and stimulates the sex drive. Feed it only in small quantities.

##### Safflower seed ( kusumbha, karadi, kardai )

Safflower seed is high in protein but also has a very high fat content. Therefore 1-2% in the food mixture is adequate.

##### Weed seeds and chaff (Chokar)

Weed seeds, of good quality, are an excellent tonic for pigeons. About one thimbleful per bird per day can be mixed with a minute quantity of linseed and hemp. This will give the birds a supplement of vitamins and minerals that are scarce in the larger grains and legumes.

They should be given in small quantities as many of these seeds have a high fat content, too much of which will make pigeons obese. Some varieties of weed seed also have high fat content.

#### Vitamin supplements

Vitamin deficiencies result in impaired health of the birds. Such deficiencies can show in various ways, including weak muscles, swollen eyelids, thin-shelled eggs, etc

There are a few cautions to note: first, it may be difficult or impossible to distinguish the pigeons that require extra supplements from the healthy ones; secondly, by giving synthetic vitamins, we discourage the pigeons from producing their own from their normal foods. In such cases, the synthetic vitamins are used in the body and the natural ones are passed out with the body wastes. There are occasions when synthetic vitamin preparations are useful for all the pigeons: for example in the winter, when they are receiving too little sunlight (ultraviolet rays from sunlight are absorbed through the pigeon's skin and help it to produce vitamin D, essential for healthy bones). A small amount of cod liver oil (enough to barely show on the food seeds) can be added to the food, not more than twice a week. Be sure that the cod-liver oil is fresh; if rancid, it will destroy the vitamin E. .

Vitamin	Function/ Essential for	Contained in
A	Growth in young ones	Green peas, yellow maize, carrots, green vegetables and cod-liver oil.
B	Promotes good appetite, healthy nervous and digestive system, helps build up the skeleton.	Wheat, green peas, and paddy, carrot and kale.
B2	Essential for the metabolism of the proteins, carbohydrates and fats and adequate functioning of the nervous system and the development of the embryo.	Cereals and legumes.
B6	Regulates metabolism in the nerves and liver. Important for growth.	All kinds of grains, yeast and bran.
B10	Prevents anaemia and deficiencies like leg cramps.	Grains, yeast and green feeds.
B12	Essential for the formation of red blood cells and for growth in the first few weeks of the pigeon's life. Necessary for the good development of eggs. It is of animal origin and not found in normal pigeon food. It is contained in chick rearing food and in black earth.	
C	Works in close relationship with Vitamin A. Made in the pigeon's own body	
D	Building the skeleton violet rays of the sun. Barley, coating of cod liver oil on seeds.	It is produced in the body from ultra-
E	Fertility in both male and female pigeon.	Cereal grains, legumes wheat and maize and green peas.
K	Regulation of blood clotting	Greens.

Common Mix of Food:

	Winter	Summer
Yellow corn	35%	20%
Peas	20%	20%
Wheat	30%	25%
Sorghum	15%	35%

Feeding strategies

An average sized pigeon weighs about 14 ounces (400 gm). On a daily basis, a pigeon requires 1/10 to 1/12 of its body weight in food; that is 1 ounces (30-40gm) per day. During the rearing of the young the amount can double and during the rest period, it may

reduce to 1 ounce (25-30gm). The 1 ounces (30-40gm) of food is best given in two parts, mornings and evenings.

#### Feeding in the rest period

During the winter rest period, no eggs are usually laid, no young are reared, and molting is over. Food required will be only for the maintenance of the pigeon's body. However, on colder days and nights, the energy requirement will be somewhat greater.

A protein content of 7-8% is adequate. Various cereals contain this amount, but, as cereal proteins are not adequate in themselves, legumes are added to give the necessary variety of amino acids.

#### Feeding before and during the breeding season

Two weeks before the breeding period starts, the diet must contain more protein. The amount of barley is gradually reduced and the amount of legume increased, so that the 7-8% protein content of the rest period reaches 12-13%, with a little variety. The mixture should be given throughout the growth and rearing of the young.

After the eggs have been laid, the protein percentage in the diet can be slightly lowered. Many protein foods are heavy and the digestive system, especially the liver, has to work hard. During the first ten days of brooding, the legume content of the diet can be reduced to 20% and the barley increased to 30%. After these ten days, increase the legumes again to 40% and reduce the barley to 10% of the mixture. During the rearing of the young, feed liberally twice a day, so that food is always available for the adults after feeding the young. Weaned youngsters require the same mixture as that on which they are reared.

#### Molting period

Pigeons molt the whole year round; in the rest period they shed some down feathers, but in March/April the first flight feathers are molted. The molt continues slowly until the main molting period, which usually starts mid-July to the beginning of August. During the molting period a lower percentage of protein than in the breeding period should be given. A protein content of 10-11% in the diet will be adequate, but through as varied a diet mixture as possible, in order to supply a full quota of amino acids.

Oilseeds such as sunflower, hemp, linseed, cabbage seed, and rape (Rai), fed in small quantities during the molting period, will give an improved bloom to the new plumage.

In all of these periods, you must not forget to supply the pigeons with a good, varied grit mixture, greens, and, for birds that are not free-flying, fresh, overturned grass sod every week. Do not leave out barley and do not feed too much!

Remember that pigeons drink immediately after eating, to help them digest their food. Every time you feed the pigeons, inspect the water container and be sure it is filled with fresh water, which should be warmed in frosty weather.

When the young are being reared, water is essential for both young and adults. If the parent birds are unable to supply the young with adequately softened food, the chicks will soon die. Pigeons, unlike most other birds, suck up water and hold their beaks in it the whole time they are drinking.

Like most birds, pigeons love to bathe, especially in the molting period. Young pigeons like to bathe throughout the year. Bath water also helps maintain humidity during brooding; otherwise the embryos can die in the shell or the shells may become too hard for the young to break out of.

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## B. REGULAR CARE AND ROUTINE FOR RACING PIGEONS

### ONCE A WEEK:

1. Garlic is an incredible natural anti-bacterial, anti-fungal & anti-inflammatory. It is the allicin that is the key ingredient to purify the bloodstream and build up the immune system, maintains beautiful feathering & white wattle. (They will not fuss about the taste of the garlic if you use no more than 1 organic clove of garlic per gallon of fresh water).

2. Once a week, 1-2 tablespoons of apple cider vinegar to a gallon water for good gut PH at a level that bacteria, like E Coli and Salmonella, doesn't like. I recommend the organic ACV from the health food store as it has the "mother" in it. You can also add pro-biotics to re-populate the good gut bacteria at that time. Start with the 1 tablespoon of ACV and if your birds drink it readily you can try to increase a little up to 2 tablespoons per gallon. If they are not drinking it readily then it is not going to do them any good so start with 1 teaspoon. I would also not put any pools out for bathing that day, as they will drink anything to try to avoid it.

ACV can also be used in heavier doses for medicinal purposes.

### THE FOLLOWING CAN BE MIXED TOGETHER ONCE A WEEK

#### WITH THE SEED:

3. PROBIOTICS I recommend a human grade pro-biotic from the health food store. You can buy it in powder and mix with seeds. Use 1 teaspoon per lb. of seed. You can also buy it in capsule

and just pull the capsule apart. I have also mixed it in the water, and if you stir it well it does mix in the water. I use Solaray Multi-dophilus powder. You can purchase it at most health food stores. It has L. Acidophilus, B. Bifidum, and L. Bulgaricus strains in it. I am also using the Solaray 12, which contains more strains of beneficial bacteria.

For raising youngsters and rehabbing pigeons that need formula I use Total Flora. This one also worked extremely well for raising baby pigeons. it contains:

L. Acidophilus, B. bifidum, L. bulgaricus, L. plantarium, L. reuteri, L. salvarius, E. faecium, S. thermophilus, fructooligosacharrides, calcium ascorbate, & enzymes.

4. A MULTI-VITAMIN MINERAL PREPARATION with amino acids, and micro minerals once a week. You should get one designed for pigeons. I alternate with another brand every other week, so the birds get best all around nutrients from different sources. Please use dosages strictly as per instructions PER LB. OF SEED, too much can overdose them, and their minerals and nutrients will be out of balance. Some preparations can be used with water and/or mixed with seed. Make sure to use in water only, if directions specify it cannot be used in seed, but only in water.

5. BREWERS YEAST Once a week a teaspoon to a lb. of pigeon seed, for energy and stamina. HOWEVER, I DON'T recommend using it when birds are feeding youngsters or when they are on antibiotics, as there can be a problem with fungus. You can purchase the multi-vitamins and brewers yeast at any pigeon supply house like Globals, Siegels, jedds, and Foy's. I like the ones made in Holland and Belgium.

MIX 3, 4, & 5 TOGETHER with A LITTLE wheat germ oil, just enough to get the MIX to stick to the seed. Shake it up WELL in a clean plastic bag and serve.

IT IS BETTER TO MIX THESE THINGS WITH THE SEED AS THEY WILL NOT QUIBBLE OVER SOME STUFF OVER THEIR FOOD, BUT THEY WON'T DRINK FULLY OF THEIR WATER IF THEY ARE NOT HAPPY WITH THE TASTE.

FOR RACING PIGEONS

For added performance you can add a little dash of

"Concentrace" in the water daily for trace minerals. This product comes from bodybuilding.com. Birdy uses this for his YB's.

#### 7. PREVENTIVE MEDICATION

I recommend these products before breeding and if your birds are in contact with other pigeons. I do use a medication for the prevention of canker, coccidiosis, and worms, called Globals Multi-Mix. This is also used by those who race pigeons. Another product used by some is a preventive medication, called Dacoxine, which is a 4 in 1 treatment. This one is for the prevention of canker, E-coli, Paratyphoid, and Coccidiosis. You need only use either Globals multi-mix or Dacoxine, do not use them at the same time. Please read & follow instructions carefully. The products are excellent and work extremely well in pigeons because it was designed for them. Please only use seasonally and always on birds 6 months or older, as it is best to initiate a good nutrition program first and let your birds build up a natural immunity.

Please follow up the above medications upon completion with several days of probiotics.

#### 8. PREVENTIVE VACCINATIONS

All domestic birds that go out to fly or are show birds, in contact with other birds should be vaccinated for Pox, Paratyphoid, and PMV. I also recommend that, if you do fly your birds, all other birds be vaccinated that are home bound (non-flying) as well. PMV must be done annually, and Paratyphoid every 6 months. Pox needs to be done only once when the bird is a youngster. Youngsters should be given these inoculations per instructions on label. Some, like the PMV inoculations, require a booster 4 to 8 weeks later, and then once a year with the older birds.

#### 9. FOOD AND GRIT AND CALCIUM

Besides giving pigeons a good pigeon mix of seed, they need grit, AND pickstone. I found that the females go for the pickstone during breeding season. It seems to have the necessary calcium then the red grit. Pigeons pick up grit when they need it, it grinds the seed in their crop and prepares it for digestion.

You can also design your own mix, Birdy has used a mix with 50% Barley during the racing season, as it is an excellent nutritious food, but not eaten readily in a mix because it has a prickly extension at the end of the husk.

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## Nutrition, Nutrition, Nutrition

Thoughts On Nutrition- by Snowbird

Breeders should get more protein--about 17% or 18%. If you can't get that mix just hand feed them some quality dry dog food that is ground and mixed with warm water--good protein and fat supplement once a day for babies (after 7 days old) and parents.

The baby should be safe if your birds have been respecting each others nest boxes, but there is a vulnerable time once the youngster gets out of the nest but before it gets adult muscle--you have to watch this closely and protect as needed.

Nutrition: Besides good pigeon seed, other must have essentials are greens/carrots and an avian vitamin everyday (if they don't eat greens keep giving them and eventually they will—use an electric dicer to get this food bite sized for pigeons). People in this forum like Prime vitamin which goes in the water and has a probiotic. When they get around nine months old they will start to show an interest in a good multi-element grit but they should have this available at all times.

Though the following are not necessary everyday, they are also essential to optimum health, so once you get these basics down, other things people use are various forms of garlic, brewers yeast, various oils (fish, cod liver, olive, etc.), various teas, Apple Cider Vinegar (Tsp per gallon in the water), electrolytes, bits of animal protein (mash a pinch of dried dog food and mix with the seed), good soil/clay, prebiotics, and other supplements like Concentrace (multimineral).

Most people medicate for canker and worms, some vaccinate for pox and PMV depending on the frequency in your area. You will get quality meds online from Jedds, Foy's, Siegels, Global Pigeon Supplies, or the Australian Pigeon Company. Meds from pet stores are often inadequate and getting them from the vet will be expensive.

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Nutrition: Foundation for a Healthy Bird

by Susan Schwab, D.V.M.

*(Although this is a parrot article, I have included it here because pigeons do like variety in the diet.)*

The most important insurance of a healthy, long life for your bird is feeding it a nutritionally sound diet. Many pet birds die at a young age from malnutrition or from diseases that are secondary to malnutrition. The average life-span of a pet parakeet is 10 years. Wild parakeets have been known to live 25 years. The difference is in their diets.

Birds in the parrot family are foragers in the wild. They will eat whatever happens to be in season or is available. Their diet includes fruits, seeds, insects and whatever else they can find. Feeding pet birds an all-seed diet is neither natural nor nutritious.

The tradition of feeding seed-only diets to pet birds began years ago when wild birds were first caught and imported to our country. This was largely because of a profound

lack of information and knowledge at that time about the nutritional requirements of birds and the content of seeds. Birds are particularly sensitive to nutritional deficiencies because they have a high metabolic rate. (An animal's metabolic rate indicates how many calories it burns to maintain itself.) Birds are calorie furnaces, and on an inadequate diet they will quickly develop malnutrition and a compromised health status.

Seeds are very high in fat (especially sunflower, safflower and peanuts), low in calcium, low in protein and almost devoid of any vitamins. The alternative to seed diets is offering a balanced diet of table foods. Foods that are healthy for you are also healthy for your bird. A balanced diet provides some of each of the four major food groups. You can still offer seeds, but they should make up no more than 50 percent of your bird's total diet. you can offer whole grains, such as wheat, along with grain products, such as whole wheat bread, pretzels and pasta.

Dairy and poultry products are excellent sources of calcium and protein; many birds learn to relish yogurt, cheese, eggs and chicken. Meat also provides a good protein source. You may substitute beans and legumes for meat as excellent protein sources. Finally, fruits and vegetables are a must for a balanced diet; they provide many essential vitamins. Avoid feeding your bird any foods high in fat. Avocados are toxic to pet birds.

Many owners object to changing their birds' diets because they have offered a variety of foods only to have them ignored or refused by their pets. Birds are creatures of habit and are highly suspicious of new foods. Count on taking approximately one year to modify your bird's diet.

The trick to changing eating habits is in how you offer the new diet. you should offer your bird fresh foods twice a day for about one hour at each feeding (fresh food will spoil quickly and if left in the cage for a length of time could develop harmful bacteria).

Birds are equipped with a natural "storage tank" for food -- the crop. Located in the breast area, the crop is an enlargement of the esophagus. The crop enables birds to "tank up" on food and have a steady supply for their digestive system for many hours. Birds in the wild use this storage system daily. They forage for food in the early hours of the morning and again late in the afternoon to avoid the heat of day. Owners can take advantage of the crop by twice-a-day feedings to produce healthier, more active and affectionate pets.

Feeding birds twice a day has many benefits. The primary benefit is that it creates a healthy appetite. A healthy appetite will stimulate your bird to try new, more nutritious foods. Birds that eat twice a day are also more active. Bird and owner will share the benefits of a closer bond because the bird will associate its owner with something positive—mealtime. Feeding twice a day will also help you monitor how much your pet is eating. A drop in food consumption can be a sign of illness.

In some situations, feeding a bird twice daily is not desirable. Sick birds, those laying eggs, nesting or caring for young should always have food in their dishes.

An easy way to implement a change in feeding schedule is to offer your parrot dry foods (seeds, breads, cereals, dog kibble, etc.) in the morning and then to share your dinner with your bird at night.

Successfully providing nutritionally sound diets comes with patience and persistence. It may take many weeks, even months, of offering new foods before your bird will accept them. Some birds like foods warm and some prefer cooked vegetables to raw. you will discover your bird's particular preferences.

Remember to give your bird time to adjust to a new diet. Offer seeds (only at mealtime) along with other foods until you are confident that your bird is consuming enough of the new foods to maintain itself. Birds are more responsive to diet changes when they are fed outside of the cage (on top of the cage is fine). Remove any food not consumed within one hour. you may offer an occasional snack between mealtimes, but make sure the snack is nutritious.

The final ingredient to a healthy diet is fresh water. You can add a multivitamin to the water until your bird is getting enough vitamins from fruits and vegetables. Most vitamin supplements have a dextrose or sugar base. The sugar base encourages bacteria to multiply in the water; therefore, you must change water twice a day. A better alternative is to sprinkle powdered vitamins (several brands are available at your local pet shop) such as SuperPreen on your bird's soft foods.

Scrub out water and food bowls daily with hot, soapy water, and disinfect them in bleach twice a week (make sure to rinse away all the bleach after you disinfect the dishes).

Birds are naturally affectionate, active and intelligent. They make excellent pets. They are extremely hardy and can survive harsh living conditions. Many birds appear active and healthy even after being on an all-seed diet for years. The truth is, though, they are actually suffering from malnutrition. A bird suffering from malnutrition will eventually die from organ failure or from secondary bacterial or viral infections that plague a compromised immune system. "Sudden death" isn't uncommon in birds; however, it's usually the result of a long-term nutritional deficiency or chronic infection.

Your avian veterinarian can assess the health of your bird through annual physical examinations and routine blood testings.

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Supplements and Deficiency In Calcium and Vitamin A

Dealing With Vitamin A Deficiency in Birds  
by Hannis L. Stoddard, III, DVM

Vitamin A deficiency can be disastrous for your bird -- but it's preventable

The most common preventable avian disease that we see at our practice is hypovitaminosis A, or vitamin A deficiency, with or without accompanying secondary infections. Pet birds that eat only seeds (especially sunflower seeds and peanuts) are most prone to this problem because an all-seed diet is low in vitamin A.

When vitamin A deficiency occurs, the cells that line the respiratory, reproductive and digestive tracts undergo structural change, making them unable to secrete mucous. Since mucous acts as a protective blanket to prevent invasion from pathogens (disease-causing agents), vitamin A deficiency allows environmental bacteria and other microorganisms to penetrate the mucous membrane barrier and set up "housekeeping" within these tissues.

Symptoms of vitamin A deficiency depend on which organ system is affected (for instance the reproductive, digestive, or respiratory tracts) and which microorganism or combination of microorganisms is invading the patient.

The respiratory system is the most often affected. Since the mouth and sinus are also lined by the cells that are compromised, you need only look inside the bird's mouth to see the early signs of this deficiency. Initially, you see small white plaques on the roof of the mouth and/or at the base of the tongue. The plaques ultimately become infected, forming large, obvious abscesses. The abscesses can distort the glottis (opening of the windpipe), causing labored breathing and eventually mechanical suffocation. The abscesses can even grow so large that they block the choana (the slit in the roof of the mouth). When this happens, the bird will exhibit profuse nasal discharge and obvious swelling around the eyes. The pain from these pockets of infection will eventually cause the bird to starve. The microorganisms can also spread throughout the bird's body with disastrous consequences.

A bird with vitamin A deficiency may show any of the following symptoms: sneezing, wheezing, nasal discharge, crusted or plugged nostrils, unthriftiness lethargy, depression, diarrhea, tail-bobbing, thinness, poor feather color, swollen eyes, ocular discharge, lack of appetite, gagging, foul-smelling breath and "slimy mouth".

Few patients, if any, die as a direct result of the vitamin A deficiency. They usually die from the secondary infections common to birds with weakened resistance and the inability of the body to go through normal cellular regeneration (to heal itself). The secondary infections may cause organ damage that will then lead to the bird's eventual death. Consequently, we treat the life-threatening infection first, dealing with the underlying vitamin A deficiency with injections of vitamin It.

To treat the secondary life-threatening component, we first conduct a series of diagnostic tests. We draw blood to help determine which organs are involved, we perform cultures and antibiotic sensitivities to determine what bacteria or fungi may be present, and we analyze the stools to check for parasites.

We then hospitalize-the bird for at least one week and treat it with appropriate medications based on the data from the tests. Often we also nebulize the bird, tube-feed it and surgically lance the abscesses once the patient is stable. Although the bird may require a fairly long recovery period, the prognosis is usually favorable unless secondary problems have caused irreversible organ damage.

Once again, the adage "An ounce of prevention is worth a pound of cure" applies with this malady. Psittacines are generally quite resistant to disease, but, once afflicted, they are often difficult to cure. This is especially true if the disease is induced by an inadequate diet, which is often compounded many times by the selective feeding habits of the birds.

The majority of vitamin A deficient diets are also lacking in other vitamins, proteins and minerals, so prevention must be aimed at an overall improvement in nutrition as well as offering appropriate vitamin supplementation. In addition to a good quality, safflower seed-based mix, parrots should be offered and taught to eat foods that are yellow and deep green in color (with a few exceptions).

To ensure your bird against a vitamin A deficiency, offer it foods such as cantaloupe, papaya, chili peppers, broccoli leaves and flowers, carrots, sweet potatoes, turnip leaves, collards, endive, butter, liver, egg yolks, beets, dandelion greens and spinach (see chart for relative vitamin A content). The daily use of one of the many good quality powdered vitamins will also help keep this common, preventable disease from afflicting your birds.

#### Vitamin A Content

Desirable Food	IU Per 100 Grams
Red chili peppers (fresh)	21,000
Red chili peppers (dried)	16,000
Broccoli leaves	77,000
Broccoli flowers	3,000
Carrots (pureed)	10,000
Sweet potatoes	9,000
Turnip leaves	7,500
Collards	6,500
Endive	3,500
Dandelion greens	14,000
Spinach	8,000
Butter	3,500
Beef liver	45,000
Egg yolks	3,000
Cantaloupe	4,000
Mango	5,000
Papaya	2,000

Foods Low in Vitamin A

Corn    Lettuce  
Summer squash   Bananas  
White potatoes   Apples  
Grapes   Oranges

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AVIAN NUTRITION: CALCIUM

Calcium is the most prevalent mineral in a pigeon's body and is required in the diet in a greater amount than any other mineral. The chick needs calcium for skeletal mineralization and the egg laying hen has a higher demand for egg formation. From a nutritional viewpoint calcium is the most challenging mineral, because the requirement is extremely variable, depending on the bird's physiological state, and because many foods are likely to be deficient in calcium. Feral pigeons, for example, have periods of very low calcium consumption and periods where calcium may be 5% to 8% of the diet—and higher in chicks. Calcium is one of the most metabolically active minerals and its metabolism is tightly regulated.

Absorption: Dietary calcium is absorbed from the duodenum and the jejunum (beginning of the small intestines). The efficiency of absorption is controlled by the levels of the parathyroid hormone vitamin D3. When dietary levels of calcium are low, most calcium is absorbed by active transport. Without getting into the how active transport works, a low-calcium diet requires D3, but calcium rich diet uses diffusion-based pathways that are Vitamin D-independent.

Calcium is absorbed in the ionic form (it has a positive charge) and inorganic forms such as calcium carbonate, limestone, oyster shell and phosphates are readily solubilized in the acidic environment of the gizzard and the stomach. Liquid forms are more soluble and thus more readily absorbed as are powdered solid forms (hawks and falcons need an especially acidic stomach environment to make the calcium in large bones bio-available and pigeons need time with large grit in the gizzard). Free fatty acids may form insoluble soaps with calcium, inhibiting its absorption. Phytic acid exists in some plants and seeds and these compounds can complex calcium and also complex calcium from other foods consumed at the time and renders them poorly digestible (1 mol of phytic acid can complex up to 6 mol of calcium to form insoluble phytates).

Metabolism: Calcium constitutes more than a third of the total mineral content of an adult bird. The skeleton contains about

98% of a birds calcium, most of which is in the form of a chemical called hydroxyapatite. Bones not only serve a structural role but provide a pool of calcium, phosphate and other compounds. Though the hydroxyapatite form provides structural rigidity in bones it is also readily solubilized to provide minerals elsewhere in the body. Contrary to popular belief, the proportion of the body weight that is the skeleton is similar in birds and mammals. The required lightness of birds is achieved through design solutions not a loss in bone mass (teeth are not needed if you have a crop and a gizzard; a keel replaces a full rib cage, etc.). Across avian species, the proportion of body weight that is comprised of bone increases with size.

In the hen, 25% of the calcium in the blood is free ionic Ca (+2), and the balance is bound to proteins (albumin), or complexed with citrate, phosphate, or sulfate. The low levels of calcium in the plasma of non laying birds are precisely regulated, because of their important role in intracellular communication, macro molecular interactions and blood clotting. This regulation is accomplished by the Vitamin D endocrine system.

Information on skeletal development and egg development (Medullary bone; shell gland; embryo metabolism) may be forthcoming if there is an interest.

Calcium Requirements: The maintenance levels for birds are not precisely known, but granivores such as pigeons usually are not deficient since phosphorous levels of seeds are also low (not to mention supplementation). Note: high calcium increases the need for phosphorous, iron and manganese.

Calcium requirements for growth are very high—turkey poults require 12% dietary calcium for the first six months and the maintenance requirement at six months drops to 0.55%. Altricial birds, like pigeons (born blind, naked and helpless), have skeletal growth rate considerably higher than other kinds of birds (precocial) but the experimental work has not yet been done to establish the precise requirement, but pigeons must eat more than seeds to meet the demands for growth. Supplementation in feral pigeons is done with mollusk shells (documented 35 kinds of mollusks consumed by feral pigeons), egg shells, bone fragments, dirt—always see them pecking selectively at dirt.

Egg Laying: Small birds have a higher calcium demand than large birds—perhaps pigeons are somewhere in the middle of this reckoning. I don't know precise pigeon requirements, but continuous daily egg production in poultry, ducks, quail and pheasants requires between 2.25% to 3.25% calcium in grain based diets. An altricial bird like a pigeon will be less (Budgies can lay large clutches with normal shells with as little as 0.8% calcium in the diet). There is no physiological need to have hens

sit on fake eggs—there is no calcium deficiency concern with a continuous egg laying pigeon hen with decent nutrition. Growth of the chicks is another matter (see above).

Deficiency: A calcium deficiency may occur due to low calcium or to excess dietary phosphorous (Calcium to phosphorous ratio is OK between 1.4:1 and 4:1). Insufficient Vitamin D3 may cause a secondary calcium deficiency by impairing calcium absorption and bone formation. Increasing the calcium in a secondary deficiency does not solve the problem but supplementing D3 will (drop of cod liver oil rubbed into the seed, flax seed, etc.).

Deficiency will lead to bone mobilization, malformed bones, weakened, porous bones, skeletal abnormalities in chicks, an osteoporosis-like condition in laying hens, decreased egg shell thickness, fewer eggs,

Toxicity: When dietary levels of calcium are in excess, absorption is minimal and the excess is excreted in the feces. Prolonged dietary excesses can lead to hypercalcemia, rickets, gout and nephrosis (kidney problems).

Secondary problems occur with excessive calcium when the digestibility of other nutrients is compromised including phosphorus, magnesium, manganese, and zinc.

#### [b]DRINKING WATER

Pigeons should have access to clean fresh water everyday in a container with top, so it does not get soiled( on the days they don't have garlic or ACV in the water). You can use a clean plastic gallon water jug. Cut a big hole in the side, just big enough for them to put their head thru and drink. This plastic container should be thoroughly washed and sanitized daily. I replace with new plastic containers every month.

0.SNACKS For snacks my pigeons love raw Spanish peanuts, that I break up in smaller pieces for them (go easy). They also get spinach or Kale once a week only, and I am experimenting with other vegetables that are on the pigeon friendly list. Kale is one of the best vegies you can offer them, as it is the most nutritious.

Cilantro can also be juiced and added to drinking water once in a while as it is good preventative for Salmonellas. You can also shred it in a small size and serve it on wet spinach. (per Snowbird)

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#### CLEANING, CLEANING, AND CLEANING

#### BATHING

Pigeons love taking baths, especially the young. I offer mine at

least a couple clean cat litter tubs of water a few days a week. Add a little bath salts to the water, that you can purchase from the above pigeon supply houses. It cleans their feathering, and keeps bug out. (Two cat litter size bath tubs per 30 birds)

Another important component of keeping pigeons healthy is cleaning the coop on a regular basis, here is a step by step instruction for doing so:

#### Step by Step Cleaning

You will need:

- A. Good germicide or other antibacterial/antifungal/viral
- B. Paloma or other floor dressing.
- C. Large Scraper & small Scraper
- D. Dust pan and hand broom or brush
- E. Large 48 gallon or smaller, trash can with liner.
- F. 2 brooms, one for sweeping up poop & one to sweep and distribute dressing.
- G. Anti-sect 2000/ and or perch oil

An average loft should be scraped and disinfected every day or every two days, depending on how many birds you have and how large the coop is.

I have about 40 pigeons in one large coop and we scrape every other day, unless the birds stay indoors more and don't go out in the aviary, then it is everyday. I have a smaller coop with only 7 birds which I need clean only every 4 days.

1. Put all your birds in the aviary, another room, or if they are out flying-that is best time to clean.

2. Get a big trash can with liner and bring in coop, we have a trash can just for pookie poop, as well as a broom, dust pan and hand brush, scraper and small scraper. I also have an extra broom for sweeping the Paloma into the floor. This keeps the germs confined to the coop and only.

3. Clean and sweep out all cubbies or perches using germicide afterward. Scrape then brush into a trash can or dust pan. A small scraper and brush work well for this. We use Antisept 2000 once in awhile to spray cubbies down to kill any bugs that get into the cracks of the wood. We let the cubbies dry and then line them with newspaper.

You can also spray the perches, and use "perch oil" which will kill any bugs in the cracks of wooden perches. Make sure they dry completely before allowing the birds access.

4. Next the floor: We use a big scraper first, to scrape out poop. We often spray the coop with an excellent germicide first, (that kills every known bacteria, virus, fungus from A to Z). This keeps

the dust from rising when scraping. Use a small scraper to get in the cracks and corners where the big one can't go. Scoop all the poop into the trash can using a dust pan, set trash can just outside of the door.

5. Next, sweep the floor with a broom, you may want to spray again with germicide to keep the dust down, use sparingly. Use hand broom to gather dust and remains in corners and pick it all up with dust pan, and dump into trash can.

6. Spray clean floor with germicide and allow to dry.

7. Sprinkle Paloma or other dressing lightly onto the floor. Use another broom to distribute and sweep the powder or Paloma into the floor cover entire floor. You don't want to use too much, just enough to cover the floor. This kills any left over germs that might be left behind, as well as goes into the cracks of the plywood to reduce any contaminants. It is also wonderful to dry up the floor quickly if there is any dampness due to rain driven in by wind, like hurricanes. It is an excellent health/preventive measure to use.

8. Clean up the trash, tie the trash liner up tightly and remove from trash from can and put out for trash as soon as you can. Clean out the trash can and put a clean plastic trash bag in it for next time, set aside. Wash off the brooms scrapers and dust pan and disinfect it all, allow it to sun dry.

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### VACCINATIONS

I am often asked about vaccinations. I am not a veterinarian, however, I have a Master's Degree and I studied avian diseases for many years. I know enough to know that you should consult a professional veterinarian if necessary, such as if you have a sick bird. With experience you will eventually be able to recognize symptoms of disease and treat them successfully. But until you learn, get the necessary assistance. But on the preventative side, vaccinations are a very important preventative measures that you may take for your flock to keep them in tip-top health. Most of the regimes that you will see for pigeons were developed by the racing folk. Racing birds often mingle at races where diseases may be easily transmitted. White Doves seldom mingle with other flocks, so they tend to remain very healthy. However, if you race birds or show birds, or bring new birds into your flock on a regular basis, it is as good idea to vaccinate. No matter what, always quarantine any new birds for 30 to 60 days before putting them into your loft. These are the vaccines readily available and recommended by pigeon veterinarians.

- A. Paramyxovirus (PMV)
- B. Paratyphoid (Salmonella)
- C. Pox

Youngsters may receive their first vaccinations soon after weaning (but not before 28 days of age). Give boosters at recommended times after initial inoculation and use oil emulsion vaccine approved for pigeons.

Be careful with Pox because Pox is a live vaccine, so if you vaccinate a bird it will be contagious to any birds that did not receive the vaccine. Either vaccinate your entire flock or none. Birds will be contagious for about 8 weeks after the vaccination. Once they have had pox, they are immune for life.

#### How to Give a Vaccination to a Pigeon

Giving vaccines is really easy. When you are beginning, have an assistant help you to hold the bird. After you are experienced, you will be able to do this yourself.

For PMV or Salmonella, first of all, remove the metal tab on the top of the bottle and then wipe the rubber bottle top with alcohol to sterilize it. Using a NEW syringe and needle, before you take the cover off the syringe, pull the plunger up. Remove the top of the syringe and place the needle through the soft rubber top of the bottle. You may have to remove the safety top of the bottle first. Push the plunger down (air will go into the vaccine). Then pull the plunger back up and the vaccine will go into the syringe. Remove the needle from the bottle. You are now ready to begin your vaccinations.

Pox is a live vaccine and will come in 2 vials. You must go through all of the above steps to remove all of the liquid from one vial (the diluent) into the syringe and then using the syringe, place the liquid portion into the second vial of the freeze dried material. The vaccine is now activated and ready for use. Pluck a few feathers from the upper leg and brush the vaccine into the feather follicles.

PMV and Paratyphoid are given with a syringe just under the loose skin of the neck or the groin. You never want to inject into or near the flight muscles. Gently lift the skin and push the needle under the loose skin, holding it the needle parallel to the body so that no muscles or blood vessels are penetrated. When the needle end is under the skin about 1/4 inch, push the plunger on the syringe.

Remember: Never put a used needle into a vaccine solution; always use a new needle when getting more vaccine; be very careful that you do not accidentally poke yourself with the needle and contaminate yourself with the vaccine!

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#### BREEDING AND BABIES

##### REARING A BABY PIGEON: (Overview)

Whatever the reason you may be called upon to take up the task of hand-rearing a baby bird, you must remember that it is very time consuming, especially with chicks that are very young.

The following rules will help you to be successful.

1. The need for heat and humidity of the brooder.
2. The need for the correct recipe, consistency and temperature of the diet.
3. The need for the correct feeding technique, frequency and hygiene.
4. The need to monitor the babies progress and to be able to detect signs of problems.

## The Need for Heat

A new born chick requires a temperature between 33-37 degrees C. As the chick grows and produces feathers its need for heat diminishes.

The best brooder can easily be made from a glass or plastic fish tank or a laminated wooden box. Untreated wood or cardboard is ill advised as it harbours germs and prevents adequate cleaning. The heat source can be a heat pad or even a 15 watt light globe housed inside a tin can that is about 12cm across. It should not get hot enough to burn the chick. A hot water bottle changed frequently is another alternative heat source. Whatever method is used to warm the brooder the heat can be kept in by a simple lid of a sheet of polystyrene with air holes punched in.

It is important to closely monitor your charges. Chicks which are too cold become lifeless and are cold to touch. Chicks that are too hot at first will show a red wrinkled skin then become restless, pant, gasp and hurl themselves around the brooder in a frenzy. Overheating is often fatal.

- The floor of the brooder should be lined with fine wood shavings with a layer of paper towelling on top. The purpose of the towelling is to monitor the bowel movements of the young bird.
- Humidify the air via an open dish of water covered with wire to prevent an accidental drowning. Humid air will prevent dehydration of the baby bird.
- Keep the baby warm (at least 80 degrees F). If the squab is completely without feathers (only has yellow down), a ventilated box containing a red light bulb is needed, (hot water bottles do not last through the night.) If the baby is fledged, then a cardboard box lined with kitchen paper is adequate
- Keep the baby dry!
- Keep the baby in a quiet, safe place - away from noise, curious humans, cats, dogs, etc.

## How much, how often•

The consistency of the food will depend greatly upon the age of the bird. A youngster that is only a day or two old will be able to handle extremely thin watery food every 2 hours, if the crop has completely emptied. Newborn chicks have only small crops and will not hold much food at all. Do not force the chick to take more than it can handle. Remember they are very weak at this tender age and will eat very slowly and tire quickly.

If you want to rear the bird yourself it is best to feed it 3-4 times a day. Acceptable foods include Complan fed through a syringe, wholemeal bread soaked in warm water or milk or a mash of warm porridge or digestive biscuit with a little scrambled or boiled free-

range egg (about a third of an egg at first, increasing to half an egg per day). Unlike garden birds who gape when hungry, it is necessary for the squab's beak to be gently opened to receive tiny pellets of food that should be pushed into the back of the throat. Feed until the crop feels plump or the bird loses interest. Food can be moistened, but do not squirt water into the mouth as baby birds can choke or actually drown this way.

You must get food and water into the baby: if she is too young to eat by herself, you will need to feed her by hand. Make a baby bird formula (whole meal bread soaked in warm water or milk or a mash of warm porridge), and buy a feeding syringe (no needles, just a feeding syringe).

Fill the syringe with formula; make sure it is not too thick or you will not be able to push it through. Carefully open the little squaker's beak. Insert the syringe carefully into her mouth and squeeze a little bit at a time. It will take you a good twenty to thirty minutes probably, and the squaker needs feeding at least five times a day. Babies must be fed! The food should be made thicker to a melted ice cream consistency as the chick grows. Feeding intervals will be determined by the speed of the emptying of the crop. Only very young birds need feeding at night, and then only once at about 3 a.m. otherwise four times daily feeding until 5 weeks of age is adequate. The food should be given at 42 degrees F. This is the temperature that can be tolerated on the lip without burning. In between feeds boil the utensils etc. so as to prevent any food spoilage and subsequent infections. Syringes can also be used.

Feed your bird every day, even after she begins eating seed by herself. Spilled food around the face should be cleaned with a warmed clean cloth before it dries. A •bib• may help to keep the feathers clean as well as a fine warm water mist spray over the body when the weather is hot, but ensure that the pigeon does not get a chill. When she first starts showing an interest in picking up seed, she will need at least one more week of handfeeding to be sure she is getting enough nutrition. It takes a while for a baby to learn how to eat and drink, so be patient. Small seeds like millet can be added gradually until the youngster begins to feed itself. When the squab is old enough to begin to peck at seeds, provide a shallow dish of water and cage bird grit.

The first indications that the time for weaning is correct is the growing lack of interest in their food. When this behaviour begins a variety of soft foods can be placed in a shallow dish on the floor of the brooder or cage. Remove these foods after 6 hours and replace fresh each morning. Feed the birds only in the evening until they lose interest and then weaning should be completed. Weaning is encouraged by offering a variety of soft foods such as fresh corn, steamed peas, broccoli, pumpkin, carrots, apple, fruits, soaked lentils, beans, sunflower seed. Seed should be given in as small quantities as possible. Millet sprays are given on a daily basis to stimulate the weaning process. Clean seed mixes soaked for 24 to 48 hours helps your bird develop a taste for a variety of seed types. The newly weaned bird will try new foods more readily than at any other period in its life, so offer your bird a variety of foods during this time. Birds start flying at the same time as weaning. The birds should be provided with a low perch during the weaning process and offered water twice a day in a low dish.

Many animal rescues use a trick for weaning that the youngsters really like. Fill a sock w/seeds (preferably a dove/quail mix) and make a slit in the sock for the bird to get at the seeds. Hang it in their feeding area. Poke at the slit in front of the young birds, and allow seeds to fall out. The birds learn to find the seeds pretty quickly.

Once it is well feathered (appearing last under the wings), keep the youngster outside in some sort of cage safe from cats during the daytime. This will help it get used to other birds: encourage it to pick up it's own seeds and grains and get beneficial sunlight. Ideally it should spend some time in a rehabilitation aviary. But if this is not possible, do ensure that the bird can fly properly and eat by itself before release, allowing it to strengthen and try it's wings in a bedroom or garage.

When you are satisfied that it is able to fend for itself, let it go in fine weather in a safe area, perhaps a town or city park, well away from cats, where it can join a regularly fed existing flock who have all year round access to water.

About 45 days after birth, a pigeon can fly. Please do not release her until you are sure she can fly well and defend herself. If you release her, bring her back to where you found her or to a safe area nearby, preferably where there are other pigeons.

If you rescued her at a very young age and feel that she should not be released into the wild, or if any other injury/condition exists so that she can be released, then you should provide her with a good home. That means she should have room to fly and always have dry, fresh food and clean water.

### Three weeks to independence

At around three weeks, it is time to start the weaning process by leaving a few that small seeds for it to peck at and a container of water so do not it can drink.

Very young babies that do not get real pigeon milk usually grow much more slowly than babies that get the milk so do not get discouraged and be patient. Hand feeding babies from day one is a last resort because they do grow much more slowly than when fed by their own parents, and sometimes they just do not make it.

Babies need water, too. Keep a close watch on the babies when you first set them out to see that they get the water they need. Some signs to watch for are: blinking eyes or the crop (digestive tract of the bird where the food is stored before digestion) will feel hard. If the crop is hard, give them a little water with a syringe and tube, and massage the feed in the crop and it will soften up. Once you see them take a good drink on their own, they will not have any more problems. But make it easy on them. Always place the water in the same container and put the container in the same location in the cage. Just like people, pigeons need more water when it is hot, so watch them closely in hot weather.

All baby birds are frail. Any period of cold weakens their ability to thrive, and infant mortality in nature is always high.

## Tube Feeding

Tube feeding is like force-feeding. It adds vital nutrients to the body when the pigeon may not actively take in these nutrients on its own. Tube feeding can be useful to aid in weaning of the young birds. This is the time when the squeakers are left on their own to learn how to eat and drink. Every year, there always seems to be at least one squeaker that does not •catch on• as quickly as the others. He may even get weaker and weaker as he falls further behind. This is a good time to tube feed. Youngsters in this situation can be fed a high calorie feeding solution containing fructose and glucose. In the pigeon, fructose has been documented to be a highly digestible sugar being quickly converted to usable energy. (The sugar fructose can be found in grape juice, honey, and in powdered preparations in health food stores.

Sick pigeons generally do not eat or drink as much as they should. This is a natural phenomenon in all animals, including man. Tube feeding can be beneficial in this situation. It will deliver vital nutrients that the bird would otherwise not take in on its own. Again, there are commercially made products for birds that contain all the necessary fats, proteins, and carbohydrates that a sick pigeon needs. Oral antibiotics can also be mixed right into the formula and placed directly into the crop.

## Tube feeding procedure

The first thing needed is a feeding syringe. Feeding syringes are a little different than regular syringes in that they have a larger opening at the end. This allows the passage of thicker and larger materials, such as ground pellets or very thick feeding solutions. A •regular• syringe can be used if you are only going to feed water or water/electrolyte solutions. Glass syringes can break easily when dropped. Plastic syringes are best, as they are very durable and easily cleaned. There are two types of feeding tubes available: rigid stainless steel tubes; or flexible, rubber feeding tubes. The best are the rubber flexible, round tipped feeding tubes, as they are soft and flexible as they are passed into the crop. This is safer, because it will move with the pigeon if it struggles, preventing damage to the mouth, esophagus, or crop. The rounded tip provides easy passage of the tube into the crop. Rigid feeding tubes such as the stainless steel ones can cause damage, if handled improperly. Soft rubber tubes are much safer. The tube size should have an outside diameter of no more than 0.4 cm (4 mm). When holding the pigeon, care must be taken NOT to put any pressure over the crop area. (Pressure on the crop can cause regurgitation [vomiting] of the feeding solution.) Next, the pigeon's neck is straightened out vertically while the beak is opened. With the mouth open, it is easy to see the opening into the trachea or windpipe. It is on the lower portion of the mouth just behind the tongue. It will contract open with every breath. The tube is then gently placed past this opening to the rear of the mouth on the bird's right side. If done correctly, the tube will pass very easily down the throat into the crop. Do not force it if you feel resistance.

The tube is passed approximately 3-3 1/2 inches in to the crop. Once in the crop you can actually feel the tip of the tube by feeling the skin on the outside of the crop. Now slowly

inject the solution into the crop. Do not fill the crop completely because this can cause some overflow. The neck should be kept in full extension during the feeding to discourage any overflow or reflux. After injection of the solution the tube is slowly and carefully removed. If reflux occurs during the feeding process the pigeon should be released immediately to let it clear his throat on his own. Attempting to hold the bird upside down or trying to swab out its throat will only cause undue stress. This will only increase the chance of aspiration (the breathing in of some of the solution.) This can cause infection.

Some tips when tube feeding

pigeons Always lubricate the feeding tube before use. A small amount of a lubricant such as K-Y Jelly or Vaseline wiped on the tube will help its passage into the esophagus.

Feed liquids should be warmed slightly. Excessively hot or cold liquids can cause irritation and possible regurgitation.

Feeding formulas should be fresh.

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Foster care breeding (aka pumpers) and Bull Breeding

Fostering eggs. This is our method to raise an all white round, then a race team, using fosters and 'natural parents'.

Put the pairs together, and let everyone lay a round of eggs. Most pairs will lay within 7-10 days of each other.

Throw away all the eggs from all the pairs on the same day.

Approximately 7-10 days later, everyone will lay a second set of eggs, usually within 3-4 days of each other.

Now the hard part -- keeping track of who you are fostering whose eggs under. Good record keeping is ESSENTIAL here.

Remove the eggs from Pair A - and carefully put the eggs from Pair B under them. (Pair A is the pair you are NOT raising babies from at this time). Record on the nest card that Pair A has Pair B's eggs.

Pair A will incubate and raise Pair B's babies. In the meantime, about a week later, Pair B will lay again - and then are allowed to keep/hatch these eggs. This way, you have now got 4 babies from Pair B, within 7-10 days of each other in age.

In our loft, this of course would be repeated with Pair C and D, E and F, etc.

Once the first set of babies has been weaned, the process is repeated. Although by then, we usually do not have to throw out a round of eggs - there are enough pairs laying within the same time frame, to swap eggs - so Pair B will not necessarily raise Pair A's - etc. (confused yet?)

Again, good record keeping is essential - otherwise, you end up not knowing whose babies are whose

We also have a few birds who just don't produce good babies on their own - so whenever possible, they are used to foster "good" producing pairs babies.  
One more note on fostering.

You can 'switch' eggs up to about 4-5 days, max. After that, you run into trouble...

For Example -- Pair A has laid eggs. Pair B lays 4-5 days later. You can still put Pair B's eggs under Pair A with success.

If Pair A's eggs are older than 4-5 days - and you try to foster Pair B's eggs under them - they might abandon the eggs before they hatch. Some pairs will sit the nest only as long as the regular incubation period is - and if the eggs don't hatch within a day or so of the 'due date' they expect - they give up and leave the nest.

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### Emergency Fostering

Sometimes one of a pair is lost - or the parents aren't good parents (common with Young Birds), and you find yourself in a dilemma. Do you hand raise a baby (difficult), or is there another pair in the loft that could help out?

Sometimes, one baby is much smaller than the other - and the larger one keeps pushing the weaker one away at feeding time - and the weaker one is in danger of dying of hunger.

In the first case -- you have some choices.

1/ If the babies aren't fully feathered yet - and you have a pair or two who have a single baby of similar size/age - you can put the babies in with the 'singles' to be raised. Hopefully, you've already banded and recorded the parentage of the orphan babies - so you don't mix up whose baby is whose.

In a pinch - a pair COULD raise three babies - but watch carefully that all babies are getting properly fed. You might have to supplement one or two of them from time to time.

2/ If you have two orphan babies - and only one other pair that could foster for you - and they have two of their own -- you can try putting one baby in with the pair - and keep one in the house to hand feed. Again, watch that all three in the nest are adequately fed. You could also swap the babies every other day - hand feeding one, while the other spends a day getting "bird fed".

If the orphans are from a pair of birds that are really important to you - and you have another pair of breeders who are on 12-14 day eggs, that you are willing to sacrifice -- you can put babies up to 5 days of age into that nest, removing the eggs of course. The "foster" parents will have a very strange surprised look on their faces, when their eggs suddenly turn into rather largish babies.... but they will take to them like they are their own.

Case Two.....

Sometimes, one chick just doesn't grow as quickly as the other. Could be there is something wrong with it - or could be, it's just not as strong. The larger of the two might take all the food - and the little one just will never do well, and could starve to death, even under it's own parents....

In this case - if you have more than one nest with a similar mix - one baby smaller than the other - you can put the two larger babies in the same nest under one pair - and the two smaller babies together under the other pair.

Or - if you have a large/small set of babies - and a pair of parents who have a single baby that is similar in size to EITHER of the 'mix' sized babies - put the two similar sized ones in the same nest. It is preferable, if possible, to leave the smaller baby with it's parents - where it is now an "only" - and will get fed more, without any sibling rivalry.

Of course, if necessary, if there are no foster parents available - you can try supplementing the smaller baby by hand feeding it once or twice a day - then putting it back in the nest with it's parents/sibling. This way, it should catch up in size to the larger baby - and you won't have to supplement any more.

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Bull breeding

HOLDING" Eggs.

This is worth a small note - we've tried this, and raised babies from the same cock bird with 3 different hens - all within the same breeding period....

Pair A lays eggs. As soon as the first egg is laid - gently remove it from the nest, and put it in an egg carton in a safe place, at room temperature. Turn the egg GENTLY once a day. Do the same as soon as the 2nd egg is laid. Make sure the eggs are at room temp (68-70 deg), and they are turned once a day. It is imperative that you remove the eggs BEFORE the hen starts incubating. Once incubation/growth has started, removing the eggs will kill the baby growing inside...

Now, this hinges on you having another pair ready to foster - you know they are going to lay eggs within 3-4 days of Pair A. Anything more than 3-4 days, and you might not have any success...

After Pair B (the foster pair) has laid their second egg - remove the eggs, and put the Pair A eggs you've been 'holding' under them.

With luck, 18 days or so you'll have 2 lovely hatches!

btw -- we did this using what is called the "bull" system. One cock bird in a 'room' with 3 hens (we actually had four - but the cock bird didn't like the fourth one for some reason.) He paired with the 3 hens - they built three separate nests - and we fostered the first two hens' eggs by 'holding' them - and let the cock bird raise a round with the 3rd hen (moved the other hens out into a different area, once they'd laid their eggs). We got six babies from the same cock bird - all hatched within 7 days of each other.

Using 'natural' breeding, it would have taken 4-5 months to have achieved the same result (6 babies from one cock bird).

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Incubation-when there is no alternative  
Matthew Vriends "Hand Feeding and Raising Baby Birds" on the subject of incubation. Once in a while it needs to be attempted when there is no alternative.

Incubation Requirements:

temperature: 98 - 100 degrees; not more than 104 degrees; any variance on the low side.

Temperature will cool briefly during turning sessions.

humidity: 55% on a hygrometer; light warm water mist spray on the last four days.

During incubation the egg must lose a certain amount of weight in the form of moisture, so that the air sac expands. At the end of the incubation cycle the egg will have lost between 13% and 15% of its weight. If the evaporation proceeds too quickly, it will become too dry for the embryo will not develop satisfactorily.

egg turning: at least three or more times a day (use a clean cloth for home made incubators since the shell is a semipermeable membrane which must remain clean). Turn the egg a quarter turn only each time.

The embryo floats toward the upper surface of the egg. If it is not turned it may stick there. Also, turning stimulates movement in the embryo which stimulates growth. Do not turn the eggs in the last 3 days before the expected hatch date, so the chick can gain a favorable position for pipping the egg and making a clean exit (not drowning in albumen).

time frame: 17 - 18 days after egg laying.

ventilation: Egg produces carbon dioxide which must be evacuated; fresh air is especially important during hatching;

ventilate and cool one minute each day.

Avoid direct sunlight.

Emergency Incubator:

The above incubations operation can be attempted with a make shift incubator, but it would seem prudent to try this only in an emergency when no brooders, rehabbers, or incubators are

available. The humidity cannot be controlled without a hygrometer and I don't know how critical this will be. Here's what you need:

- closed container with a window and a roof light rigged to achieve the required temperature i.e aquarium, etc.
- thermometer located at egg level and visible through a widow.
- pan around the eggs for water; a towel base.

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### Determining Fertility of Eggs-"Candling Eggs"

Remember that cell division in a fertile egg does not begin until brooding starts. There is no actual life in the egg until incubation. Therefore if you don't plan on hatching any babies, be sure to throw the eggs out before incubation begins.

After 5 to 7 days of brooding, the eggs should be inspected to see if they are fertile.

Carefully remove the eggs from the nest, DO NOT shake or move abruptly in any manner. Don't try to carry them both in one hand as you may drop them. I usually wrap the eggs gently in a papertowel, each seperately and bring them in, inside a basket. If you have never candled an egg before, ask someone to help hold the egg to avoid any accident.

Go into a dark room without windows or closet. Be sure to have the lights on so you can see what you are doing.

Next, you can either hold the egg, inside a hole cut in a piece of cardboard, or encircle the egg with your fingers while holding it. If you don't feel comfortable doing this for fear you might drop it, please seek assistance. I usually encircle the egg with my fingers as I hold it, and hold the flashlight in the other hand, but I'm very comfortable with doing this as I have done this numerous times.

Turn a bright light on behind the egg, a flashlight will do. Turn off the light in the closet, or whatever dark room you have.

If the egg is fertile, you should see an embryo, which looks like a small dark shadowy circle in one area of the egg, and/or you can actually see blood vessels thru the thin shell.

Be sure to put the eggs back as soon as possible, if fertile.

Do not try this too many days later (after the 5th to 7th day), as a growing embryo may not be visible anymore. The egg may appear to be clear, but it could be the embryo taking up more room in the egg, and the blood vessels nor small embryo will not be visible with flashlight.

If you are not sure if the egg is viable or not, I would put it back under the hen just in case.

Incubation (from the onset of brooding) is 14 to 18 days

depending on the weather. It has been my experience that eggs usually hatch around the 18th day.

If the egg doesn't hatch on the 18th day please don't throw out, allow the hen to incubate a few more days, it does not necessarily mean the egg is not fertile. It has been my experience that eggs are fertile 9 times out of 10. Sometimes the egg will look dark or an odd color, which can be normal and doesn't mean the baby has died or the egg is rotten. Give the egg the benefit of the doubt and allow the hen to incubate a few more days.

The egg is probably not fertile if it doesn't hatch after the extra days given, or embryo died. Some hens will push the egg out of the nest, as they seem to sense these things. If the egg smells rotten (the embryo died), or if you see fluid moving about (egg not viable) when you hold it up to a light, then those are good indicators the egg will not hatch.

You should see tiny little eruptions or openings in the eggs when the baby is hatching, that is called "pipping". The baby is actually beginning to crack or break the egg by chipping at it with its egg tooth. You may think initially the egg has a crack in it, but it is probably the baby pipping out of the shell. This is around the 18th day. The baby will twist and turn in the shell and use its egg tooth to break out of the shell. The egg tooth is on top of the beak of hatchlings, it is a horn-like projection that enables chicks to break open the shell. A few days after hatching the egg tooth is absorbed and no longer visible.

From the first pecking of the shell to complete hatching can take anywhere from 15 to 30 hours. Within a few hours of hatchlings drying out, they receive their first meal of "pigeon milk" from the parents.

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Egg Binding in Birds

by Carol Heesen

As we move through the breeding season, there is increased discussion of the problem of egg binding. What is egg binding? Egg binding is the inability of a hen to pass a developed or partially developed egg. A partially developed egg can have either a soft shell or no shell. Many cases of egg binding occur when a hen is trying to pass what appears to be a "normal" egg. The inability to pass the egg quickly results in the death of the hen.

There are a multitude of theories as to what causes egg binding. Many consider cool temperatures to be the deciding factor. I find this a very questionable theory. Birds in the wild often breed early in the spring while temperatures are still very cool and yet do not suffer from egg binding. I personally have Goulds successfully breeding in my outdoor

flights when temperatures are down in the low to mid 40s. Despite raising hundreds of birds in cool conditions, I have not had a hen experience egg binding.

Another common theory is that the hen is too young. In parrots and budgies, where the bird continues to grow in size for 2 or more years, this may often be the case. The poor hen has just not grown sufficiently to allow the easy passage of the developed egg. Finches and canaries, however, grow and mature very quickly. Most have reached full adult size by the time they reach 4 months of age. In the wild, Goulds have often been observed raising chicks before they have even molted into their adult colors. I have observed this same phenomenon in my own flights when I have been a bit slow in separating my maturing juveniles.

Let me be quick to point out that I am not advocating breeding very young birds. The offspring of early breeding are not of the same quality as later breedings. It is best, I believe, to allow our birds to become older before attempting breeding. My point is only that early breeding does not, in my experience, result in egg binding.

Another common theory is that egg binding is the result of lack of calcium in the diet. Most of us offer a variety of calcium sources to our birds (egg shell, cuttlebone, oyster shell) and yet hens still die from egg binding.

I do believe nutrition is at the root of this problem. Most bird breeders are careful to offer a variety of calcium sources. Rather, I believe, the problem is the inability of the bird to metabolize the calcium that is readily available in the diet. The other major cause is poor condition of the mucus membranes in the vent area.

Let's look at each of these issues separately.

Calcium is used by the body to not only form the shell of the developing egg and maintain strong bones, but is also crucial in the proper functioning of the muscles. While it does take a large amount of calcium to form an egg shell, the hen also needs calcium for the muscle action needed to expel the egg.

Vitamin D3 is crucial in the absorption of calcium. Without it, all that good calcium we offer our birds passes right through the body without being absorbed. In outdoor flights, our birds are able to produce D3 via a chemical reaction to sunlight. In indoor flights, they are unable to do this. Sunlight through a window is not sufficient. The ultraviolet light needed does not pass through window glass. Full spectrum lights can help but some studies have shown that the ultraviolet is only at sufficient levels at less than one foot from the light source. For inside birds, a D3 supplement is almost always helpful.

An excess of phosphorous, can also interfere with the absorption of calcium. According to Robert Black, plant materials (like all those wonderful seeds we feed our birds, contain an abundance of phosphorous. Animal products like egg foods, insect

foods and mealworm, contain an abundance of calcium. By serving both plant and animal products to our birds, we are able to keep the calcium/phosphorous ratio in balance.

Some of those yummy greens we offer can also interfere with calcium absorption. Oxalic acid found in spinach, beet greens, chard and rhubarb reacts with the calcium so that it can not be absorbed. While these greens are rich in a number of nutrients, it is important to feed them in small amounts and provide extra calcium when doing so.

In order to pass a developed egg, the mucus membranes around the vent must be soft and flexible. It is the fat based vitamins that are primarily responsible for this condition, most notably linoleic acid (Vitamin F) and Vitamin A. Without these essential nutrients, the oviduct becomes dry and hard. Most avian vitamins do not include the fat based vitamins, so it is important to supply a separate source for these vital nutrients. These essential fatty vitamins can be found in many of the oily seeds such as safflower seed, sunflower seed, and niger seed. I have found niger seed the easiest for finches to accept.

If you do have a finch suffering from egg binding there are some things you can do.

\* First and foremost, a warm, quiet environment will allow the bird to focus it's reserves on passing the egg rather than keeping warm.

\* An immediate increase in calcium will do nothing to harden the shell of an already formed egg but will do wonders in improving the muscle action needed to expel the egg. Calcivet by Vetafarm, provides not only the calcium, but also the D3 needed to absorb the calcium. It can be served in the drinking water or sprouted seed if the bird is still eating and drinking. If the bird has stopped eating and drinking, it can be administered directly into the crop.

\* Massaging a small amount of vegetable oil around the vent will help soften the mucus membranes around the vent and help the hen pass the egg.

- Once the egg has passed, the bird will appear to have made a complete recovery. It is now time to assess the nutritional problems that caused this problem in the first place. It is dangerous to attempt to breed this hen again until the nutritional deficiencies have been addressed.

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#### Making an Egg Bound Hen Comfortable

I advice to seek out a qualified avian vet. These conditions may not be remedied permanently by these treatments, and a vet should ALWAYS be consulted with any egg related issue. As soon as you see your bird in that (hunchback) position with rounded back, tail down, sometimes wings will hang down, (males may or may not be picking on her) and you know she should have laid her egg, sometimes they will lay the egg the next

day, but if not don't wait, you can give her a drop or two of pure olive oil down the throat, and most likely you will see the egg within a day. The olive oil will lubricate the tract and help loosen it and get the egg out. If there is any sign of blood you will need to seek out a professional avian vet. Calcium in liquid form, or in alfalfa tab, or calcium tablet, or TUMS (1/4 of human dose) should also be given. This will give the birds muscle extra nutrition to help push the egg out. Cod liver oil will also provide the vitamin D and other minerals to support calcium uptake. I always give a drop of colloidal silver down the throat each day, until egg passes for infection.

You need to isolate the bird so she can rest and won't be bothered by the other birds. Put a heating pad on low, and lay towel on top of the heating pad, and then lay down lots of tissue in the isolation cage so you can monitor her droppings/shells/ or egg coming out. Let her sit comfortably, and give her access to food and water.

You can also give her access to bathing facility, as this will give moisture to the vent and help draw the egg out. Or, hold the hen's feet, vent and bottom in 1 inch pan of slightly warm water for 5 minutes. This may prompt the muscles to relax and expell the egg into the water naturally.

You can try this procedure also, if you have a hen with a broken egg just inside the vent, symptoms are egg shells and yolk coming out of the vent, as well as the hunchback look. Administer olive oil, once a day, until everything is out and there is no more signs of shell or yolk coming out, and the poop is normal. If there is any sign of blood you should get her to an avian vet immediately.

If she drops the egg but doesn't act better within a day, and poops are not normal, or if there is any sign of blood accompanying the egg, this is a serious situation that requires rehabber or avian vet immediately.

Garlic, Neem oil, and a drop of colloidal silver down the throat is also recommended. I have also given on occasion some brewers yeast for extra B complex vitamins.

#### Post egg Paralysis

Keep the bird warm. Give extra calcium (oyster shell 500 unit dose) and brewers yeast tabs for five days. You can also make raspberry tea, as it will help with contractions. Brew a cup of the tea and add water to delute it to half the strength.

#### Soft shell eggs/over & under production of eggs

For birds that have already treated with calcium gluconate and other forms to restore calcium with no results. I treated a hen who was still laying soft shell eggs as follows:

Garlic capsule (1 per day) Clean bloodstream, immune system stabilizer

Colloidal silver (A few drops down the throat)for infections.

Rub a small amount of Pro-gesterone cream on the leg, rub it until it is absorbed into the leg. Warning: You must purchase a cream that is free of any artificials. I recommend

Premier Research Labs "Natural Gesterone Cream" as it is 100% natural and has vitamins in it. You should also call the manufacturer to make sure the product can be used on birds.

The cream balances the hormones, thereby regulating egg production, and allowing calcium uptake. When the hormones are out of balance calcium cannot be absorbed.

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#### Cleaning Breeding Cubbies/with fronts

There is quite a bit of difference when cleaning the breeding cubbies, because there are babies in there. You can't remove the babies for too long a period of time, depending on their age, because the parents will not be happy, we also can't use any toxic chemicals on the floors in the breeding pen.

At about 5 days of age, when I can't stand the poop pile any longer, I will start cleaning about every day or every other day.

Once it has been cleaned it isn't so bad after that.

You will need:

1. Clean nest bowl lined with clean paper towels or whatever type of nest material you use, and a big basket with handle and cover.
2. Small hand broom with soft bristle and dust pan.
3. Small hand scraper
4. Newspaper for nest box, paper towels, or Chux.
4. Disinfectant spray/ animal and pet friendly Nothing toxic

Follow these steps:

A. Pull the front off the nest box gently, set aside.

B. Gently lift babies out of the nest bowl and set them into the clean nest bowl. Put the bowl with babies inside the basket and cover with clean cloth, or light towel. If you have a safe place for them set them there. I usually have them within my sight but away from dust.

C. Now you have to work quickly. Pick up nest front & scrape the edges where poop has gathered into trash container or trash bag. Do this as far away from the babies as you can. Brush clean & spray front with disinfectant, and set out to dry.

D. Pull dirty newspapers or paper towels, chux out of Nest box, into trash can. Clean out thoroughly with hand brush, sweep all areas of cubby, sweeping dirt into dust pan and then out into trash bag.

E. Spray cubby lightly with disinfectant. Allow to dry. Replace with newspaper or paper towels, or Chux. Pick the babies up from the basket, in their nest bowl, return them to the nest box, and gently put the front back in.

F. Pick up all tools, trash bag, and dirty nest bowl and remove from breeding coop. Allow mom to go back to her babies. She will grump & fuss on her way back, complaining of the disruption but will be happy with her clean nest box and bowl. The more

you make yourself available, the more they get used to the routine.

If it is cold and the babies are still as bare, you should bring them inside a warm house. If the poop isn't too bad yet and there is a health risk (cold weather), leave them with mom, don't clean unless you absolutely must.

As the babies grow older you can figure out their needs, when leaving the nest box. If they are walking around and it is warm, set them in an enclosed patio and allow them access to food and water. They will enjoy the time spent, while you are cleaning.

I have an old play pen that I set in the patio, it gives them some space yet keeps them confined.

G. Clean all utensils with disinfectant and wash. Clean the nest bowl that you replaced with clean one. disinfect it, wash it, and let it dry in the sun. Line it with nest material at the time of the next cleaning.

With babies it is most important to use the least invasive measures for cleaning and use a mild cleaner for the floor (also pet friendly) in the breeder coop. This area should be tranquil with no stress, as that is also inclusive of raising (physical & emotional) healthy youngsters...and healthy, happy parents, as they are part of that equation.

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BABY BIRD RESCUE:  
ADVANCED HAND FEEDING TIPS  
+ BABY FOOD RECIPE

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MacMilk: Crop Milk Replacer Recipe

1 jar (71 grams) strained chicken baby food  
1 hard-boiled egg yolk (16.6 grams)  
1 tablespoon low-fat yogurt (15.3 grams)  
¼ teaspoon corn oil (1.13 grams)  
247.6 mg calcium carbonate  
2 drops cod-liver oil (from gel cap)  
1 drop vitamin E (diluted 1:10 in corn oil; see notes)  
1 small pinch vitamin B complex (see notes)  
25 mg. Vitamin C (ascorbic acid)

For birds days 1 to 3, digestive enzymes (see notes)

Method: Mix all ingredients in a blender. Allow the digestive enzymes to work on the food for ½ hour before using at room temperature. Warm it to 'wrist' temperature before feeding.

Note: because the replacer offers more calories and is more bioavailable than other diets, you may require less than you are used to feeding. Weigh the bird, calculate its energy requirements and feed accordingly.

MacMilk® Astrid MacLeod and Janine Perlman, 2001©

## NOTES

Vitamins: Vitamin E, as purchased, is too 'strong' for the correction required in this diet. Mix one drop of vitamin E (from a 400 IU/ capsule) with 10 drops of corn oil. Shake or stir well.

Then, use 1 drop of the diluted vitamin E in the recipe. The remainder can be kept in an airtight container and stored in a cool, dark place. It can be used over the next few days -. Because vitamin E degrades, it will have to be mixed fresh after a few days, so don't make too much at once. The amount of B complex required is too small to weigh on a gram scale. The amount required for this recipe is a pinch the size of one sesame seed.

Enzymes: Hatchling doves do not have high enough levels of proteases and other enzymes to digest foods well. Although crop milk is high in protein, as described earlier in this section, some of the protein is in the form of 'free amino acids' - thus, already broken down. This is one of the reasons that raising hatchling doves has been very difficult in the past. We can break down the protein in the crop milk replacer by adding digestive enzymes.

Birds days one to three: digestive enzymes must be added to all hatchling diets, and can be discontinued after day three, when the bird's own digestive enzymes are at higher levels.

Pancrezyme can be purchased from a veterinary clinic. Enzymes from the health food store probably will not be effective. Because enzymes are required for hatchling diets and in emaciation protocol, they are good to have on hand.

Method: You will require 1/8 teaspoon of enzymes for one recipe of MacMilk. Mix the enzymes with the food 30 minutes before feeding, to allow the enzymes to work on the food. Do not mix enzymes with the day's ration of food - only with what will be used in the next feeding. Otherwise, the diet will spoil. You will have to estimate how much of a recipe of MacMilk you require per feeding based on the number of hatchlings you have to feed.

Then, add the enzymes as needed; for example, if you will be using 1/8th recipe of MacMilk, use a small pinch of enzymes (1/8th the amount of what is

required for the whole recipe). To do this, take the amount of food that you'll need for the next feeding and mix it with the enzymes. Let the food sit for 30 minutes before feeding, so that the enzymes can work on the food.

Columbids Day Four and Later: Discontinue the addition of enzymes to MacMilk. Some species begin to mix crop milk with regurgitated (partially digested) seeds or grains sooner than others. Generally, the rule of thumb might be to use crop milk replacer for at least the first week of life, and begin to gradually mix in other foods over a period of two weeks. During the first days of new additions, the baby bird will not yet be digesting all the carbohydrates, and the high-protein food is still needed for growth and feathering, thus a gradual changeover is necessary. Good choices might be Exact® with gradual additions of foods like mixed-cereal pablum with an added tablespoon of strained baby food corn.

Feeding technique: To feed older nestling doves, one method allows the baby to 'root'. Pull up formula in a large feeding syringe and then remove the plunger. Across the wide opening of the syringe (not the tip), stretch a piece of vet wrap or rubber dam (used by dentists) that has a hole to accommodate the bill. Secure well with a rubber band.

The bird will thrust its bill into the opening and 'drink', much as it does from its parent. These methods can be messy until you acquire a technique; wipe up any formula on the baby with a Q-tip dipped in warm water.

Some rehabbers prefer to feed nestling doves and pigeons with a tube and syringe. This does take practice; the tube must slide down the side of the throat without getting any fluid into the tracheal opening. Instructions for tube feeding can be found in the fluid therapy section of this manual. As a rehabilitator's tube-feeding skills develop, the amount of formula the doves take at various ages follows a pattern. Although a rehabilitator may attempt to feed quickly at the height of baby season, haste can have serious consequences. Always go slowly when emptying the contents of the syringe into the bird's crop, especially with newly presented birds. Every so often a dove will have a smaller crop capacity than normal and the excess formula can aspirate the bird.

When using a tube and syringe to feed or hydrate any bird, make sure the tubing is soft and flexible. Medical grade tubing is expensive but worth every penny to prevent harm to delicate tissue in the throat and crop.

To prevent impaction, it is very important that the crop be allowed to fully empty before it is filled again. The crop is very noticeable as a sort of pouch that overlays the breastbone. After feeding, the crop should not be hard to the touch. Feed only enough to fill the crop  $\frac{3}{4}$  full -- this feels similar to a hot water bottle that is  $\frac{3}{4}$  full.

An impacted crop results when the crop becomes too full for the normal passage of food. Since doves have larger crops than gaping birds, they do not have to be fed as often. The rule of thumb for doves in their first week of life would be 4 feedings per day, and as the bird moves towards weaning, going to 3 feedings per day and gradually weaning to 2.

+++OR+++

### MacMilk©: Crop Milk Replacer Recipe

1 jar (71 grams) strained chicken baby food  
1 raw egg yolk (16.6 grams)  
1 tablespoon low-fat yogurt (15.3 grams)  
1/4 teaspoon corn oil (1.13 grams)  
0.62 g calcium carbonate  
2 drops cod-liver oil (from gel cap)  
1 drop vitamin E (diluted 1:10 in corn oil; see notes)  
2 drops fish body (omega-3; not cod liver) oil  
1 small pinch vitamin B complex (see notes)  
25 mg. Vitamin C (ascorbic acid)

Method: Mix all ingredients in a blender. Keep the diet in the fridge, taking out and warming only as much as you need for one feeding.

#### NOTES

For birds 1-3 days post-hatch:

It may be necessary to dilute the mix a little more, particularly if they are not being kept at high humidity. It's essential to add a small amount of feces from a healthy adult conspecific; the younger the bird, the more urgent this is. Add it to two feedings per day. As soon as it's added, consider the food contaminated; discard any leftovers and clean all implements thoroughly. No digestive enzymes need be added to this mix.

In nature, young columbids are fed small amounts often, by their parents. The 'nursing' bouts are long in duration. They should NOT be tube-fed, but instead need to 'work' for their food by sucking. The process is very reminiscent of mammals suckling, and their chances of survival are much higher if they are fed in this natural manner.

At the end of the first week post-hatch, gradually add a highly digestible grain (be sure that it contains the proper amount of calcium and vitamins) to the food. It must be fully hydrated!

E.g., if you're adding baby cereal or Exact, make a 'cereal soup' with water (at least 2 parts water to 1 part cereal/Exact by weight) before adding it to the MMM. Add only a very small amount for the first couple of days, and then at a rate (e.g., 10% per day) that will make the food mostly grain by the end of 15-20 days. Fledglings must be supplemented with hand feedings for as long as they beg (this can be up to 6 weeks or so), even if they are also eating on their own. Weigh them regularly until they're completely weaned. A high-quality (companion/exotic) finch seed mix is a good choice for self-feeding. Be sure that they have 'pigeon grit' (a multimineral grit) and oystershell grit available ad lib.

Vitamins: Vitamin E, as purchased, is too potent for what is required in this diet. Mix one drop of vitamin E (from a 400 IU/ capsule) with 10 drops of corn oil. Shake or stir well. Then, use 1 drop of the diluted vitamin E in the recipe. The remainder can be kept in an airtight container and stored in a cool, dark place. It can be used over the next few days. Because vitamin E degrades, it will have to be mixed fresh after a few days, so don't make too much at once. The amount of B complex required is too small to weigh on a gram scale. The amount required for this recipe is a pinch the size of one or two sesame seeds.

Astrid MacLeod and Janine Perlman, 2004©.

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#### The Balloon Method:

For those of you who ever have or find the need to use an alternative method of feeding young pigeons, this is an EXCELLENT method to feed young squabs. It's more messy, but it's a more "natural" way to feed a young chick with little chance of aspirating or harming the baby like through conventional tube feeding, eye droppers, or other methods. Here are the instructions:

"This involves slicing the thin tip off a syringe (a 20ml should be fine for a 2 week old squab), filling the syringe with formula and taping something over the mouth of the syringe such as a piece of cloth, stretch bandage or a piece cut out of a balloon. You cut a cross (X) in the fabric and steer the pigeon's beak into the hole. The squab will start to gobble the food as you depress the plunger gently to pump more food in, mimicking the way the parent feeds his squab. Make the Kaytee a bit thinner than recommended as it thickens in the crop. Feed until the crop is noticeably inflated but not hard. Like a ¾ hot water bottle. I think that for a 2 week old squab that would be 30ml per feed, 3 times a day going up to 40ml per feed when they are 4 weeks old."

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#### PIGEONS AND PERMACULTURE

Permaculture is a "green" way of life and a way of thinking. A permaculturist examines every aspect of life, and attempts to base life on renewable resources that ease man's negative impact on the Earth. Every item, tool, plant, or animal must serve multiple purposes and blend harmoniously into the sustainable 'whole' of the land.

Pets in America contribute very little towards the permaculture ideal. They consume food from polluting farms transported in polluting trucks, and use bedding or litter mined in ecosystem destroying mines and shipped in more trucks. They fowl that bedding so that it cannot be reused, recycled, or composted. The proud dog or cat owner must throw this waste directly into the trash bin. Fido has a significant "carbon paw-print" of his own, which in modern times and in most households is not offset by any useful task. Most urban pets barely answer to their names, much less do any of the work they were originally domesticated to do. They have lost their place in the permaculture web of usefulness.

Humans love companion animals, so going without pets isn't the answer. So enters the Rock Dove. A domesticated pet that lived far more generations with humans than cats, parrots, or horses, the pigeon is the only animal so thoroughly domesticated that it does not live outside of cities. The pigeon stays near man even when we try to shove them away. Pigeons are so naturally tame, I have taken an egg from under the parent, inspected the hatching peeper inside, and put it back with no reaction from the bird.

Pigeons and doves have many uses and skills to admire, and an aviary full of lovely birds lifts the spirit. These birds can be used as lures, in order to encourage wild avian species to a yard or park. They can provide food for humans in the form of delicious squab. Many Depression Era families kept pigeons, let them free fly in the day to feed themselves, and ate the young as the only meat they could afford. Now squab is a delicacy. One breeding pair of King Pigeons can produce 16lbs of meat per year. Other products of the pigeon include feathers for craft projects or compost, some of the best manure on earth. The droppings go straight into the compost bin, then into nitrogen rich vegetable beds to feed your family. Pigeons also provide entertainment through racing, the great soothing noises they make, and the ability of some breeds to send messages through homing skills. Because pigeons are immune to avian bird flu and west Nile virus, and resistant to many other diseases, they will be gracing our skies for generations to come.

The best "green" home for pigeons is a loft with an attached aviary, or flight cage. Pigeons nest in the enclosed loft area and fly free in the cage, sunning themselves and taking baths. A pigeon's home should add beauty and atmosphere to your garden. Make it as nice as possible with paint and rust protection. Around the wire flight cage, runoff from the roof can water vines of pigeon peas, squash, and gourds. Plant wolfberry, barberry, pomegranate, quailbush, or desert hackberry and chilitipine inside the aviary where they are protected from hungry ground squirrels and hares. Dig a small infiltration basin in the aviary, berm around it to keep predators out, then fill with a deep mulch and worms. Soon the cycle of life takes off. Your birds nourish the bushes and worms, the bushes and birds nourish you.

Ten things to feel good about:

1. No pigeon products need ever go to a landfill.
2. Pigeons do not carry dangerous bacteria and disease, so they are child-safe.
3. Pigeons are vegetarians.
4. Pigeons are not part of the illegal pet trade.
5. They come in many fun shapes and sizes.
6. They are affordable to raise.
7. They require minutes a day of your time.
8. Pigeons are clean and love baths.
9. Pigeons are very satisfied in captivity and naturally tame.
10. Many pigeon diseases can be treated or prevented by natural medicines.
- 11.

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TRAINING HOMING PIGEONS

In-depth training guide  
Training--Part I by Lee

Training: here is some expert advice from Lee here at the site:

"I am going to post some training ideas ..ill do one at a time there are three in all. This isnt the only way to do this but it works for me i have been using these methods for years just some of my ideas on the subject ..

Youngbirds under the age of 10 days old should be left alone for the most part it is my belief that they do fine with their parents care. At this age (10 days) the birds will begin to stand up in the nest and a person should start handling them as this makes the birds tamer. Keep in mind that brides and grooms may some day be holding them for release. During the next two weeks the YBs will begin to move more and more it is also during this time that they may wander into someone's else's nest area so close watch must be kept on the birds to ensure that they don't get scalped by some jealous cock bird. During this time they will learn to eat from the feeder and go to the waterier and will be weaned from their parents care and will take a perch (this is the most stressful time for the YB and if its immune system isn't strong then it will fall to illnesses so watch them closely) You can start to trap train healthy birds they should be about 25 to 30 days old at this point. If the bird can fly to its perch then it should be able to fly from the trap to the floor.

Trap training: When you start trap training your birds need to be on a good feeding schedule. Start by taking the birds you want to train and put them in the training release cage leave them in the cage for about 30 min this helps to settle the birds down and gets them use to the cage. Set them outside in the shade where they cant be bothered by cats /dogs etc. Place on the landing board of the loft a trap training cage this sits on the landing board and butts up against the trap the other end of the cage has a door where you can place the YB inside the cage. Place the birds 2,3,4, at a time in the cage before their feeding so they are hungry go inside put down the feed and make a feeding noise like a handful of seed in a coke can rattle this and the birds should trap through. If they don't then go out side and gently push them through the trap. Add more birds and do the same procedure until all are through the trap. The point here is for the birds to understand that they have to trap to eat. Usually within three days they will have picked up the trapping and will trap on their own. The key here is repeat again and again and again they will learn quickly. If you have door trap or a sputnik you can put the bird through the trap as in this example however there isn't a landing board so just manually put the birds through...After the birds have learned to trap then you can let them out to exercise. Most fanciers allow their birds out for only an hour I do this or sometimes an hour and a half. You can do this by just opening the trap and they will go out on the landing board after an hour or so close the trap when they hear you rattling the feed can they will come in. be patient these are young birds and need more time ALWAYS!! Let your birds out when they are hungry never after feeding always BEFORE!!

Daily exercise and training: Now that your birds have learned to trap when you call them in to eat it is time to start distance training, there is two ways to do this:

A. You can allow the birds to range on their own .In this method you turn your birds out at least one time a day to exercise after a time the will begin to range, by this I mean they will begin to fly in circle around the loft area. It is natural for the birds to fly an area of about five miles as this is the normal feeding range of the pigeon your birds will do this providing they aren't let out with older birds in this situation they tend to do as the old birds do and will sit on the loft in the lounge chair and sun. The old birds know where they are don't need to fly the normal ranging area.

B. In this situation you can force the birds to range by taking them out for short jumps and releasing them from their cage to fly back home. This is the method I use, this way I can take older birds out and they will show the newbies the way home. I start this method at about 100 feet from the loft and go from there. I make small jumps and work in all directions North South East and West. If you start at 100 feet then do this for three or four days this will get the birds use to the cage and they will begin to settle down. They will fly to the loft and usually sit there or get on the ground and peck around. After they sit a while maybe 15 min I take a flag and wave it at the birds this makes them fly again they will soon get the idea that they are out there to exercise. ALWAYS!!! ALWAYS !!! Let them out before you feed .Old trusted birds can go out anytime but Ybs need to come back in the trap when you beckon them and will do so if they are hungry. Move to ¼ mile and take an old bird with you to release. When you get to the release point let the birds sit in the cage for about 15 minutes this gives the birds time to look around and realize where they are (during this time you must look for hawks dogs and so on also make sure that the birds have a clear area to fly into, no wires, trees traffic, buildings and so on.) release the birds and they should circle around and then fly to the loft. Do this two times from this place. Move to the next place on the next day 1/4th mile out but in a different direction (work counter clockwise on the map) The birds will normally fly clockwise so if you work counter clockwise they will be flying back into the area that they have already flown. Do this until you have flown the birds from all directions and have come back to the place you started now move to the ½ mile mark work all around the compass then jump to the 1 mile range always work counter clockwise and repeat repeat, repeat that is the key .Now what you are doing here is allowing the birds to condition themselves and learn this 5 mile circle. After the 1-mile circle go to 2 miles and work around the circle then go to 4 miles work the circle then 6 miles work the circle. I will stop here and post some more in a few days or so.

A few things to remember. Always fly your birds hungry especially Ybs older birds will home hungry or not.10 MPH is the max for wind on training a young bird again old birds can handle 12 to 18 MPH with ease. I have had my old birds out in 25 mph winds just for training purposes, keep in mind that the altitude that they fly the winds will be higher than the ground level also 25 mph winds aren't conducive of a good wedding or funeral for that matter. My cut off point for my Old birds is 15 MPH if I am doing a wedding or a funeral. Training in the rain is ok for old birds but Ybs need more experience (next year). Single bird training is ok after the YB has flown many miles 200 or more what I am saying here is they need experience first then all of the special training will work better and you will lose fewer birds. An old-timer told me one time "son if you don't want to

lose your birds then don't let them out " be pre paired for losses it will likely happen remember you are learning as well as the birds...

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#### Training: Part II

"Now you can go to 8 miles work the circle then 10 miles work the circle. At this point your birds should be in good condition. Your birds should be flocking good and all should be coming home at the same time also when they get home they should sit and rest a few min then begin to peck on the ground or begin to flirt with each other and so on. If they just sit and don't inter react with the flock then look closely at the bird and make sure it isn't sick. When you get all the birds coming from 10-mile range you can start to change it up some...

Now lets concentrate on your farthest release point and start to work towards that. Your birds are flying and flocking good from 10 miles out from all directions and it is a good bet that they can hit that 10 mile circle from any direction meaning if they are out 15 miles they will run into terrain that they know within their normal ranging flight distance (5 miles) so we are going to use the straight line training method from this point on to all of your release points.

You are out to 10 miles, now go to 15 miles toward your farthest release point. We all know that pigeons can fly 50-60 MPH but it is a good pigeon that flies 35-45 MPH on a regular basis so count on your birds to fly at 40 MPH on their way home so from 15 miles out they will need at least 25 to 30 min to complete that. They will be home sooner in most cases but they need the 30 min in case of bad weather or other problems. Keep in mind that they are coming home to eat and will fly straight in. You should be allowing at least 2 hrs meaning that you will release 2 hrs before feeding time Also most folks wont release with less than 2 hrs before dark so this gets them use to working with the 2 hr system. Lets say that they come in from the 15 mile point in 25 to 30 min this is a good time for them if the time is shorter then they are not looking at the terrain (this may mean that they are too hungry) if it is longer than 30 min then they need to be released from that point again as they well may be lost and are still searching for the best route to fly home.

Continue to fly in 5-mile increments towards the outer most points that you will release from until you have met your goals. You should be feeding good quality feed maybe in the 14 to 15 % protein range conditioning feed as it is called. And they need to rest a couple days a week example: fly Monday, rest Tuesday, fly Wednesday, rest Thursday, fly Friday, rest Saturday, bath on Sunday, on the days you rest the birds can be out exercising on their own if ya want. You will need to go to you farthest release point at least once a week to keep the birds in condition you can go to different directions but just keep your birds in the air on a weekly basis. This is good for the birds it also helps with breeding.

Old birds will in fact if they have been released from a point several times just hit the sky and break for home maybe wont circle, maybe will go high and just head for home. This means that the folks on the ground may not get a good show Ybs on the other hand will

fly around at different heights and cross the release point maybe 3 times or more before breaking away and heading home.

Pigeons have the intelligence of a 12-year-old child and can maintain the directions in their head for about 6 to 8 months (this varies) but I recommend that if you have to take a break in training (maybe a week or so) that you start at the place you left off from. If longer than that then maybe start from the 10-mile point... You have to learn your birds and know their limitations never ask a bird to fly more than you know they can high winds, rain snow, darkness, outside influences can dampen their skills. Weather is a big factor in our business also space weather or the C factor as it is called can dampen their skills I have some birds that I trust and have had them out in a G3 magnetic storm and they homed well on the other hand I have seen many young birds lost during a G1 or G2 storm (space weather is a science that we don't know much about some folks don't pay any attention to it some do I tend to believe it does affect the homing abilities of pigeons and many other animals you just have to decide what is best for your situation..... "

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#### TRAINING RACERS

I'm sure there are 1,001 different methods but I'll share mine.

I assume that you are talking about young bird training and not old birds.

I raise very early youngsters. I pair my breeders around Thanksgiving and plan my 1st round to hatch at Christmas. I then band (ring) my youngsters around New Year's day. I use the light system so that my youngsters will molt during June/July and have a brand new set of flights for the races.

I have a California type of aviary where the trap door is within the aviary. Weaned youngsters are placed in the young bird loft at 4 weeks of age and trained with a whistle and shaking the feed can to go through the traps. The aviary doors are opened just about an hour before feeding at 6 weeks of age so that they can take their first flights around the loft. Hawks are particularly worrisome at this point.

They are loft flown daily until mid May when I start road training. The youngsters are routing by then where they fly out of sight for 30 - 45 minutes. They are taken on about 10 training tosses. The first is within site of the loft a few hundred yards away. The second toss is at 1 mile. For this training I go in the direction of the race course but I don't think its all that important. Also, I don't work on speed trapping. They're tossed in small groups of 7 or 8 at 15 minutes apart. If you have a partner who can watch for their return and whistle them in, all the better. I don't so I just return after the last toss and usually find them sitting on the loft and then call them in. For this training I'm really interested in developing their homing skills. I will do another at 1 mile, twice at 5 miles, maybe 3 times at 10, then a couple each at 20 and then 30.

This 1st phase of their road training is finished around mid June. Then because my young pigeons were on the light system they begin to molt severely. I separate the boys from the

girls. I feed a lot of oil seeds like hemp and safflower and other small seeds to help with feather growth. Give them pigeon tea with honey. Leave them very quiet. Loft fly only if they want alternating the boys one day and the girls the next.

By the first of August they have regrown most all their flights. A few will still have the 9th and 10th coming in. We then begin road training in earnest. I have a refresher where I take them once at 1,5,10,20, and 30. Now this is where it is very helpful to have another person at the loft to work them through the traps as fast as possible. I find it best to do this in the morning and have their feeding consistent with their training. You want them to trap as fast as possible now. If you have an electronic clock go ahead and enter your team and start watching their times. You'll begin to notice your sprinters now.

Now there are many methods used by as many racers on preparing your team a few weeks before the first race. I'm a big believer in having my youngsters an hour in the air daily. The best is on the road. If you loft fly, have them in air for an hour in the morning and an hour in the evening. You should however try to get them on the road at least 4 times a week from at least 30 to 40 miles.

Regarding direction... Train in the direction of the race course at first. Try to find the break point. Draw lines on a map from the lofts in your club to the release point. Look at the winning lofts last year and see their routes. Toss a few times along their routes about 40 miles from your loft. A GPS unit is pretty handy to help with all this. Personally, I like tossing my birds at times about 90 degrees off the race course as I think it helps with their homing skills.

Now this is very important... toss your birds with another club member or a few members birds at least once before the first race. Trust me if you don't do this most of your youngsters will follow other birds home on their first race. They will probably smarten up by the second race but it's best to sort this out before the season.

Another tip that I plan to do this season is train my youngsters against the wind. You can really strengthen them with this kind of training plus they then know how to handle a tricky windy day of racing which will happen.

I feed my youngsters during training 40% barley, 40% race mix, and 20% pellets.

I know this is a very long post and I apologize. One thing that is very important is to know when enough is enough. Don't over work your birds. When you come into the loft and they're picking themselves off their perches flapping their wings a 100 mph you will know that they're ready to fly. Keep them healthy and don't underfeed but don't overfeed. It's a zen thing and balance is the key as it is in all ways of life.

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Advice on showing Pigeons  
by Doratha Connally

Fall is the traditional time for most pigeon shows and it's never too early to begin preparing your birds to compete. Below are a few simple ideas to help make your birds more competitive.

(Items in red refer to the sidebar at the right for sources or definitions.)

#### Feed and vitamins

It almost goes without saying that show pigeons need good quality food to develop overall condition and beautiful feathering. Ask other breeders in your area what brands they use and then experiment with what works for you. It isn't necessary to feed the most expensive food but you probably won't get great results with the cheapest, either.

Some exhibitors give their birds pigeon vitamins (available from pigeon supply companies) and believe that they add extra condition to the feathers and overall health. If you give the water-soluble type you must clean your waterers every day as bacteria thrive in vitamins.

#### Bathe your birds

At least once a week, take a large shallow pan and fill it with about 4-5 inches of water. Place it in your flypen or loft and watch the pigeons dive in -- pigeons love to bathe.

There are various products that you can add to the bath water to help with feather condition. These are sold by the pigeon supply companies. Or you can add a tablespoon of 20 Mule Team Borax which helps clean the feathers and feet and also helps kill feather lice.

Three to four days before a show, let your pigeons bathe. This allows time for the feathers to redevelop their "bloom" before the show.

Check your birds for any sign of feather lice.

The most typical louse is easily visible - usually inside the birds' wings. They are brown, cigar shaped and about 1/16th to 1/8th inch long. They feed on the feather material and if you don't get rid of them, they can actually chew tiny pinholes through the feather.

Many judges will instantly eliminate a bird from competition that has lice or more than a few of these pinholes.

Treatment: There are various treatments, including powders and sprays. Again, check the pigeon supply houses. One of the easiest treatments is Sevin dust. Place it in an old jar; punch about 8-10 holes in the lid (kids get your parents to help you with this). Screw on the lid. Wear a dust mask.

Holding the pigeon, shake a little onto the bird's back; gently work it into the feathers. Then powder under each wing and on the breast. It isn't necessary to powder the entire

bird. Keep the powder out of the bird's face, eyes and mouth. Powder your loft and the perches. This needs to be done at least every 6-8 weeks.

According to Wendell Levi, author of THE PIGEON, it is probably impossible to get rid of every single louse. But don't let this deter you from battling these pests. They can ruin your very best bird's chances at the show.

Very Important: When using pesticides, wear a mask. Wash your hands thoroughly and change your clothes after using any pesticides.

### Trimming

This is the process of taking out unwanted feathers by plucking (and on some breeds cutting). For example: If your breed standard has specified color markings and your bird has a feather of the wrong color in the wrong place you will want to "trim" or pluck that feather. Some breeds, such as Swallows, need to have broken or misshapen foot feathers removed about 6-8 weeks before the show so they will have time to re-grow.

Getting hold of a single pigeon feather can be tricky -- take your time and be careful. You don't want to end up with a bald spot. Some breed standards allow for the judge to disqualify a bird that has been obviously trimmed.

Always look for instructions about your breed or talk to a breeder before you start. Trimming can make a bird look extremely sharp or can ruin it.

### Training

No matter how beautiful your bird is, if it is terrified -- flying all around the judging coop or crouching in the corner -- it probably won't win. You need to train your bird to understand the judging procedure so that it will be calm and station.\*\*

To train your bird you need either an actual show coop or something very similar. Standard show coops are 18x18x18 inches for large breeds or 15x15x15 for smaller breeds. They are constructed of vertical wire bars with a vertical sliding door on the front. (See our "Pigeon Show Results" page for examples of show and judging coops) The floor is usually plywood covered with heavy paper sprinkled with wood shavings or indoor/outdoor carpeting.

Begin by simply placing the bird in the show coop. Do this gently and calmly. Allow it to stay in the coop for 10-20 minutes. Remove it and return it to the loft. This process should be done as calmly as possible so that the bird doesn't associate the coop with fear.

Do this for several days, lengthening the time as you go. If you are involved in one of the more popular breeds your bird may be in the judging coop for long periods of time at the show.

After your bird seems calm in the coop, begin studying it just as a judge would. Slowly extend your hand to the bars of the coop. Walk back and forth in front of the coop. Open

the door slowly and then close it. When your bird accepts this without fear, flatten your hand as if you were going to shake hands with someone and slide your fingers through the bars. You can direct your bird into or out of a corner doing this. Remove your bird from the coop and inspect it as if you were judging it. Open out each wing and spread the tail feathers. Look closely at its head and eye. Then return it to the coop. Wait a few minutes and then do the whole procedure again.

Many judges use a judging stick. This is usually a metal fold-up pointer used for business or school presentations. An old car antennae or thin dowel rod will work. Again, you must be very gentle in getting your birds accustomed to the judging stick. The first day just unfold it and slowly wave it in front of the coop and then over it. The next day, touch the bars of the coop. When the bird shows no fear then you can begin to reach through the bars and very gently touch the bird on the tail or under the breast. The judging stick is used to help encourage the bird to station correctly. In a breed like Modenas, the judge would use it to encourage the bird to lift its tail; in American Show Racers, the judge might push down on the tail. Again, read your standard and study other birds of your breeds to know how your breed should station.

The tricky part of training is to not overdo it. You can make a bird so relaxed with the whole procedure that it appears bored. So, train to the point where there is no sign of wildness and then just a weekly quick refresher may be all the training your birds need.

#### Carrier or Crate - Getting Your Birds to the Show

How do you plan to carry your birds to the show? There are fancy boxes, baskets, metal crates, etc. that you can buy through the supply houses. Some people make their own or use cardboard boxes with lots of holes for ventilation. (Pigeons put off a lot of body heat and can get too warm in a container without good ventilation.)

Ideally, each bird should be in its own compartment to minimize pecking. Place some wood shavings in the bottom to give the bird traction and to absorb droppings. Just like the show coop, it is a good idea to get your birds accustomed to traveling in their carriers. Load them up the week before the first show and just drive around the block. This will also give you practice in the process of loading your birds. And give you some idea of how much time you'll need the morning of the show to load up.

Again, three or four days before the show, allow your pigeons to bathe. Check for any odd feathers that need removing and trim your bird's toenails (unless your standard calls for sharp toenails). Just the very tip needs to be removed. If you've never done this be careful not to cut into the "quick" -- the pink part that has blood supply.

#### The Day of the Show

Calmly load your birds into your carrier and place them on a level surface in your vehicle in an area that is not too warm or too cold. You want this trip to the show to be as stress free as possible for you and the birds. Give yourself plenty of time to get to the show with

at least a few minutes extra so that your birds have a chance to relax and get used to their surroundings.

When you get to the show, find your show coops. These will have your bird's band number on a card attached to the front of the coop (your name may be on this card also). As you place your bird in the coop, check it over -- if there are any droppings on the feet or elsewhere, wipe them with a barely damp paper towel or cloth.

Your coop should have a food cup and a water cup. Make certain that the water cup is full of fresh water. Your birds may need a drink, depending on how long they have been in the carrier. Dehydrated birds will not show well.

Pigeon shows are run in different ways so if this is your first event, find the show secretary or show superintendent. Ask if you will be allowed to carry your birds up to the judging area or if the club is using "runners." (A runner is a person who carries birds from the show coop to the judging coop). Then ask which judging area your breed will be judged at and when. Times for judging are usually not set at exact times so you have to be flexible and watch your judge to see when he/she is ready for your breed. Yours may be the very first breed to be judged or it may be later in the day.

Don't get upset or stressed -- pigeon shows are usually very loosely run. The judge will wait for you -- within reason -- and the other exhibitors will usually help you in any way they can.

DON'T get discouraged if you lose!! Every judge has a different opinion -- your birds may lose one week and win the next. For your first show season, try to learn as much as you can -- to develop an eye for your breed. Study the winning birds -- how do they look different from your birds?

Are they in perfect feather condition while yours are still molting?

Are they in better weight?

Did they station well every time the judge looked at them?

Is your bird just having a bad day? Did it drop its tail or head when the judge was looking?

Does the winning bird more closely resemble the written standard for the ideal bird?

Breeding and exhibiting an excellent bird is an art -- if it was easy there would be no reason for competitions. Be honest with yourself about your birds -- are they close to the standard?

After judging ask the judge his opinion of your birds, if he/she has time. Try to learn how to help your birds win.

You may be one of the fortunate ones who starts winning in their first season. But for most, it takes work and time. DON'T GET DISCOURAGED! Make the commitment to

the sport of showing pigeons -- work to develop a winning line of birds that are beautifully presented at each show.

You'll have something to be proud of!

Tips to Cut Down on Emergencies at the Show!

by Jeff Hubbard, TPA Director

Crates. Crates get misplaced or stolen at shows. It is a sad event but never the less, it does happen. So make sure to write your name, address, telephone number and club affiliation on your crate.

Carry a small bag of pine shavings with you. These can be purchased at any pet supply store. The small bags don't take up much space but come in handy if your bedding gets wet or accumulates a large amount of droppings during travel.

Feed and water. Birds will generally be given access to food and water, courtesy of the host event. However most birds, especially the smaller breeds, do much better if you bring feed which they are accustomed to -- and maybe a couple of handfuls of small seeds or pigeon treat.

Pack along a few clear plastic cups or Dixie cups that are appropriate for the breed you raise and show. Most shows provide one size of cup and they are not suited in most cases for every breed. Some large cups don't allow smaller birds adequate access to feed and water. And some small cups are just that: too small in terms of the amount of feed or water they can hold for the larger breeds.

Carry a small plastic quart milk jug so that you can have access to water for your birds. It might come in handy if you need to give the birds a drink on the road or -- if you do like I do -- mixing electrolytes with the water. This prevents the birds from dehydrating quite so bad during travel and while at a show that is more distant or lengthy in nature.

Electrolytes. Athletes use them to prevent dehydration. Electrolytes can be picked up from pigeon supply houses. My favorites come in little sachet packets and are produced by the NATURAL company from Belgium\*. They can be purchased through Siegel's at [www.siegelpigeon.com](http://www.siegelpigeon.com) or 1-800-437-4436. If you don't have time to order through the mail prior to going to show, pick up a bottle of Pedialyte at the grocery store in the baby food section. Pedialite is a liquid form of electrolytes that you can mix in the water. They market a plain Jane variety that has no flavoring (clear).

Bird security. Again, it is sad but often if you don't take proper measures, you will leave yourself open to misfortune.

There are two ways I have seen used to secure birds in the show cages at the shows. One is to purchase small lock, the tiny ones, and to latch the bottom of the show coop door to the bottom of the show coop frame. This makes it harder for someone to steal a bird because they will have to either cut the lock or lift the entire set of show coops in order to

steal a bird -- probably creating a very large noticeable commotion before nabbing the bird.

Another way of offering some security is to secure the door to the frame with plastic zip (cable) ties. Zip ties can be picked up at most Wal-Mart's or hardware stores. Just make sure you have a pair of wire cutters or a sharp knife so that you can remove the tie to access your bird.

Most serious show persons carry a small plastic tool box or fishing tackle box with a single tray to hold the following supplies:

Nail Clippers

Emery boards for filing beaks

Syringe with some aquarium tubing that fits over syringe tip in order to force water into birds that won't drink

A small wash rag or dishtowel for wiping birds' feet.

A soft toothbrush and small bottle of Johnson's Baby Shampoo in case one needs to do some emergency cleaning of a bird.

Wooden clothespins for attaching food and water cups to coops, thereby holding them in steadier upright positions.

Some Vaseline for cleaning up the legs and feet of the birds, and adding shine.

Small scissors for trimming when allowed on your breed.

Tweezers for plucking that one feather that takes precision work to make things right.

Dixie cups or plastic cups for feed and water containers for your breed of birds.

A small pocket notebook for jotting down notes on your birds or quickly getting the address of people you meet at the show.

A black felt tip marker for writing on coop cards.

A bottle of LYSOCUR eye drops\*\* available from Siegel's Pigeon Supply. Great for popping a drop into the irritated eyes of a pigeon from dust, shavings, or fighting with other birds at the show.

QUICKSTOP™ available from the pet store which allows you to quickly stop the bleeding if you cut a beak or toenail too close.

This doesn't cover everything one might want. Some people have a secret ingredient they like to add into their show box. You might find other nifty ideas while talking to other exhibitors.

The bottom line is that you can prevent some of the so-called emergencies or drama in the show hall by being well prepared. After all, emergencies are often just those things that are unplanned for.

Have a wonderful show season and good luck on carrying home the GRAND CHAMPION trophy.

\*The NATURAL brand electrolytes are Siegel's item number 0327 and cost \$5.95 plus shipping.

\*\*The LYSOCUR eye drops are Siegel's item number 7019 and cost \$8.50 plus shipping.

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pigeon intelligence/memory quoted from wikipedia

Pigeons have featured in numerous experiments in comparative psychology, including experiments concerned with animal cognition, and as a result we have considerable knowledge of pigeon intelligence.

Available data show, for example, that:

Pigeons have the capacity to share attention between different dimensions of a stimulus, but (like humans and other animals) their performance with multiple dimensions is worse than with a single stimulus dimension.

Pigeons can be taught relatively complex actions and response sequences, and can learn to make responses in different sequences.

Pigeons readily learn to respond in the presence of one simple stimulus and withhold responding in the presence of a different stimulus, or to make different responses in the presence of different stimuli.

Pigeons can discriminate between other individual pigeons, and can use the behaviour of another individual as a cue to tell them what response to make.

Pigeons readily learn to make discriminative responses to different categories of stimuli, defined either by arbitrary rules (e.g. green triangles) or by human concepts (e.g. pictures of human beings).

They do less well with categories defined by abstract logical relationships, e.g. "symmetrical" or "same", though some experimenters have successfully trained pigeons to discriminate such categories.

Pigeons seem to require more information than humans for constructing a three-dimensional image from a plane representation.

Pigeons seem to have difficulty in dealing with problems involving classes of classes. Thus they do not do very well with the isolation of a relationship among variables, as against a representation of a set of exemplars.

Pigeons can remember large numbers of individual images for a long time, e.g. hundreds of images for periods of several years.

All these are capacities that are likely to be found in most mammal and bird species. In addition pigeons have unusual, perhaps unique, abilities to learn routes back to their home from long distances. This homing behavior is different from that of birds that show migration, which usually occurs over a fixed route at fixed times of the year, whereas homing is more flexible; however similar mechanisms may be involved.

Additionally pigeons may be among the very few animals to pass the mirror test, which tests whether an animal recognizes its reflection as an image of itself — along with common chimpanzees, bonobos, orangutans, dolphins, elephants, and humans. However, many scientists have criticized the tests, which purported to show that pigeons could pass the mirror test.

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## Part 6: DISEASES

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### AVIAN POX

Aka: pigeon pox

Pox infections are caused by a virus that attacks the skin and mucous membrane cells, infecting the bare skin around the eyes, on the beak, on the feet and internally within the mouth and throat area. On occasions infection of a wound on a feathered area of the body can occur. The lesions are typically scabby in appearance with pus often being present due to secondary bacterial infection. The internal form can be so severe that feeding and breathing are affected to the point that death occurs. Lesions typically occur 4 to 14 days after initial infection and may be present for several weeks. Diagnosis is based on the clinical signs • the internal form affecting the mouth and throat may need a laboratory diagnosis to confirm this condition. The disease needs to be differentiated from canker with which the mouth form could easily be confused, and from Candida infection caused by a fungal infection of the mouth. In external pox, an infected pigeon will have crusty lesions on its un-feathered parts, especially around the eyes, around the beak, on the feet, and around the anus. The mucous membrane form (the internal form: diphtheria) is recognized by a cheese like, evil smelling deposit in the beak and throat cavities. It is possible for an individual pigeon to have both forms of the disease. However, the chances of survival are rare if the pigeon has an internal pox.

The poxvirus is transmitted via saliva droplets from the nose and mouth, seldom via droppings. The infection is then picked up with food or water or by a mosquito bite. The virus may be also present in dust that, when inhaled, infects the bird.

The first visible signs that a bird is infected occur after 4-14 days. In one example, the virus can enter the bloodstream through a wound. The virus multiplies quickly and infects the liver and bone marrow, from whence it infects the blood. Via the blood, the pox organisms then migrate to the skin and mucous membranes, forming lesions that are a good feeding ground for many bacteria, such as staphylococci and streptococci. Thus pus soon forms.

#### Treatment

The patient should be treated with antibiotics such as chlortetracycline in order to combat possible secondary bacterial infection. Add boric acid to lukewarm water and gently rub it on the affected eye(s) using cotton. In addition, a vitamin preparation should be administered (especially vitamin A to promote skin healing).

- In serious outbreak of pox the deposit on the skin and mucous membrane must be removed daily.

- Treat healthy pigeons with chlortetracycline for 4- 7 days. Also give 7.5 gm chlortetracycline per gallon of drinking water.

- Disinfect the cote at least twice, with a week between treatments.
- Continue chlortetracycline treatment for four weeks.

As with paramyxo this condition is due to a virus and no specific treatment is available. Antibiotics may be used under veterinary direction to combat secondary infections and multi vitamins may be of benefit in some birds during the recovery phase. As no specific treatment is available the prevention of the disease is very important. There is only one vaccine licensed for use in the U.K., this is the Intervet product Pigeon Pox Vaccine (Living) Nobilis. All birds over six weeks old should be vaccinated. Annual re-vaccination should be done. The vaccine is administered by removing six to eight feathers from the thigh; the skin is stretched to open the feather follicles and the vaccine applied with the brush provided to the de-feathered area. Do not apply the vaccine to bleeding follicles and do not use a disinfectant to clean the skin before vaccination.

If Pox and Paramyxo vaccine are to be used together in a loft then both vaccines should be given on the same day. If this is not possible then a minimum gap of two weeks and preferably six weeks should be allowed between vaccinations.

The poxvirus is very resistant and will remain infective for many months. Biting flies and other insects can transmit it. As a result good loft hygiene is important in the control of the disease.

Homeopathic remedies are:

Lesions on head & comb are wart like in nature -- Antim tart

Lesions in mouth are diphtheritic type -- Kali mur, Nat sulph

Lesions with fever -- Antim tart, Aconite

Lesions without fever -- Bryonia, Calc phos

Head remedy -- Variolinum30, or 200

A combination of Pulsatilla200+ Thuja200 + Nat Sulp200, 5ml each is mixed in 8 liters of water for 100 birds.

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Aspergillosis

Often mistaken for canker or tuberculosis. The symptoms are a hard growth or lump in the windpipe, gasping for breath, sneezing, coughing, nasal and throat discharges, diarrhea, swollen joints or lameness. Throat canker shows up as a soft easily removable cheesy growth; Aspergillosis is hard and embedded into tissue and cannot be removed without excessive bleeding or pain to the bird. It also attacks the liver and spleen where it

may be revealed as white growths in autopsy. The cause is fungus and mould spores usually floating within the immediate environment of the loft. These proliferate from damp deep litter straw or hay which lay dormant until temperature increases and are only one of many fungal entities lurking therein to cause a variety of illnesses. Another cause is moldy feedstuff i.e. blackened beans/peas, sour wheat/barley, powdery maize (inspect for blue/grey moldy powder and smell for sourness). Fumigate the loft with a mould-destroying agent, sterilize all drinkers, grit boxes, corn bins etc. Paint a solution of aqueous iodine, glycerin and honey onto the affected throat area with an artist brush. This solution must also be added to the drinking water for both patient and uninfected birds. There is no 100% cure and vital organ damage will remain permanent.

Two of the main causes are moldy maize or peanuts, which by definition are also two main ingredients of the pigeons diet. Maize should be checked regularly and peanuts purchased only if fit for human consumption and fed in small amounts only due to their limited storability.

Fungus disorders in pigeons are not always readily recognized until their manifestation into a more serious illness. These take numerous forms and reduce resistance to secondary infections see - Aspergillosis, Chlamidospore, Feather Rot, Thrush (*Candida albicans*) etc. Fungus disorders attack the respiratory system, nervous system, reproductive organs, and air sacs etc. reducing performance and yet the bird often displays apparent health. The causes are outlined under the various disease headings but a couple of extra causes may be outlined here: Aflatoxin poisoning

Aflatoxin is produced by a mould (*Aspergillus flavus*) which may develop in any badly harvested or stored grain or vegetable matter (straw, hay etc.) The mould thrives upon changeable humidity when the grain (or growing plant) is exposed to warmth after damp conditions. Unfortunately Aflatoxin develops unseen within the centre of the grain; outwardly the feedstuff has the appearance of being sound. Seasonal weather, incorrect storage plus several other factors, one of which could be condensation within the silo or the corn bin may promote the fungal growth. At its least severe condition Aflatoxin poisoning can result in brain damage, lung, heart, liver, spleen, and kidney damage, at its worst sudden death. There are pigeons that will not fly, yet appearing apparently healthy. The cause is almost certainly a fungus disorder affecting either the brain or the air sacs. Another cause of Aspergillosis fungus disorder may lie due to bad loft management i.e. damp hay or straw. A further cause comes by the addition of Brewers Yeast to the feed whilst treating the bird with antibiotics, as the bird caretaker adds a mould to a mould and in many cases negates the medical treatment. Young pigeons in the nest are very susceptible to fungus disorders; there is a time to use Yeast and a time to withhold it. These are two of them. Fortunately most mild fungus disorders can be controlled by the addition of weak tincture aqueous iodine to the water and this may also have a tonic effect when not abused (1 teaspoon per Gallon). Sometimes fungus problems may be mistaken for P.M.V. in their symptoms.

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Abdominal Trouble

These include diarrhoea, dropsy, paratyphoid, rupture or tumour which are detailed below. Most pigeons will display abdominal problems at some time or another and this does not necessarily signify disease. The most common cause of loose droppings are:

- sudden change in air temperature from warm to cold; pigeons fed regulated diets may use up all calorific energy to maintain body heat. This leads to mild hunger and the passing of water. In both cases the balance is soon restored with feeding.
- Change of feed or feeding regularity may also result in the passing of wet or loose faeces until the body adjusts.
- Excessive use of vitamins - the metabolism will only absorb and use a minute amount required, the remainder (excess) will be expelled. Very often this expulsion is accompanied by thirst with loose or wet faeces and may very often negate any benefit derived from the vitamin addition to diet.
- Toxic or deleterious substances

-when the pigeon ingests anything of this nature it will immediately attempt to flush the system.

Before panic measures are taken and medicines resorted to check all possibilities and probabilities! The simplest course of action to effect a cure is to isolate the bird, do not feed for 24 hrs, remove water immediately after the bird has taken a drink (twice daily). On the second day remove the water immediately after feeding, feed lightly with bulk protein and fibre (peas/beans) avoid small grain or seeds. Gradually increase the feed from the third day onwards and replace the drinker containing a

proprietary enteric assisting agent e.g. Entrodex. on days 5-6-7 allow a course of multivitamins. Alternatively bicarbonate of soda is an excellent calmativ agent (1 tablespoon - 4 pts. water) during days 1-3. This is also recommended for use throughout regular weekly management on one early day per week (Sunday or Monday).

The faeces from hunger-exertion-change of diet-toxins may be recognized from the following list:

- yellow and frothy;
- clear watery, water with black spaghetti like pieces;
- bright green fluid;
- soft consistency of various colours (the colour may be dictated by diet or digestion of bird and vary accordingly from bird to bird);
- little or no odour detectable.

#### Adenovirus

This is commonly known as the •young bird vomiting syndrome•. Symptoms include retention of undigested food, full crop, thirst, weight loss and foul smelling loose faeces.

It rarely affects the entire flock and fatality rate is low; the disease may disappear almost as quickly as it arrived in some birds or continue its infectious course for several days. Generally Adenovirus is an ailment in young birds and birds who have recovered become immune although possibly remain carriers. Being a virus, antibiotics cannot cure but may be used to prevent the escalation of secondary infections from stress imbalance. The most common allied secondary infection being of respiratory nature and E.Coli. The treatment for nursing to a speedy recovery is covered in the section on Toxin ingestion. The period of controlled water supply should be extended to three days, and feeding should be restricted to beans/peas approx. 1 oz once per day. The antibiotic administered to best effect is BAYTRIL. When using antibiotics you are advised to remove all grits and minerals, do not feed any yeast containing supplements, do not use any other additives to drinking water until the course of treatment is completed.

### Allergy

Pigeons in some cases are allergic to the loft environment or other inmates. Once isolated to a solitary cell cure is affected almost immediately.

### Anaemia

This is weakness from poor blood. Symptoms include pale eyes, lethargy, pallid throat, will not exercise keenly. Causes can be:

- none-assimilation of vitamins from natural diet,
- secondary reaction to many illnesses through passing of excess body fluids;
- old age;
- deficient diet;
- poor rearing in young birds,
- general debilitation from poor husbandry.

The pigeons are in need of a tonic i.e. B complex vitamins, Brewers Yeast, Sulphate of Iron. Give B complex liquid like Bivinal-5 drops in the morning and 5 drops in the evening for a week or Brotone(B Complex liquid).

### Apoplexy

Symptoms - shaking, staggering, falling over, and misjudging distance, collapse. Usually found only in overheated and crowded lofts during very hot weather. Overcrowding and excessive use of heating seeds or stimulants may be other causes. This is mainly a hot weather ailment when the brain is affected by increased blood flow and rupturing of minute blood vessels causing haemorrhage. This is easily cured or rectified: increase ventilation to cool air, darken loft with sunshade. Most cases demonstrate immediate recovery; serious cases may be taken to a vet for bleeding from a wing vein.

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AVIAN INFLUENZA - N/A for pigeons. They do not contract, carry, transport, spread, or die from the Avian Influenza that kills chickens.

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### Bone Troubles

These include bent keel, rickets, off legs syndrome. Bent keels in squeakers are usually caused by pressure upon the soft cartilaginous type bone before hardening and not always through lack of calcium as it is sometimes thought. This can be avoided by checking nesting materials for depth and comfort as the full weight of the squab is borne upon its keel. Always wean for the first few days into deep dry straw and avoid perching opportunities upon hard edges. Rickets are caused by lack of sufficient calcium and trace elements. Any loft that ensures adequate supply of fresh grits and minerals daily in most cases should not have any cases of rickets. Some birds are unable to assimilate these into the metabolism from feed or supplements and draw their requirement from their own bones. If bone weakness persists after supplementation then it must be deemed to be an undesirable fault.

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### TRICHOMONAS GALLINAE (canker)

Canker (trichomoniasis) is probably the most common disease affecting pigeons throughout the world. It is wide spread in Australian feral and domestic pigeons, both fancy and racing and is also a major cause of death in budgies and canaries.

The disease is caused by the TRICHOMONAD protozoa. There are different strains of the organism which vary widely in their ability to cause disease. Adult birds are often carriers - that is, they have the organism and spread it to other birds but look totally healthy themselves. The organism is commonly spread through food and water by carrier birds and passed from parents to their young. Overcrowding, poor hygiene and other stress factors result in greater spread of infection and debilitate birds so that latent infections become active and cause disease. Canker lesions often become secondarily infected by bacteria and make the disease much worse.

In young birds poor growth and deaths are common. In older birds, weight loss and weakness or just poor performance are indicators that there is an underlying trichomonal infection.

The common crop form of canker is the one most breeders are familiar with - the vomiting bird, the bird with froth at the beak, the bird slowly losing weight and eventually dying even though it appears to be eating. The crop form of canker usually results in constrictions forming in or around the crop, stopping the passage of seed and causing the bird to starve to death. A more sinister form of canker occurs in some cases, where the organism invades the liver and causes large cheesy abscesses full of organisms. These birds show no symptoms until the abscesses are well established and most of these birds die of liver failure.

Avian veterinarians can often find the carrier birds by doing a crop-wash and finding the organism under the microscope. However, the bird with liver abscess may escape

detection. Because the disease is so common, breeders should look to treating their flocks to either eradicate the organism or stop it from entering their stock.

### Canker (Trichomoniasis)

Pigeons have this disease permanently but will keep equilibrium until severely stressed. Canker is due to a parasitic organism called *Trichomonas colombi* and three forms are recognised affecting the pharynx, navel and internal organs respectively. The majority of adult pigeons are symptomless carriers of the organism but clinical cases may occur if the bird is under stress and in young pigeons the disease may be severe and even fatal. The disease is spread from adults to squabs in the crop milk and between pigeons through drinking water.

#### Pharyngeal Form

Cheesy yellow deposits are seen on the membranes of the pharynx at the back of the mouth. The deposits can affect food intake and also breathing. Severely affected birds are depressed, food intake is reduced and they become emaciated. Affected birds may have diarrhoea. Water intake may increase. In advanced stages a stringy mucous or putrid odour can be detected in the mouth. Throat Canker which forms a soft cheesy growth may be easily removed with a cotton bud dipped in aqueous iodine and glycerine, then treated with a standard veterinary cure.

#### Navel Form

This form occurs in young birds that are affected in the nest box from affected crop milk dripping onto the nest box floor. A typical cheesy yellow deposit is present under the skin at the navel and it may spread from here to the internal organs.

#### Internal Form

The internally affected organs include liver, crop and lung in which the cheesy yellow deposits may be found. The clinical signs of the internal form vary depending upon the organ involved but usually diarrhoea and emaciation are a feature of this condition.

All infected birds should be isolated as it is readily spread to any bird in low condition via the feed or drinkers. Canker does not require routine treatment but, may be monitored by regular clinical inspection of faeces and treated only as required. Canker equilibrium imbalance is often a secondary infection to a more serious disease. Therefore it does not make sense to attempt to completely eradicate this protozoan with routine treatment but only maintain a natural equilibrium within the immune system. Only treat as a cure for badly infected birds (imbalances) It can be cured within 3 - 5 days plus for 3 - 5 days convalescence. Dimetridazole is very effective against *Trichomonas*. All susceptible and in contact birds would be treated for a period of seven days. In some birds a broad-spectrum antibiotic or multi vitamin may be recommended. Flagyl is another antibiotic that is used as an anti-canker drug. Carnidazole is the generic name for all anti canker

drugs • 1 10mg tablet is given for an adult pigeon and half ( 5 mg) is given for a newly weaned pigeon. This is a single oral dose.

Diagnosis has to be based on the clinical signs in the living birds. Samples of crop smears are positive in the majority of adult birds and diagnosis is dependent on the number of organisms present. Post mortem examination of cadavers will give a positive diagnosis of the internal form. The disease needs to be distinguished from Pox, Tuberculosis, Aspergillosis and Salmonellosis.

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#### The Emerging Problem Of Pigeon Circovirus

A new disease concern for pigeon fanciers is being recognized with increasing frequency. With reports of infected flocks in northern and southern California, Canada, and Australia, it now appears that Pigeon Circovirus may become a major problem among mixed-aged flocks. This is an example of a disease that has been around for at least a decade, but that went unrecognized until recently. 1.

Circoviruses are a newly described group that includes Pigeon Circovirus, Psittacine Beak and Feather Disease (PBFD) and Chicken Anemia Agent (CAA). **Detailed laboratory studies confirm that these viruses are similar to one another (they share some portions of their DNA), but there is no known cross-over of disease agents from one group of birds to another.** PBFD is certainly the best known of the three, affecting more than 35 species of "hookbills" (parrots, macaws, cockatoos, and their allies). This disease results in characteristic abnormalities in feather growth, beak lesions and long-term loss of body condition. It is known that both PBFD and CAA cause disruption of the tissues comprising the lymphoid system. This system (including the spleen, thymus, Bursa of Fabricius, and both gut- and bronchial-associated lymphoid tissues) houses cells that are responsible for most immune functions of the body: making antibodies, recognizing disease organisms, processing antigens, and so forth. Because CAA and PBFD viruses harm the lymphoid organs, birds having these diseases are "immunosuppressed". That is, these viruses cause a form of acquired immunodeficiency (like human AIDS). One result is that secondary infections with other viruses, bacteria and fungi are common among birds with PBFD and CAA, even when birds are vaccinated against the secondary problems. In other words, Circoviruses compromise the birds' ability to benefit from vaccination!

Disease symptoms seen in birds with Pigeon Circovirus somewhat resemble those seen with PBFD and CAA. Pigeons initially show respiratory symptoms, weight loss, diarrhea, and stop eating, often dying after a short (2 to 5 day) period of illness. Many symptoms seen in Circovirus - infected birds are really attributable to disease caused by secondary infections that take hold because Circovirus has suppressed the bird's immune responses. Among these secondary infections, researchers have found Chlamydia (Ornithosis/Psittacosis), Herpes virus, Pasteurella (Cholera), Paramyxovirus - 1, Trichomonas (Canker), and Aspergillus (among others). Interestingly, in some Circovirus - infected flocks, there will be illness, but no mortality, while in other flocks, 100% of the squabs will die.

When these pigeons are presented for post-mortem exam, the most common findings are

destruction of cells in the spleen, thymus and Bursa. The latter two organs normally shrink in size after hatching and are tiny or absent in the adult bird. In the youngster, however, they are very important as sites for immune system tissues. With these primary target organs, it is not surprising that all pigeons with confirmed Circovirus infections thus far have been one year or less in age. Infections have occurred both in racing lofts (in one case a bird returned two days late from a race and other individuals were performing poorly.), and in squab operations; a variety of breeds are represented. The relatively high frequency of infections among racing pigeons suggests that inadequate attention has been paid to shipping conditions and quarantine. Dr. Leslie Woods, of U.C. Davis feels that if Pigeon Circovirus holds true to the pattern set by PBF and CAA, then infection may be by a fecal-oral route. As yet, there are no known wild bird reservoirs for the virus, so it is uncertain how racers are encountering the disease.

Several factors conspire at present to hinder the prevention and diagnosis of Circovirus in Pigeons. So far, researchers have not been able get the virus to replicate in the lab. This step is required before rapid diagnostic tests can be developed or vaccine trials can be done. Additionally, the presence of so many secondary infections in Circovirus - positive flocks can lead to errors in treatment and diagnosis. Unfortunately, the other Circoviruses are very resistant to treatment with heat, disinfectants and detergents. 2. If this also holds for Pigeon Circovirus, it may be that the only way to salvage an infected flock is to eliminate all young birds for at least a year (ie, let the virus die - out naturally). Even this measure may fail, however, if the virus is able to exist in a "carrier state" in some adult birds. These and other details of the epidemiology (natural history and patterns of infection) of Pigeon Circovirus are completely unknown.

Our advice is to pay careful attention to hygiene and quarantine procedures when shipping birds, especially racers. Fanciers who import squabs, particularly into flocks that already have many young birds, should observe strict quarantines for 2 to 4 weeks after arrival. Until flocks can routinely be vaccinated, this newly recognized, immunosuppressive virus represents a real threat to 'open - entry' flocks and racing lofts.

Dave J. Rupiper DVM

Kenneth T. Briggs DVM, Ph.D.

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COCCIDIOSIS - Very common disease.

Pale birds; bloody droppings; ruffled feathers; deaths.

One celled parasite - coccidia - 9 species.

Host specific; immunity specific.

Coccidia - need moisture, O<sub>2</sub>, and temperature.

Coccidiosis, an intestinal disease, is also caused by a protozoan parasite, usually *Eimeria labbeana* or *E.columbarum*. The protozoan infects the cells in the intestinal walls in large numbers, multiply there and eventually destroys the individual cells. Each time a cell is destroyed, protozoa are released into the intestine, infect the semi-digested food, and attack new cells. One form of the parasite is passed out in taeces and is called an oocyst.

The seriousness of the infection will depend on the numbers of protozoa. Seriously infected pigeons rapidly lose weight, and their droppings are watery. No blood appears in the pigeon's droppings.

The oocysts released in the droppings can only develop further if ingested by another pigeon, but only •ripe• oocysts will develop. The ripening takes place best in a damp and warm environment. Pigeons can be infected only by ripe oocysts of pigeon coccidia, and not those of other animals.

In order to prevent this disease, you must keep the cote scrupulously clean and dry and protect it from infected birds. Add Amprolium pro salt 5gms in one litre of drinking water for 5 days and then give a gap of 3-4 days after which give half the dose in 1litre water for another 5 days.

A fecal examination one-week after the last treatment is strongly recommended.

Coccidiosis is one of the oldest and most widely known diseases of poultry, Although there are good effective treatments and preventive medications (coccidiostats) for coccidiosis, it still occurs quite frequently.

It is a disease caused by the invasion of the intestinal wall with coccidia, a type of microscopic one-cellular animals caused protozoa.

There are basically nine kinds of coccidiosis. One kind: *Eimeria tenella*, causes cecal coccidiosis, where blood is found in the two blind pouches (ceca) of the gut, and in chronic or healed cases a yellow core ("cigar") can be found in the ceca.

The other eight kinds infect the small intestine. The two most important ones are *Eimeria Acervulina* and *Eimeria Necatrix*. Both damage the intestine severely and can cause mortality and loss of egg-production.

Turkeys have their own kinds of coccidiosis, different from chicken varieties.

There are seven species of coccidiosis found in turkeys.

A mild coccidiosis infection is not very harmful and is actually necessary to create immunity in the future laying hen, if she is to live on the floor.

Coccidiosis organisms develop little eggs (oocysts) in the intestine that are passed in the droppings and can then infect other chickens in the same pen. If chickens are held on wire floor, they cannot get in contact with droppings and will generally remain free of coccidiosis.

Wet litter and warm temperature induce a heavy coccidiosis infection in the litter. That's why many coccidiosis outbreaks occur in the springtime (May, June).

Severe infections of coccidiosis will result in young chickens being sleepy and sitting with ruffled feathers. In cases of cecal coccidiosis, dropping will contain blood. Heavy mortality can result if treatment is not started immediately.

Treatment consists of drugs such as liquid amprolium or sulfa drugs (Sulmet, ESB3 or Whitsyn), but one should be careful with sulfa drugs, as they can be toxic when given too long or in too high dosages.

Never give sulfa drugs to laying hens. In *E. Necatrix* infectious blood may occur in the intestine and mortality can be 1% per week or more.

*E. Acervulina* infections are less dramatic, but tend to be more chronic in nature with long term damage to the intestine and resulting in smaller, unthrifty pullets that do not produce enough eggs.

If chickens appear sick and ruffled from coccidiosis, get a diagnosis at a diagnostic laboratory. It can be made quickly and medication started immediately.

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E-Coli In Pigeons - August 25, 2000

J. F. HIGGINS, V.M.D.

VCA NORTHSIDE ANIMAL HOSPITAL BETHELEHEM, PA

*Escherichia coli*, better known as *E. coli*, is a bacterium that commonly infects our pigeons. It is considered a normal constituent of pigeon feces, but certain strains of *E. coli* can be severely pathogenic. Whenever we recover *E. coli* from organs other than the gastrointestinal tract (e.g. liver, spleen) we can deduce that *E. coli* is causing clinical disease. The symptoms of an *E. coli* infection can mimic symptoms seen with other diseases (e.g. paratyphoid, PMV): weight loss, diarrhea, dead in shell, joint abscesses, and even head tilt, etc. This disease can affect both young birds and old birds, and is usually associated with some form of stress such as racing, breeding, overcrowding, etc. It is often found in conjunction with adenovirus in young birds.

Diagnosis of *E. coli* infection is achieved by culture and sensitivity. This is best done by an experienced person who will usually sacrifice one or two symptomatic birds; and, in a sterile manner, sample suspicious organs (e.g. liver/spleen) with a sterile swab. The contents of the swab are then streaked on a culture plate allowing the bacteria to grow and be identified. Antibiotic discs are embedded in the culture plate allowing for clear identification of the best antibiotic to kill that particular strain of the bacteria. We often find that *E. coli* grown from a bird from Loft A can be treated with Baytril, while *E. coli* grown from a bird from Loft B is resistant to Baytril. There are not commercially available *E. coli* vaccines; but, Dr. Steve Weir, a pigeon veterinarian from Oklahoma, has had some success with vaccines of his own design. Most of the time, prevention involves avoiding overcrowding, minimizing stress, optimizing nutrition, and maintaining good basic loft hygiene.

Summary:

- *E. coli* is a normal inhabitant of the pigeon's GI tract.

- Symptoms are the same for other diseases.
- Diagnosis cannot be made on symptoms alone.
- Appropriate antibiotic therapy should be based on culture

sensitivity.

Summary:

- E. coli is a normal inhabitant of the pigeon's GI tract.
- Symptoms are the same for other diseases.
- Diagnosis cannot be made on symptoms alone.
- Appropriate antibiotic therapy should be based on culture sensitivity.

Do not believe ads that claim that certain drugs are E. coli drugs.

They may not be.

- There are no commercially available vaccines.

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### Fungal Poisoning, Dangers of Fungus

As a brief background, in August of this year I brought 3 young birds home from a fellow fancier, who were kept in quarantine 3 weeks and then moved into the main loft. About 2 weeks after they moved in one bird became ill and I separated him, bringing him indoors to watch and care for him. Although he was eating well enough, he was listless and he wasn't keeping any of his food down. He ended up being injected twice daily with Baytril and getting multiple small volume tube feedings daily, but less than a week after bringing him inside he was gone. Immediate cause of death was aspiration of vomit, which happened because he'd become too weak to actually execute vomiting.

While that bird was being cared for indoors I became suspicious that a 2nd pigeon was becoming ill. Her symptoms included listlessness and apparent pain or discomfort in her crop. This was evidenced by her sitting very erect with head stretched up high, and an inability or unwillingness to sit in a relaxed position. Subsequently she stopped eating and I ended up medicating and feeding her as well, but she also expired quickly, within days.

Fecal and crop swabs showed only a high # of gram positive rod bacteria, hence the baytril. I'd also collected a specimen from the entire loft and sent it off for testing, which returned only haemophilus bacteria (I have a suspicion that one turns up in those mail tests a lot just because it survives the time frame). That also should succumb readily to antibiotic treatment, and so the entire loft was being treated by this time with baytril (tablets) as a precaution. During the course of the illness as it developed in the two birds who died, respiratory congestion developed and became severe, so Tylan was being delivered via drinking water as well.

I decided that despite the expense, I had to know what was happening to my birds because at this point, it seemed contagious but not bacterial, or possibly due to some kind of toxicity, and I had to find out what was going on to try and keep it from wiping out my birds.

I took my Beauty Bird to Michigan State University's Diagnostic Center for Population and Animal Health <http://animalhealth.msu.edu> for necropsy.

[I want to stress how thorough and complete this organization is, and I would encourage everyone to contact them for such services if ever needed. You can ship animals to them and they will provide you with complete instructions. The cost for this service was \$150.00 which is very reasonable given that it included complete necropsy, all indicated cultures, histological examination, and any other procedure deemed indicated by the pathologist. The only additional charges are for individual toxicological tests, and those are handled ala carte as indicated by other results. My avian vet was willing to do a necropsy and send tissue samples out, but it would have cost far more to do it that way as they charge for the tests then in turn pass on the lab's charges, and most likely MSU would be doing the actual tests anyway. In all my experiences with the Veterinary hospital at MSU they have exceeded expectations and I am very impressed with them. I have to include that recommendation of them as a resource!]

Beauty's necropsy did indicate some tissue damage and possible rupture in her crop, however it was only the microscopic histology which revealed what had really happened to her. She had developed a severe fungal infection of the crop and surrounding tissues, something known to experts as a 'mucor' class infection of a type most often seen in young cattle. The organism indicated was 'Zygomycetes' which is a normal environmental fungus (found everywhere) and which is not normally a pathogen, however it can invade tissues and become dangerous if ingested in large amounts or if the host is debilitated. This is something that can cause life-threatening problems in diabetics, and immune compromised patients.

The most likely source of exposure would be through feed, and of course we're told time and again not to feed damp, wet, or moldy seeds and to keep our lofts dry, etc. Well I live by this advice and my loft is kept very clean, and very dry. During the weeks it took for this situation to evolve I drove myself insane trying to figure out what I was doing wrong and how 'whatever-it-was' got into my birds. We went through bedding (sawdust, straw) being a culprit to the birds ingesting too much grass, to something in the soil, to contemplating possible vandalism (deliberate poisoning) and the list went on. I laid awake at night wondering if there was anything more I could or should be doing.

As for food, I buy it in small amounts, mix in my legumes and other supplements, and store it in a closed container. It is dry and I have never had a problem with any mildew, mold, fungus, or damp feed. I threw all out anyway and replaced it with food from a different source, just trying to cover every possible avenue.

On the day that Beauty passed, I happened to find a large amount of mold/fungus growing in, of all places, their bag of grit.

I purchased (note the past tense!) grit from a local feed/farm supply, in 5 lb packages, which they bag up and sell pre-measured. The best explanation I can come up with is that the bags were allowed to get damp, or the grit itself was damp or wet and dirty when

bagged, and the mold grew up and through the material. It was not visible at all through the plastic, (probably avoiding the light) and not grossly apparent until I'd used up about half the grit. Bits of it that might have been scooped up or come loose would just have looked like dust or bits of dry grass or something innocuous. Once I saw the large mass of it in there, I immediately threw it away but later retrieved it and took it along with the remains to the lab. When the pathologist completed her tests, she was convinced this was the source given the appearance of the material and her other findings. I regret that I did not take a picture of it to share. It's indicative of how stressed I was at the time that I didn't even think about doing that!

I guess I should also share that this is not a topical sort of fungus (like yeast) and that drugs like Nystatin are useless against it. In fact, what the pathologist referred to as 'big guns' anti-fungals should be used sparingly if at all, as they pose health risks in the form of tissue and organ damage that can be more dangerous than the pathogen they are used against. I have since confirmed this opinion with 2 other vets and also web research, even on human patients being treated for fungal infections. Administration of drugs like ketoconazole and the like must be done carefully and certainly never given to any patient 'just in case' they might have some sort of fungal infection, or done knowing the associated risks. Despite my knowing with 100% certainty that my birds were exposed to this potential fungal pathogen, I have elected NOT to treat the rest of them with an anti-fungal as I feel the risks outweigh the benefits. It is best to trust to their own immune systems and on getting/keeping them in top shape with good diet and supplements.

I also wanted to stress how easy it is to become distracted by one set of circumstances or symptoms and fail to see a bigger picture. Making an assumption that a new bird brought something contagious into the loft was an obvious early mistake. And finally...and most scary, there is no way to test for illnesses like these. The only available way would be by biopsy of the crop.

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### Heavy Metal Poisoning in Birds

Brass is an alloy of copper and zinc. Both of these metals are potentially toxic to birds.

Brass padlocks are probably not a problem for cages of small birds who are unlikely to chew the padlock. However, they should be avoided around larger birds who are able to chew them.

There was a report recently in the Journal of Avian Medicine & Surgery of a hyacinth macaw who nearly died from zinc poisoning. He had destroyed 3 brass padlocks and had also chewed on the chrome cage wires (chrome also contains zinc).

Lead is also extremely toxic to birds. Common sources of lead include lead paint, lead fishing weights, curtain weights, lead frames of stained glass windows and tiffany lamps, foil from champagne bottles, lead solder, old pewter, lead batteries and weighted ashtrays and toys.

Copper is also potentially toxic to birds although avian toxicity from this metal is less common. Acidic foods stored in copper containers may leach out copper, and occasionally copper piping for water is a potential source of increased copper in the diet if the water is slightly acidic and has been allowed to remain in contact with the piping for some length of time. Allowing the water from the tap to run for a few minutes before filling the water dishes will prevent this problem.

Tin (not galvanized), steel and iron (not treated with antirust paints) are not toxic to birds.

Zinc is extremely toxic to birds. Sources include galvanized cage wire, clips or staples, bird toy snaps, zippers, keys, nails, plumbing nuts, nuts on animal transport cages, hardware cloth, padlocks, chrome, and some antirust paints, shampoos and skin preparations.

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### Paramyxovirus

This is also known as P.M.V. (the poultry equivalent of which is Newcastle Disease). Affected birds will at first have an increased thirst and will pass liquid faeces - this may be followed by nervous signs. The nervous signs seen include paralysis, torsion of the neck and uncoordinated body movements • not all these signs will necessarily occur in every affected bird as there are many strains and various degrees of virulence of the disease. Symptoms are many and varied, sometimes several together, at other times singular. These include watery faeces, slimy green/brown faeces, nervousness, lack of co-ordination, falling backwards, misjudging distance, fear of sudden noise, reaction to bright light, torsion of neck, complete twisting movement of neck, inability to pick up grain immediately etc.

Diagnosis is based largely on the clinical signs and it can be confirmed by blood tests. The disease needs to be differentiated from Salmonellosis, other causes of wet droppings and other causes of nervous signs including poisoning. There is no cure but recovery is possible after nursing and convalescence for 10-14 weeks. The mortality/fatality rate is dependant upon the viral strain contracted. Some strains may kill within days but are extremely rare. Most strains result in recovery and future immunity for the individual although some may demonstrate continued nervousness for up to two years. The disease has an incubation period of 8-12 weeks after which the symptoms begin to appear. During this period the pigeons are infective to others. The symptoms are actually the onset of recovery, which takes another 8-14 weeks, plus further convalescence. Immunity is passed from an immune parent to nestlings, however this immunity only lasts for 3 weeks. Youngsters should be vaccinated at 21-28 days old. Prevention is via vaccination for both young and old but, 14 days must be allowed for vaccination to become affective; immunity is not immediate and also builds and wanes over a period of ten months for full effectiveness (not 12 months as many imagine).

Not all pigeons contract Paramyxovirus, some are resistant, possibly due to having contracted a mild but unnoticed strain at some previous time. However this is not an argument for not vaccinating the bird. The disease may be spread as airborne or contact borne. Vaccination is ineffective against the disease once the pigeon is in the stage of incubation of the virus. Birds who have recovered do not remain as carriers of the present pigeon related strain of P.M.V. However viruses do mutate so all information available may be subject to revision in future. As this condition is due to a virus no specific treatment is available. Antibiotics and multi vitamins may be used if the birds are under stress. Prevention of this disease is very important. There are vaccines but they may not be available in India. The best time to vaccinate young birds is during the last two weeks of March and the first week of April. The young birds should be at least 3 weeks old. The best time to vaccinate older birds is during November and December before the start of the laying season. Vaccines are given subcutaneously in the midline of the neck with the needle towards the tail of the bird. Great care must be taken to keep the needles, bottles etc as clean as possible.

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In-depth PMV article:  
PARAMYXOVIRUS

Avian paramyxovirus 1, (Newcastle's Disease or PMV 1), is one of a group of nine distinct serovars (with several more yet to be characterized) of the virus that are dangerous to birds. Although paramyxovirus is theoretically vertically transmissible, this mode of transmission is considered unlikely because infected hens will generally stop laying eggs when they are viremic. Eggs contaminated by virus-laden feces immediately after laying could contaminate an incubator, and can serve as a source of virus for recently hatched neonates.

Exotic Foreign Doves & Pigeons, including the Ringneck and Diamond Doves are susceptible to this disease. Here is some data, which may be helpful to the fancier. This information does not take the place of the information from an avian vet.

Use the "killed virus type" vaccine. Most all of the pigeon & poultry supply companies carry it. A ½ " 20 gauge needle is the recommended size.

Pigeons & Doves of average "pigeon size" would take 0.5 ml (1/2 ml) per bird. Ringnecks & similar sized doves take .025 ml (1/4 ml) per bird. Diamond Doves and similar sized doves take half of the Ringneck dosage.

Young birds: give initial injection at about 4 weeks old & the second booster 4-8 weeks apart. Older birds are vaccinated the same way – using the two vaccinations. Yearly vaccinations are recommended also.

Injection of the vaccine is made just under the skin. Many give it in the neck, in the insides of the leg & others inject it in the belly area. No matter where it is injected clean the area with alcohol before inserting the needle.

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Symptoms are many and varied, sometimes several together, other times singular. Watery feces, slimy green/brown feces, nervousness, lack of co-ordination, falling backwards, misjudging distance, fear of sudden noise, reaction to bright light, torsion of neck, complete twisting movement of neck, inability to pick up grain immediately etc. NO CURE but recovery after nursing and convalescence after 10-14 weeks. Mortality / fatality rate dependant upon viral strain contracted. Some strains may kill within days but extremely rare. Most strains result in recovery and future immunity for the individual although some may demonstrate continued nervousness for up to two years. Parental immunity cannot be transferred to young so natural immunity is impossible. Some immune individuals may become susceptible once again after several years of non-contact. The immune system rejects unused or unrequired defenses periodically whilst updating its armory. The disease has an incubation period of 8-12 weeks after which the symptoms begin to appear. During this period the pigeons are infective to others. The symptoms are actually the onset of recovery, which takes another 8-14 weeks. Immunity is passed from immune parent to nestlings, however this immunity only lasts for 3 weeks. Youngsters should be vaccinated at 21-28 days old. Prevention is via vaccination for both young and old but, 14 days must be allowed for vaccination to become affective; immunity is not immediate and also builds and wanes over a period of ten months full effectiveness (not 12 months as many imagine) Not all pigeons contract Paramyxovirus, some are resistant, possibly due to having contracted a mild but unnoticed strain at some previous time. However, this is not an argument for none vaccination. Experience of this disease is extremely distressing and annual preventative vaccination of all owned pigeons is to be desired. The disease may be spread as airborne, fancier borne or contact borne, so aviary prisoner stock are not exempt from risk. Vaccination is ineffective against the disease once the pigeon is in the stages of incubation of virus. Recovered birds do not remain as carriers of the present pigeon related strain of P.M.V. However, virus do mutate so all information available may be subject to revision in future.

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Paramyxovirus is a viral disease that does not affect man or animals, but a human that handles a pigeon with PMV or the live vaccine can develop conjunctivitis if sensible precautions are not taken (eg, do not touch your eyes immediately after handling a pigeon with PMV or the live vaccine).

- \* Incubation period can vary from a few days to several weeks.
- \* It is most often of moderate virulence with 5% to 10% mortality, but rarely highly virulent strains can cause 90% mortality.
- \* Mortality rates are significantly higher if supportive care is not given (eg. when the virus is injected experimentally in a laboratory).
- \* Water deprivation and stress increase mortality.
- \* Spontaneous recovery within 6 - 12 weeks is common, but recovery can take longer.
- \* Nervous symptoms can persist for life or return in times of stress.
- \* Some pigeons will suffer from persistent diarrhoea after recovery.

SYMPTOMS:

Diarrhoea is often the first symptom, but feral pigeons will not often come to the attention of a rescuer until the nervous signs appear. Not all symptoms will be present at the same time. All symptoms are aggravated by excitement.

The most common symptoms seen by the rescuer will be:

- \* Thin broken solid droppings in a pool of liquid
  - \* Fine tremor of eyes or head
  - \* Staggering
  - \* Somersaulting in flight
  - \* Crash landing
  - \* Difficulty picking up seed, pecking and missing.
  - \* Tossing seed backwards
  - \* Twisting neck, head upside down (torticollis, star gazing)
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- \* Paralysis of legs or wings
  - \* Spiralling in flight
  - \* Flying backwards
  - \* Turning in circles
  - \* Having fits

## HOUSING

- \* During the recovery period keep pigeons with Pigeon PMV in a quiet, warm (not hot) cage with soft flooring away from any intense light source.
- \* Towelling is ideal for flooring as they can damage their feathering if they have fits.
- \* Provide a brick for perching.

## FEEDING AND WATERING

- \* Place seed in a deep dish so that if they stab at random they can pick seed up.
- \* Because Pigeon PMV can cause fits pigeons are at risk of drowning but they need free access to water. Provide water (with added electrolytes if possible) in a deep narrow container to minimise the risk of accidental drowning. Watch the pigeon to ensure it is drinking.
- \* Hand feeding may be necessary. If feeding by gavage tube is not an option the pigeon's mouth has to be opened and the food pushed to the back of throat. Suitable foods that can be fed this way include pellets of egg food paste dipped in water and soaked dog biscuits.
- \* Weigh the pigeon daily and carry out a poop count to ensure that he is getting enough food. As a guideline: a healthy pigeon will pass between 20 and 30 raisin sized poops a day.

## NURSING CARE

- \* Supportive care is usually sufficient.
- \* Resistance to other diseases such as coccidiosis, trichomoniasis and aspergillosis is reduced. Avoid conditions that could aggravate these conditions (stress, damp etc), watch out for symptoms and provide prompt treatment if symptoms appear.
- \* The disease runs its course in about 6 weeks, by that time the pigeon has stopped shedding the virus and won't infect other pigeons but nervous symptoms and gastrointestinal may persist longer.
- \* Vitamins should be given to boost the immune system.
- \* Probiotics can be used to crowd out any bad “gut” bacteria.
- \* Electrolytes can be given to replace the electrolytes lost through polyuria.
- \* I have found that providing a calcium supplement on arrival (Gem Calcium Syrup with Vitamin D3) has helped. The dose I gave was two drops a day for 3 days.
- \* Do not use antibiotics without consulting a vet. They can intensify the lesions and aggravate the course of the disease.

### SOME USEFUL HOMEOPATHIC REMEDIES

- \* I have had some success treating the paralysis/stroke symptoms of Pigeon PMV using the homeopathic remedy Conium Maculatum (common hemlock) dosing with a single tablet of the 30 potency three times a day for up to 10 days.
- \* Birds that tremble and fall over when they try to move because their balance is impaired may benefit from Argenitum Nit 30 potency, one tablet given 3 or 4 times a day for up to 2 days.
- \* Belladonna can be used for birds that are restless with convulsive movement and jerking limbs. 2 pilules twice a day.

Remember not to touch homeopathic pilules with your hands, this can contaminate them and reduce effectiveness, give them on a “clean mouth” (no food or additions to the drinking water 20 minutes before or 20 minutes after) and stop the remedy as soon as an improvement shows

### HYGIENE

- \* Pigeon PMV is highly infectious to other pigeons , victims should be kept isolated from other birds for at least 6 weeks.
- \* Maintain scrupulous hygiene , regularly disinfecting food and water containers with bleach.
- \* Always see to a pigeon with Pigeon PMV after you have treated your other birds. That reduces the risk of carrying the infection to other birds in your care.
- \* Wash hands after contact and take care not to track fecal waste or carry fecal dust to areas where other birds are.
- \* Some rescuers keep a clean overall and shoes just inside the isolation area, to put on while caring for Pigeon PMV sufferers and remove when leaving the area.
- \* Dispose of droppings wisely, they can be a source of infection to feral pigeons.

## PREVENTION AND CONTROL

In a loft situation it is important to vaccinate pigeons against Pigeon PMV. Remember that it is the pigeon that is not showing any symptoms of Pigeon PMV but is shedding the virus that is the greatest danger to other pigeons. By the time the obvious symptoms appear the virus could have infected other pigeons in your care. Always isolate new pigeons. They can be vaccinated if they show no signs of the disease after 10 days in quarantine.

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### Protein poisoning

This may be a common complaint and young birds definitely benefit from a lighter diet during the warmer months. Psittacosis (parrot fever)

This is a virus disease similar to Paratyphoid and usually affects young birds. Although this is a disease affecting psittacines (parrots, budgerigars etc.), it can be found in pigeons as well. Symptoms include pasty and sticky mucous in throat lining and mouth, diarrhoea, green and white faeces (smelly), soiled mated vent, swollen abdomen, vomiting, poor appetite, listlessness, panting, rump may be seen to constantly rise and fall, dull partially closed eyes, sneezing, weaned birds tend to stay upon the loft floor. Birds usually die in their nest and death is fairly rapid for older infected birds. It is caused by a virus passed via sneezing and faeces, food contamination etc. Incubation is 2-10 days and onset is very sudden with a high fatality rate. It is usually accompanied by various secondary infections i.e. canker, pneumonia, peritonitis (liver & kidney infection), enteritis, roup. The effects include pus forming in air sacs and lungs, damage to heart, liver, kidneys and spleen. Birds that contract a mild form survive to become carriers. Action should be taken to destroy and burn all infected birds and routinely disinfect all lofts fixtures and fittings. Psittacosis is essentially a filth disease caused by damp and wet droppings. If you smell ammonia or foul odour, with houseflies in abundance then suspect the onset of this disease. Pigeons will very often eat maggots that may be contaminated. Keep your loft clean.

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### Pseudomonas Infection in Pet and Breeding Birds by Tiffany Margolin, DVM

Does your bird have a "cold"? Is his nose runny, is he sneezing, or having other signs of a respiratory infection? There are many causes of respiratory problems in birds, but one of the most stubborn and elusive culprits is Pseudomonas.

Recently, a green wing macaw named Jackpot was brought to our clinic because he had signs similar to those described above. A simple culture revealed that he had a severe Pseudomonas infection.

What exactly is *Pseudomonas*? It is pronounced "sudamonas", and is a water-loving organism. It is most often found in water sources such as hoses, taps and even water-filtering systems. It is a gram-negative rod-like organism that is not normally found in a healthy bird. If it gains a foothold, it readily proliferates in the warm, moist environment of a bird's respiratory system. Unfortunately for both the bird and its owner, *Pseudomonas* can be very resistant to many commonly used antibiotics.

*Pseudomonas* infections, by and large, involve the respiratory system. Signs of the infection may include clear or yellowish discharge from one or both nostrils, sneezing, scratching at the nose and ears, and conjunctivitis (red eyes). If the problem is detected early enough, much subtler signs may be the only ones present. For example, the feathers around the nostrils may just be slightly crusty.

When an orange winged amazon named ET was brought in, its owner said that he was, "Sneezing a bit, and just not acting himself.) ET turned out to have a very resistant form of *Pseudomonas*. It could be treated only with injectable antibiotics. Although we have most commonly observed the infection in psittacines, it is not limited to that group. Most adult birds have immune systems strong enough to wall the infection off to the upper respiratory system. As an infection progresses and becomes more severe, signs can include swollen sinuses around the eyes and complete obstruction of the nostrils.

Juvenile psittacines are at greater risk if exposed to *Pseudomonas*, because of their immature immune systems. Instead of localizing the bacteria to the respiratory tract, their systems may be overwhelmed and become septicemic (Carrying the bacteria in the bloodstream to all of the organ systems). This danger is very real if the formula water is contaminated. This can be avoided if one is careful to boil the water before using it. Also be sure that all utensils are thoroughly cleaned and disinfected before each use.

Recently, a four week old cockatiel was afflicted. The bird became extremely ill and died within 24 hours. It was brought to our clinic for necropsy. The environment was investigated for months before finding the bacteria living in the filters that purified her aviary water! One must culture taps, surfaces, and other areas that the water may contact. Even if bottled water is used --the most likely spot to find a problem is inside the cap.

We have discussed treatment in the individual bird, but how does one address aviary contamination? Surface disinfectants must be employed here. Nolvasan does not kill *Pseudomonas*. For surface disinfection with bleach, use a dilution of one part bleach to thirty parts water and rinse thoroughly. Remove all bleach residue from cages and bowls before contact with birds is allowed. Roccal-D, Kennelsol and many other disinfectants also labeled for use against *Pseudomonas*. Follow manufacturer's instructions.

If the water lines are contaminated, they must be flushed with an appropriate disinfectant and recultured. Check water filtering devices on a regular basis. It is also recommended to run the tap for several seconds before filling bowls to reduce the overall bacterial count.

I cannot overstate the importance of having a known *Pseudomonas* bird rechecked and recultured on a regular basis. This bacteria has an extremely high rate of recurrence if this is not done. It often becomes stronger and more resistant with each subsequent generation. Consult your avian veterinarian if you suspect a problem with your aviary or pet bird.

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#### VIRAL DISEASES

Several important viral diseases are vertically transmitted in birds. Psittacine Beak and Feather Disease, (PBFD), has been demonstrated to be vertically transmitted, since the virus is found in the blood of infected birds. It has been shown that artificially incubated baby birds from PBFD-infected hens will consistently develop PBFD. So, attempting to control PBFD by pulling eggs for artificial incubation is futile.

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HERPESVIRUSES, most of which are quite species-specific, include Pacheco's Disease Virus, Amazon tracheitis virus, respiratory disease in *Neophema* sp. and *Psittacula* sp., wart-like or flat plaque-like lesions on the skin of psittacine birds, budgerigar herpesvirus, pigeon herpesvirus (infectious to budgies and cockatiels), falcon herpesvirus (infectious to budgies and Amazon parrots), and Marek's disease (suggestive lesions in budgies). It has been theorized that some hens latently infected with Pacheco's Disease virus can pass the virus (and antibodies to the virus) to their eggs. The resulting neonates would be latently infected carriers that might not develop detectable levels of antibodies. Herpesvirus of European budgerigars causes feather abnormalities (referred to as "feather dusters") and is thought to be egg transmitted, and has been demonstrated in dead-in-shell embryos and is considered a major cause of early embryonic death in affected flocks, resulting in decreased egg hatchability.

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#### PROVENTRICULAR DILATATION DISEASE

PDD, is an enigmatic disease that is being diagnosed with increased frequency. Although we have much to learn about this disease, my personal experience indicates that PDD may be vertically transmitted. I am working with an aviary that has a pair of severe macaws whose eggs were taken for artificial incubation because the parents often damaged the eggs after being laid. The eggs were placed in a brand new incubator, and the babies were the only ones in the nursery while they were being hand-fed. The owner had problems with the babies from day one, as the crops were slow to empty, and they did not gain weight properly. The babies had to be given antibiotics, antifungals and motility enhancers (cisapride) to get them to digest their food at all. One baby died when it was six weeks of age, and histopathology showed all the classic PDD lesions. The second baby died shortly after weaning and once again, histopath confirmed PDD. Histopathological examination of tissues from a dead bird (especially the proventriculus, ventriculus, crop, small intestines, and brain) is the only way to confirm PDD in a dead bird, as grossly, many diseases can look like PDD. When the PDD tests that Dr. Branson Ritchie at the University of Georgia is developing are available, we will be very interested in testing the parent birds of these two babies. At this time, barium radiographs

may render a presumptive diagnosis, and biopsy of areas of the gastrointestinal tract may prove diagnostic if positive, but once the new testing becomes available, it will be much easier to screen for this terrible disease.

Some adenoviruses, REO viruses, and reticuloendotheliosis viruses can be vertically transmitted. Influenza A may be vertically transmitted, as well.

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#### OTHER DISEASES:

The Off Legs Syndrome is caused by a variety of factors.

- insufficient calcium and trace elements in diet, laying hens draw these from their bones to provide shell to eggs: ensure adequate supply in feed content.
- Excess weight causing pressure to nerve endings : reduce feed slightly but maintain quality.
- Lack of iron causing anaemia: Bivinal liquid 5 drops in the morning and 5 in the evening for a week or B. Complex (no more than twice weekly).

Do not give Brewers Yeast to parents rearing young due to possible yeast/fungus problems. Although Brewers Yeast is excellent for supplying B Complex vitamins there are times when it must not be used i.e. during rearing, whilst administering antibiotic treatments or nursing pigeons with fungal afflictions.

Catarrh (Coryza •• common cold•- Mycoplasmosis see ornithosis & psittacosis)

Symptoms - clear watery discharge from eyes and nostrils, throat and wheezing or rattling sounds when breathing. This is yet another equilibrium disorder; pigeons live permanently with the causative agent and there is nor never will be a total cure. However it may be treated with antibiotics when it appears in a severe form. Broad-spectrum antibiotics used are Oxytetracycline liquid 5 drops of which should be given in the morning and 5 drops in the evening for at least 3 days or Enrox Oral solution with the same dosage. It may be cured by injectable Oxytetracycline into the subcutaneous tissue of the neck or into the breast muscle. One shot only is required to effect cure together with aviary convalescence. Convalescent birds should receive honey and garlic plus additional vitamin C in drinking water and probiotics to speed recovery

The most common afflictions to cause problems are:

#### One Eyed Cold

This takes several forms; some innocuous and some pernicious being the symptom of a more serious disease. One eyed cold is identified by clear water and air bubbles in one eye only, accompanied by slight swelling and reddening of eyelid and cere. Most commonly noticed is a watery or mucousy discharge in only one eye. But occasionally both eyes will have a watery appearance. Sometimes one eye can become completely shut depending upon the degree of infection. Should these symptoms develop to dark reddening and hard mucous deposits plus nasal discharge and severe breathing problems then the bird has a more serious disease. One eyed cold in young birds often occurs with

the peak moulting time coinciding with atmospheric (temperature) wide variation (hot days-cold nights). Generally speaking this is easily rectified by greater ventilation or isolation to an aviary and increasing the Vitamin C supplement. Left to take its course the patient recovers in 4 - 7 days and gentle swabbing of the eye to remove dried particles certainly helps. One-eyed colds are also associated with a peck in the eye or some other type of physical injury affecting the eye. They are also often confused with the onset of mycoplasmosis.

### Dry Cold

Dry cold is rather like hay fever in humans. Symptoms are sneezing, breathing difficulty, etc., and yet perfectly healthy in all other respects. The cause is most probably lack of humidity and air circulation during dry spells or lack of air circulation within an excessively closed loft environment coupled with overcrowding. To detect a dry cold - first gently press upon each side of the wattles with finger and thumb; the bird will sneeze. Inspect under the wattle and one will observe a blunt needle like appendage. This is the incumbent valve and serves the function similar to hair in the human nostril i.e. it prevents dust etc. from entering and blocking the airway.

In an unaffected bird this should appear slightly moist (not wet) and clear, being a healthy pink. The affected bird will be different; when applying slight pressure to the wattles, instead of sneezing, the pigeon will awkwardly open its beak and attempt to shake its head. The incumbent valve will appear dry and powdery with slight deposits of dust and mucous. The pigeon will only breathe through its beak and any attempt to close the slight gap will meet with resistance. The inside of the wattle must be gently cleaned with a slightly moistened feather taking care to remove any deposits. Remove all dust from the loft and increase humidity (put in an extra drinker). Most importantly do not overcrowd and keep down the dust as much as possible. This is the most common respiratory problem and antibiotics are not required nor will they cure.

### Diarrhoea

This is a symptom rather than a disease and may indicate disease of enteric nature, arsenic, copper, lead poisoning from pesticides etc., change of diet, poor diet, hunger, stress from exertion, reaction to medication or additives, excess vitamins, medical additives to galvanised drinking vessel causing chemical reaction, algae build up in hose pipes used for filling drinkers etc.. It could also be due to a sudden drop in air temperature. If the faeces is devoid of odour it is only a metabolic imbalance -give more fibre/protein in diet, bicarbonate of soda (it helps minor complaints) in water or use Entrodex and Electrolytes to re-hydrate. For the general treatment of diarrhoea administer Furazolidone-half a tablet (5mg) both morning and evening for five days. You can also give Gramogyl syrup, 5 drops morning and evening. Should the faeces be foul smelling, unusually coloured or blood spattered then use this check list for the probability of other disease. The pigeon will always try to physic itself by flushing out the system, in some respects this is good

but, the danger lies in cross infection of other loft inmates when normally harmless carried bacteria can flare into a problem caused by increased activity. Always isolate suspected sick birds immediately to prevent further spread of the disease.

### Dropsy

This is more usually a problem with old pigeons that demonstrate a swollen abdomen filled with watery tissue. Ascites is another name- the accumulation of lymph or tissue fluid in the tissue between cells. The bird gasps for breath with constant panting and signs of exhaustion. There are several causes - obesity at laying, lack of exercise; over-breeding, weak heart, worms (severe), coccidiosis, digestive problems, injury and internal tumour. Birds rarely recover from this condition and there is no treatment for the same.

### Enteritis

The symptoms are inflammation of the mucous membrane of the intestine, watery droppings, weakness or listlessness, poor appetite, excessive thirst. It is caused by bad digestion, severe worm infection, and rodent contamination of feed. It may cause liver damage and problems in other vital organs dependent upon the causative organism. Simple cases may be nursed and convalesced in the same manner as diarrhoea. The treatment is symptomatic i.e. the treatment should be carried out on the basis of symptoms. Liver problems are controlled by administering Liv 52 (vet) 5 drops morning and 5 in the evening.

### Feather Rot

There are two causes - fungus/feather and boring mite. Both cases thrive in damp patches i.e. residual damp from faeces on perches / nests/ floor corners. It is usually found to affect birds of coarse webbed feather type. The fungus, microbe or mite lives within the soft pulp of the feather shaft, gradually breaking to the stubble until bald patches appear. Affected pigeons may be bathed in Camphor water. Pigeons will moult clean but the problem may reoccur at the next humid season. The modern veterinary treatment is injectable Ivermectin, which also acts as a complete de-louser and wormer. Ivermectin has proved safe for pigeons and has also shown a capability to improve feather quality at subsequent moulting. IVOMEK can be applied via a single drop upon the skin, under the feathering at the very rear of the birds head - this has proven to be remarkably effective for keeping the birds louse or mite free for the season.

### Going Light

This again is a symptom rather than an illness and may be related to a number of causes. The bird suffers rapid weight loss, listlessness and emaciation. This may possibly be due to coccidiosis, ornithosis, psittacosis, a fungus related disorder, canker etc. There is also another form of going light which is very common. This is when an apparently healthy bird with full body appears extremely light (not fit) and seems to lack vitality, will not fly

and when made to do so appears to be •all in•. Often these birds will rarely leave the loft floor or struggle to reach

their perch; somehow they just seem lifeless in the hand. It could be suffering from over exertion and all will and physical power is destroyed and somehow the bird never recovers its former character. Monitor all offspring for signs of vigour loss! Give a multi vitamin solution like Vimril or Alviton-5 drops in the morning and 5 in the evening for a week.

### Haemophilus

Birds infected with the Haemophilus bacteria suffer from a severe conjunctivitis, which affects both eyes. In this condition the eyelids are markedly swollen and there is purulent discharge. Affected birds often show respiratory distress signs due to infection of the upper respiratory tract.

The disease spreads by direct contact and droplet infection from one bird to another. Diagnosis is based on the clinical signs and laboratory culture from the eyes or nasal discharge. As this is a bacterial infection a suitable antibiotic such as a Tetracycline can be prescribed by a veterinary surgeon once the disease has been confirmed

### Indigestion

A symptom is that the pigeon fails to digest its full feed overnight. This may be due to probably gorging after being hungry. If it has affected more than one bird the grain was probably kiln dried and too hard to soak and digest. Too much barley; irregular feeding; too heavy feeding, lack of grit in gizzard are other reasons. Convalesce by feeding sparingly then gradual build up in quantity; replenish fresh clean grits and minerals; bicarbonate of soda in drinker. Give the bird a liver tonic like Liv 52 (vet), antibiotics- oxytetracycline or Enrox. If the bird has a grain or any other feed stuck in its throat, help induce regurgitation (vomiting). Pour warm water (not hot) into the bird's beak with a dropper and then press the crop lightly. The other possibility is hernia of the gizzard which has no cure.

### Lameness

This may be caused by injury, Staphylococcus arthritis, Aspergillosis, Tuberculosis, Salmonella Typhimurium. Give the bird an analgesic suspension like Ibugesic for 1 •2 days and massage the leg with turpentine liniment, which would give warmth to the affected leg. Consult a vet if not obviously injured. If diseased - cure with injectable antibiotics like Enrox 0.1ml I/M or Gentamicin 0.5ml I/M.

### Liver Problems

Symptoms include consistent yellow fluid droppings, lassitude, thirst. The condition may be attributed to genetic fault, overuse of vitamins A & D, lack of sunshine, damp, lack of

exercise, too long imprisonment, damage from previous disease, excessive use of stimulants or incorrect use of antibiotics (overdose). Plenty of sunshine

and exercise should be given to the ailing pigeon. Do not give multivitamins! Administer the bird Liv 52 (vet) 5 drops in the morning and 5 in the evening.

### Mycoplasmosis

Mycoplasmosis is caused by tiny microscopic organisms transmitted from pigeon to pigeon through droppings in water and food. One to two weeks after the initial infection, you may note a watery nasal discharge, which later develops into a slimy pus-containing discharge. A grayish deposit appears in the beak and the saliva is tough and hangs wire-like between tongue and palate. There is swelling in the infected beak and throat cavity; an unhealthy smell is apparent. The nostrils become grey. If you press the nostrils, a thick discharge emerges. As the air passages become congested, breathing becomes laboured; the patient sits with open beak and makes wheezing noises, especially in the evenings and at night. The air sacs can also be infected.

In mycoplasmosis there is usually not an infection of the eyelid. Fatalities rarely occur, although the disease usually has a long duration. The disease appears to lower the bird's resistance to other disease and chronic infection can markedly affect performance due to respiratory problems. Internally the air sacs can be seen to be affected and secondary bacterial infections can occur at this site

### Treatment

Serious cases require antibiotic treatment. Enrox-2 tsp in 1 lt of water or 0.1ml injection I/M or Sulpha drugs-1/ 2 tablet in 1 lt water for 3-4 days. All healthy pigeons of the same loft should be treated with Althrocyn or similar medicine. Althrocyn, which is usually available in the powdered form, should be given 4 gm in 1 lt water for 5-7 days. Thoroughly clean and disinfect the whole coot, preferably on a weekly schedule.

Suitable antibiotic medication with Enrofloxacin, Tetracyclines, Tylosin or Tylamulin is effective against uncomplicated cases of Mycoplasmosis.

Mycoplasma infection is endemic in the pigeon population and the majority of pigeons will be affected by the organism. Stress conditions favour the development of the clinical disease in birds. The principle clinical finding is one of catarrh and initially there is a clear nasal discharge which in time becomes thicker due to the presence of pus.

### Ornithosis

The disease is caused by Chlamydomonas, a group of organisms with characteristics of both viruses and bacteria. The disease is not fatal to fully grown pigeons. Ornithosis is due to a micro-organism called Chlamydia. It is susceptible to antibiotics like bacteria but lives within and destroys body cells like a virus. Clinical signs vary from poor

performance to an acute disease causing a marked conjunctivitis, decreased appetite, respiratory disease, diarrhoea and death.

Isolated patients will quickly respond if placed in a warm, draft free cage and will in a few days or weeks be their old selves again. O-c (• ornithosis-complex•) under normal circumstances does not present a great danger. But should the birds suffer from stress (molting, bad food, cold and damp in the lofts, drafts, etc) they become more susceptible to a heavy o-c infection. If an additional disease should infect a bird, then the danger is also greater. A bird suffering from o-c is less inclined to fly, a symptom that also occurs in many diseases. After a time, the bird will develop respiratory problems, will quickly tire, and sit with open beak gasping for breath, hunched up in appearance, raised feathers on rump, damp matted patches upon wing butts (eye wiping or scratching) constant sneezing. Thereafter, the normally white or light rose coloured eyelid membranes will well and become gray or brown. The eyes water profusely, and an inflamed, wet patch soon forms under the eyes. In serious cases the eyelids will stick together, and secondary bacterial infections can cause blindness. The nostrils become gray and are also wet from a running nose. The bird will sneeze and scratch at its face. Should the mucous membranes of the nose, throat, and trachea become infected, the bird will sit with open beak, gasping for breath. As the trachea fills with mucous, you may hear a rattling sound as the bird gasps. The intestines may become infected, resulting in diarrhoea.

O-c is very infectious. It can be transmitted via infected drinking water and also through the air. The cote must be well-ventilated, clean and light, and disinfected at least once a week. Damp, stagnant air will spread the disease more quickly. Disinfect loft and all utensils, blow torch disinfect again and limewash. It is extremely difficult to eradicate and may reoccur. Completely isolate all others into a fresh air aviary quarantine. It is essentially a disease due to filth or lack of observation.

#### Treatment

You should do two things:

1. Allow the bird to be injected by a vet: 0.5 ml oxytetracycline in the breast muscle; repeat after 24 hours and
2. Administer chlortetracycline powder in the drinking water or Hostacycline powder 4 gms in 1 lt water for 5 to 7 days or more. Multivitamins must be given for 30-60 days.

Diagnosis of this disease in the live bird is difficult and must rely heavily on the clinical symptoms present. Blood tests will identify birds that have been exposed to the organism but are not a good indication of the present disease status. Where dead birds are available, samples from the liver or spleen can give a positive diagnosis in the laboratory. The disease needs to be distinguished from Mycoplasma infection, Haemophilus infection and •One Eyed Cold•.

#### Paratyphoid (Salmonellosis)

Salmonella bacteria, mainly found in the intestines causes problems with the bone joints, diarrhoea and nervous problems. In general, the disease is not fatal, as long as medicines are given on time.

The bacteria are passed in the droppings of infected birds, or via the crop milk, the saliva, or infected eggs. It is well known that certain unaffected pigeons can be carriers. Birds are infected by ingesting food or water contaminated by the droppings of infected birds.

Pigeons infected with salmonella bacteria get serious intestinal problems in four to five days. Fatalities occur quickly in young birds, because they have no immunity. Older birds, however, incubate the disease over a long period, and if they are not adequately cured, they will become carriers capable of infecting other birds via their oviducts and their droppings.

Squeakers may suddenly lose weight at 4-6 weeks and show signs of staring eyes, twisted necks, losing balance, gasping, difficulty in eating or digesting, mainly water filled crop, will not fly up to perches. Old birds demonstrate dropped wing, wing swelling, lameness, swollen foot (usually left foot), hens become barren, eggs fail to hatch. Affected birds have enteritis which may be blood stained. They are depressed, become dehydrated rapidly and emaciated. Death quickly follows if they are not treated. It is possible for Salmonellae to enter the blood stream and a generalised infection will result. In addition to the two forms of Salmonella recorded above cases are seen where the organism localises in one or more joints. Affected joints are swollen and painful and movement of the joint is lost due to the pain involved. If the organism is localised in the brain nervous signs will be seen depending upon the area of brain involved.

Infected pigeons may show only one, some or all of the symptoms. Carriers rarely show any symptoms at all. The complexity of correct diagnosis makes this the most common but often wrongly diagnosed illness. The many and varied symptoms cause confusion for treatment but, are actually good signs for diagnosis when several birds appear to be ailing in different ways. The greatest problem is in identifying the carrier which may appear fully fit (start with the oldest first and work backwards). The main cause is rodent contaminated feed, cross infection from wild birds or contact with a carrier from elsewhere. It is often confused with P.M.V. due to the symptoms. Treatment

Serious cases must be injected by a veterinarian with 0.5ml oxytetracycline, repeated after 24 and 48 hours. In addition oral administration of chlortetracycline must be given via the drinking water twice daily for five days. After the first five days no medications should be given for two days, or an individual treatment of one Furazolidone tablet per day should be administered. The cote must be thoroughly cleaned and disinfected. The bird should receive no grit during the course of treatment.

The disease is particularly severe in young birds and can be introduced into a loft by an apparently healthy carrier bird that can excrete the organism in faeces or saliva but which shows no clinical signs of disease itself. Young birds can be affected from crop milk or

affected faeces. Salmonellae most commonly affects the intestinal tract. Laboratory testing is required to confirm a diagnosis of Salmonellosis. The disease needs to be differentiated from other causes of diarrhoea (viruses, other bacteria, parasites etc), injury to the joint and other causes of nervous signs including Paramyxo-virus and poisoning.

Where dead birds are available for post mortem, examination of cultures from the birds should determine whether or not the organism is present. In live birds faecal and mouth swabs may detect the organism.

### Pneumonia

This is a secondary infection usually accompanying Ornithosis, Psittacosis, cold etc. It is caused or spread via dust infected dried droppings (faeces) or spread via contact and feed trays or drinkers. There are two types - (1) Virus (2) Pneumonococcus. There is no cure; however, secondary infections can be treated. Add Enrox oral 2tsp in 1lt drinking water.

### Prolapse

The medication is a displaced oviduct or rectum protruding from the vent after egg laying. It is usually caused by obesity, over breeding or old age. The protruding organ may be gently replaced with gentle coercion but is liable to infection if not immediately noticed. Clean the organ that is protruding with warm water and gently press the organ inside. Do not leave the bird immediately after pressing the organ inside, instead hold for sometime in the same position to reduce straining.

### Rickets (See bone troubles.)

It is caused by a lack of calcium or damp conditions, inattentive parents, impoverished diet and followed by arthritis or rheumatic condition with permanent weakening of muscular efficiency. Give the bird Ascal or Ostacalcium or any other calcium supplement.

### Roup

This is a highly contagious form of avian Diphtheria. Symptoms include cold, running nostril mucous, inflamed eyes, catarrh, dry cheesy matter in throat and nostrils, sometimes pox like lesions, blue-grey membrane in throat, on tongue and grey coloured wattles. Swab the throat, nose or any other part having the •cheesy• material with glycerine. Isolate patients, increase ventilation, fumigate loft and convalesce all birds in open-air environment as much as possible. The condition is mainly caused by overcrowding and bad ventilation or cross infection from wild birds.

### Thrush

This is a fungal disorder (Candida Albicans) resulting normally in loss of equilibrium but increased by stress. Causes include mouldy feed, spores from droppings or litter which

can be airborne or waterborne. May attack the throat, respiratory tracts, reproductive organs and vent. More common in nestlings. Symptoms are grey coated throat, blue-coated tongue (do not confuse with blue tipped tongue which is inherited pigmentation not a disease symptom), rattling and general debilitation or poor growth. Old pigeons show lack of vigour, reluctance to mate or rear young, may refuse to feed infected young and change nest location where possible.

Cure for old pigeons -swab throat with mixture of aqueous iodine, glycerine and honey. Use water purifier in drinkers, blow torch dry any damp nesting area and disinfect. Check all feed for sourness. There is no worth while cure for nestlings. Worse case scenario - thrush can escalate via secondary complications into Aspergillosis or Psittacosis. Identify immediately and effect prompt action. The disease is not serious if caught immediately. Vitamin deficiency

This is usually a result of stress from moulting and insufficient vitamins are assimilated into the body from feed to maintain balance. Give the bird Vimral - a multivitamin solution-5 drops in the morning and 5 in the evening for a week. This deficiency can be cured with one Halibut oil capsule daily for 5 days and no recurring disorder in most cases.

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My bird fell off her perch! (Birds Fall from Perches)

There has been a considerable amount of discussion regarding African Greys falling from their perches. This can be "normal" behaviour in Greys - some of whom are natural klutzes, or it can be a sign of underlying disease. In Greys, low dietary calcium resulting in hypocalcemia may be a cause.

Heavy metal (eg lead or zinc) poisoning should also be considered. Lead poisoning is the most common form of poisoning in the avian species. Zinc poisoning produces similar toxic effects, except that with zinc poisoning, seizures are uncommon.

I have been consulted on two cases of birds who fell off their perches, but were also depressed and anorexic. Zinc poisoning was the cause in both of these birds.

The first case was a Blue & Gold macaw, who had been previously healthy. He presented to the vet after falling off his perch. The bird was depressed and not eating. Blood work and x-rays were negative for lead.

The bird's cage had been painted two days earlier with a rust paint. This paint contained up to 1% of zinc chromate.

The bird was treated with S.C. Lactated Ringer's Solution (LRS) to rehydrate and with antidotal chelating agents to bind the zinc. The bird responded well to treatment.

The second case occurred this past weekend. A 4-yr-old, previously healthy CAG (Congo African Grey) presented at the veterinarians with a bleeding beak sustained during a fall from her perch. The bird was depressed, was not eating and had stopped vocalizing.

On questioning the owner, the bird had been quieter than normal for a few days prior to falling off her perch on a number of occasions.

The bird had been placed in a larger, old cage two weeks previously. It had been painted with a lead-free latex paint. However, the owner stated that the cage was rusty prior to painting. I asked if she had used an "anti-rust" primer.

The owner admitted using an anti-rust primer that she had been assured was safe for birds. The bird had been chewing on the paint which had started to flake off.

X-ray was negative for lead. Blood calcium was low normal. Blood zinc levels are pending.

The bird was given calcium gluconate, LRS, started on chelation therapy and placed in an Aquabrood unit. Yesterday (one day later), the bird was much brighter, more active and eating fairly well. Zinc poisoning from the "anti-rust" paint is suspected as the cause of this bird's illness.

When considering paints for your bird's cage, ensure that it is both free of lead AND of zinc.

Paints to prevent or to cover rust, usually contain zinc salts and should not be used around birds.

Heavy metal poisoning should be considered as a reason for unexplained falls from the perch.

Gillian Willis

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Trichomonas gallinae

articles by

Dr. Gordon Chalmers

Karl Frank

CANKER!

by Dr. Karl Frank

The diagram of the flagellate protozoan *Trichomonas gallinae* can be seen at the left with its undulating membrane and a central axostyle. There may be as many as 2 dozen strains of this organism infecting our racing pigeons with each strain being resistant or susceptible to some antibiotics. It may also be assumed that each of those strains exhibits a different level of virulence. The typical yellow growths in the mouth, pharynx, and crop as seen on the right are much less frequent than was the case in the past. Although these cheesy masses have become rare in Europe's racing pigeon scene, the infection trichomoniasis is still regarded there as the largest inhibitor to today's racing pigeon performance.

The wide spread use of antibiotics in the 1970's and 1980's has almost been successful in exterminating these strains which left an easily visible symptom of their presence. This "extermination" coincided with the emergence of various strains of this organism to which the pigeon's body does not react with a violent immune response and create these cheesy masses. Without an immune response, these more virulent strains are invisible to the naked eye but can easily invade the body, attacking and destroying the liver and various other internal organs.

Today's fancier may very well assume himself to be safe from trichomoniasis in the absence of cheesy masses in his birds or he may resort to periodic blind "cures" with antibiotics just in case... Either alternative is problematic because the bird's racing performance may be severely affected in the first case or the blind cures may lead to the development of resistant strains making the administration of the antibiotic ineffective. Only microscopic examination of the crop's contents will show the presence or absence of *Trichomonas gallinae* and also the relative concentration of this protozoan.

Some veterinarians, e.g. Tiberius Mohr, would prefer to rinse the crop and examine this liquid with a phase contrast microscope in looking for these flagellates or he may even culture this liquid in a special medium and thereby concentrate the specimen. The advantage of this system is that even a very low presence of trichomonads can be detected and they can also be tested for antibiotic resistance.

In the absence of such a specialized laboratory I need to be content following a much simpler method which still gives useful results. A cotton swab is fluffed up a bit and immersed in distilled water. The excess fluid is removed and the swab is inserted into the crop. All walls of the crop are contacted by using a swirling motion with the swab which is then withdrawn and the fluid held in the cotton is expressed onto a slide with the help of a spatula or bunt knife. We add a cover slip and have a look at the slide under a magnification of 300 X. These Protozoa can be seen to move about in a somewhat jerky wobbling motion.

Since it is counterproductive to assist in the creation of micro - organisms resistant to available antibiotics, it would be ideal if we could use only antibiotics to which the organism in question is sensitive to. However, antibiotic sensitivity tests regarding *Trichomonas* are not readily available in many locations. The solution is, at least partially, to examine crop smears microscopically not only before treatment but also a couple of days after treatment just to make sure that the antibiotic used is still effective against the micro - organism in question. A recent study done in the faculty of veterinary medicine in Barcelona found some *Trichomonas* organism resistant to all the nitroimidazole drugs tested. Similar results were obtained by a study done in Utrecht (Netherlands) where it was also found that the dosage commonly recommended for Ronidazole is usually too low and needs to be multiplied many times for the drug to be effective.

The route of infection is usually via contaminated drinking water which may happen in the basket toward the release point of any race. It would just take a couple of infected birds drinking from the trough and floating some of their protozoan guests into the common drinker. They can multiply relatively fast in their new host, especially since there is not much competition in a clean bird. Such infection will inevitably lead to reduced performance for which the bird is often blamed

Very little is known about immunity to trichomoniasis in pigeons ( but please read the very informative article by Dr. Gordon Chalmers further down ) for which reason it may be advisable to have a look at factors affecting *Trichomonas* infection in humans:

Three microscopically indistinguishable separate species of *Trichomonas* organisms can establish themselves in humans, the harmless commensals *Trichomonas tenax* and *Trichomonas hominis* as well as *Trichomonas vaginalis* which can cause a low grade inflammation of the genito - urinary tract in both men and women. The commensal, *Trichomonas tenax*, has an incidence of 10-20% in some populations and is transmitted from mouth to mouth. Since it is a harmless organism it would not be advisable to administer antibiotics just because some keen medical doctor found this organism in a smear of saliva.

The other commensal, *Trichomonas hominis*, lives in our intestinal tract. It is quite common in the tropics and transmitted by the fecal-oral route.

*Trichomonas vaginalis* is a common parasite of both males and females. Coitus is the common mode of transmission. The organism is commonly found in females, surveys indicating from 25-50% of sexually active women being infected; only about 5% of men are infected. Many cases of trichomoniasis are totally asymptomatic! In fact, asymptomatic cases are the rule in males. The intensity of infection, the pH of vaginal and other secretions, the physiologic status of the vaginal and other genitourinary tract surfaces, and the accompanying bacterial flora are among the factors affecting pathogenicity. The organisms cannot survive at the normal vaginal acidity of pH 3.8-4.4.

\* And how would that relate to pigeons? Perhaps the mere presence of some trichomonads may not be enough reason for firing the guns. Nature abhors a vacuum. Exterminating the micro-organisms present in the birds may invite another less benign variety to move in and take their place.

\* Keeping the birds totally free of *Trichomonas* may make them very susceptible to any strain which they may come in contact with. Extensive lesions are commonly produced in germ-free animals which by their nature have no immunity against these organisms. The Eiberg strain, as an example, can rapidly lead to the death of the pigeon without immunity in 14 - 17 days through necrosis of the liver. (University of Massachusetts study)

\* Perhaps a healthy bacterial flora may fend off these invaders by producing low enough pH values as is the case in the healthy vagina.

Should we therefore not treat our racing pigeons against trichomoniasis at all?

This may be possible if you are lucky enough in that the only strain of *Trichomonas gallinae* present in your birds has a very low virulence.

However, it is not practical for many fanciers who keep their flying team(s) free of this Protozoan. They cannot afford the drastic decrease of performance (with the loss of a large percentage of their racing team) due to a rapid multiplication of *Trichomonas* organisms in their birds. They would rather choose the periodic attempt to keep these flagellates at a low concentration.

Nevertheless, a microscopic examination before and after such treatment appears to be the prudent thing to do. In such examinations one may often find "little critters" dashing about at high speeds in straight lines. They are much smaller than *Trichomonas gallinae* and are other protozoa called *Hexamita* or *Spironucleus*. They also can do much damage and some drugs such as Emtryl® used against canker may be ineffective against them.

The time may have come to look into more natural management practices of many diseases but particularly trichomoniasis. It has been shown by a number of veterinarians that, try as much as one may, it is not possible to remove the organisms causing canker entirely from the pigeon. There will always be some left after an antibiotics administration and these will start the cycle anew, multiplying when the growing conditions are favourable for them. Not only do we run the risk of this organism to develop immunity to our trichomonicidal drugs through repeated dosing but these drugs also have definite toxic effects on the pigeons we try to protect.

Ad Schaerlaekens wrote an interesting anecdote regarding this very dilemma:

"MARC ROOSSENS

A long time ago Belgian star Marc Roosens told me he had just one problem in pigeon sport: trichomoniasis. No matter how much he medicated, the birds could not get rid of it. Till he 'saw the light'. After he had given the birds water the drinker was taken from the loft after just a few minutes twice a day and he kept on doing this for weeks and... believe it or not, since then the problem was solved. What he did was give trichomoniasis not a chance to stay alive."

Ad also relayed the following:

"In Germany scientist made tests:

Pigeons were given water in a common drinker, others were given water individually and the difference was spectacular. Birds that drank out of the same drinker nearly all had trichomoniasis but hardly any trichomoniasis was found among the birds which were given water individually."

Food for thought, isn't it?

Canker Revisited

by Dr. Gordon Chalmers

When I read the title of the recent excellent Digest article ("Is There a New Strain of Canker?" - December 15, 1998) by Dr Kevin Zollars, my first reactions to the question posed were, "Yes, very likely, and what is more, there are likely more than one new one." I was pleased when I read the article itself because of the realistic and philosophical points Kevin raised. After it is read carefully several times, and well absorbed, this article should be placed prominently in the files of every fancier. It occurred to me then that, as a corollary to this key article, I might present some background information on strains of *Trichomonas gallinae*, the cause of canker, and their importance to all of us. I have drawn the information in this article from a number of important old and some fairly current scientific papers selected from my files. Incidentally, in the following material, when I refer to the canker organism, I will likely use the terms "*Trichomonas gallinae*, *T. gallinae* (the latter is simply a shortened form of the full scientific name), trichomonad, trichomonas and canker organisms" interchangeably -- all mean the same thing. Infection by this organism was first identified in Europe in 1878 by a researcher named Rivolta. Many years later in the USA, a scientist named Robert Stabler, conducting research in Colorado, pioneered extensive work on the organism in pigeons -- in fact in 1938, he gave the organism its scientific name, *Trichomonas gallinae*. In a 1948 publication on the subject, he noted that not all pigeons that harbor the organism die of the infection, or even have internal changes to indicate the presence of this organism. As well, he found that youngsters from some parents in a loft nearly always died of canker in a few days or weeks after hatching, whereas certain other parents, although infected, raised healthy youngsters indefinitely. Obviously these facts gave rise to the idea that there were strains with differing abilities to cause disease, a suggestion that had also been proposed by other scientists who had worked on canker in pigeons.

To test this idea, Dr Stabler then set up an experiment in which he used canker organisms that he arbitrarily designated as "strains" (see explanation in the next paragraph), from

five different sources: Strain 1 from an infected wild youngster, Strain 2 from a healthy adult King, Strain 3 from a healthy adult Carneau, Strain 4 from an adult racing pigeon that had a history of transmitting lethal canker to his youngsters and to at least three successive hens, and Strain 5 from the mouth of a peregrine falcon that had died with severe canker of the mouth. (Note that canker caused by *T. gallinae* occurs in birds of prey in which it is called "frounce". Broadly related organisms in this group also cause infections, variously, in the reproductive systems of humans, cattle, and sheep, and in the digestive tracts of domestic chickens and turkeys. I have also seen it in devastating outbreak form in small aviary finches in which the disease very much resembled that seen in the oral cavity of young pigeons.)

Dr Stabler defined "strain" as the particular canker organisms removed from the mouth of an individual bird, even though he recognized the possibility that any given bird might harbor more than one strain. The results he obtained seemed to justify the use of the organisms from a particular bird as "a strain", at least in terms of their ability to cause disease. He maintained the five individual strains mentioned previously by inoculating them by eyedropper into the mouths of clean pigeons, and took great care to be sure that the different strains weren't accidentally mixed. The clean pigeons he infected with these five strains came from his own loft of racing pigeons that he knew were free of canker-causing organisms.

In the first experiment, he used 25 of his own young birds, aged 6 weeks, 5 1/2 weeks, 5 1/2 months, 7 months, and 9 months, with five birds in each group. One bird in each age group was inoculated by mouth with Strain 1, one in each group received Strain 2, and so on. Results showed that the Strains 1, 4, and 5 caused severe signs of disease that ended in the death of all except two youngsters, a 7 and a 9-month-old bird infected with the Strain 4. These two birds had severe canker for over a week, but they recovered. Strains 2 and 3 either didn't produce signs of disease in the youngsters they infected, or the infection was very slight and lasted only 2-4 days.

In follow-up work, Dr Stabler showed that Strain 1 (which became known in trichomonad circles as his famous "Jones' Barn" strain) obtained from the wild youngster with canker, was the most deadly of the five strains, killing 12 of 13 birds inoculated with it in an average of 10.6 days. Over all, he was able to show that, of 119 pigeons infected successively with this potent strain, 114 (95.8%) died in 4 to 18 days. In later work, he showed that Strain 1 was deadly even if only one organism was placed in the mouths of susceptible pigeons. Obviously, this single organism multiplied rapidly into the thousands or more to cause serious illness.

These results showed that there was a marked difference in the ability of these five different strains of *T. gallinae* to cause disease in pigeons. These strains varied from those that caused little or no disease to those that caused high losses. Obviously, there were also strains that were intermediate in their ability to cause canker, since they were able to cause serious illness from which most birds eventually recovered.

In important later studies, Dr Stabler was able to show that mild strains of the canker organism were able to protect birds against more deadly strains, a finding that continues to have practical application today. To confirm these results, he first gave eight of his own trichomonas-free youngsters the relatively potent Strain 5 obtained from the peregrine falcon. All developed severe canker of the mouth, six birds recovered and two died. Fifty-four days after the initial infection with Strain 5, the six survivors were given

the very deadly Strain 1. None of them developed evidence of disease during the following month. These six birds were then killed and examined at post mortem. There was evidence of scarring of the liver of three birds, findings that suggested infection from the previous dose of organisms. The other three birds were almost completely free of signs of infection. The only significant finding in these birds was the loss of the palatal fringe on the roof of the mouth. (Dr Stabler believed that, in every case examined, this change was highly characteristic of evidence that the canker organism was the cause.) He then repeated this experiment with eight more clean youngsters that were first given the mild Strain 3 from the adult Carneaux. Only two youngsters developed a mild form of the disease. About a month later, all eight birds were given the deadly Strain 1. In the next three weeks, only two of the eight birds developed signs of canker. One had a mild form of the disease, and the other had a severe form from which it eventually recovered. Post mortem examinations of these eight birds determined that tissues of seven birds were completely normal, and that the bird that developed severe canker had severe changes of canker in the liver. At the same time, as a control, Dr Stabler inoculated 13 youngsters from his own loft of trichomonas-free birds with deadly Strain 1; 12 of the 13 birds died. Thus, these experiments demonstrated that infection by a mild strain of *T. gallinae* conferred protection against a more deadly strain of the organism. However, the duration of that immunity wasn't determined at that time.

During the spring, summer and fall of 1950, there was a major outbreak of canker in mourning doves across much of the southern USA, with the greatest losses apparently in Alabama where it was estimated that deaths might well run into the thousands in that state. Dr Stabler obtained strains of trichomonads from several sources of these doves to see if the organisms from these doves could cause illness in pigeons. He inoculated 50,000-100,000 organisms from different doves, into each of five pigeons from his clean colony. For comparison, he inoculated only 3,000-10,000 organisms of his deadly Jones' Barn strain into another five clean pigeons, all of which subsequently died of canker of the liver. The most deadly of the strains from the doves came from a bird collected in Alabama, and like the Jones' barn strain, this one proved to be equally deadly, killing all but one of the pigeons inoculated with it. The other four strains obtained from the doves proved to be relatively mild when inoculated into pigeons, as most of these pigeons survived the infection.

The next question to resolve was this: would pigeons that survived the infections with mild strains obtained from doves, be able to withstand infection by the deadly Jones' barn strain? To test this idea, Dr Stabler inoculated all of these survivors with the Jones' barn strain. The result was that all birds inoculated with the Jones' barn strain survived, findings that indicated good protection following infection with strains from the doves.

1. Did the fact that these birds survived mean that the strains derived from doves had killed off the deadly Jones' barn strain, or
2. was the Jones' barn strain still present in these surviving birds, and if so, was it now altered so that it was now a mild strain, or
3. was the Jones' barn strain as powerful as ever for clean birds, but unable to cause illness in protected birds??

To test these ideas, Dr Stabler collected canker organisms from birds that had a combination of a mild strain and the deadly Jones' barn strain, and inoculated these organisms into clean pigeons. The results were variable, as some of the newly infected clean birds had only mild changes of canker, whereas other birds either died of severe canker, or almost died. These results indicated that the deadly Jones' barn strain continued to be present, and equally important, was as potent as ever. Over all, of 13 birds infected, six died outright, one barely survived, and six had mild cases of canker. Incidentally, Dr Stabler reported that the Jones' barn strain typically caused the most severe disease in the liver of infected birds, whereas milder strains produced only oral infections.

Although the procedure isn't too practical for us as pigeon fanciers, Dr Richard Kocan working at the Patuxent Wildlife Research Center, Laurel, Maryland, found that blood plasma from pigeons infected with even a mild strain of *T. gallinae* could protect other pigeons infected with a deadly strain of the organism. Much more practically, Dr Kocan was also able to demonstrate that previously infected pigeons treated with the old anti-canker drug Enheptin, were free of the organism for as long as 16 months, yet remained immune to infection when they were inoculated with deadly strains. On this point, some of his other work showed that 172 of 313 wild pigeons and 54 of 66 mourning doves (all of the mourning doves captured were completely free of the canker organism) -- all trapped in his area, were resistant to the deadly Jones' barn strain. His conclusions: recovery from an infection with *T. gallinae*, even when the birds eventually completely eliminate the organism from their systems, results in long-term immunity to this parasite - a fact that is of great importance to us as pigeon fanciers, one that we can use to advantage, especially in these days of apparent resistance by this organism to some of our modern, previously useful drugs.

The subject of drug resistance by the canker organism to modern drugs is also of major current importance to us. Almost 10 years ago, in 1990, Drs Lumeij and Zwijnenberg of Utrecht University, Holland, demonstrated the fact that canker organisms recovered from a large flock of pigeons in that country, were uniformly resistant to all of our commonly used modern drugs -- Emtryl, Ridzol, Spartrix and Flagyl. On the basis of that information, it seems likely that canker organisms in many other untested flocks of pigeons in Holland and indeed throughout Europe, and likely North America as well, could have been similarly resistant at that time, likely, as these researchers pointed out, because of the common practice among fanciers, of continually under-dosing birds with these drugs.

Although the subject of under-dosing, especially with Emtryl, is a pet peeve of mine, and I sound like a broken record on the matter, I think it bears repetition. In my travels, I find that the dosage of the 40% water-soluble so-called "Canadian" Emtryl, as recommended by several pigeon supply houses in North America is far below that recommended for pigeons by the producer of the drug. (At one time, this company sold small 3-gram packets of Emtryl, the exact dosage for one Imperial gallon - 4.55 liters). The fact that Emtryl is being recommended today at much lower dosages could certainly contribute to the problem of drug resistance mentioned in the previous paragraph, and may be a developing problem with major far-reaching consequences for us. I would remind fanciers that the correct dosage of Emtryl for pigeons, as recommended by the company, is 3 grams (or one level teaspoon) per imperial gallon (4.55 liters) of drinking water for

5-7 days. For the US gallon (4 liters), this is about 3/4 teaspoon per gallon for the same treatment period.

To avoid the problems of toxicity if birds drink excessive amounts of water especially during hot weather, try an Australian method that I know works well. Make up the correct dosage of Emtryl and place it in front of the birds at, say, the evening feeding for a couple of hours or so. After this time, throw out the medicated water and replace it with fresh water until the next evening. Repeat the correct dosage for a couple of hours or so each evening for a total of 5-7 days. This method insures firstly, that birds receive the correct therapeutic dose each day for the treatment period, and secondly, that problems with toxicity can be largely avoided. As Dr Zollars pointed out in his article, don't treat with Emtryl or other drugs of the same family during the pairing up period, because there is some suggestion that the drug can interfere with fertility. It is also a good idea to change drugs each time you feel birds need to be treated, say, Emtryl for one 5-7 day treatment period, and Ridzol for the next one, etc., all at the correct dosage.

Still on the subject of canker and treatments, some fanciers subscribe to the idea that if it's not broken, don't fix it. Dr Colin Walker, the Australian veterinarian who has written excellent articles for the Digest, seems to accept this idea. In one of his books, he states that drugs alone will never control a canker problem. He feels that it is important to allow developing youngsters enough exposure to the organism that they can develop natural resistance -- my idea for many years as well, based on the work of Dr Stabler.

Dr Walker expands on this idea by stating that if birds in the stock loft (and presumably their youngsters) did not develop canker the previous year, no treatment is needed this year. However, if canker did occur in stock birds and their youngsters last year, birds should be treated this year with a suitable drug prior to mating, and for two days every week after that. Further, he suggests co-ordinating these two-day treatments with the hatching period when trichomonad shedding is the highest. If the occasional youngster still develops canker, he recommends treating the parents and both youngsters in the nest with Spartrix or Flagyl for three days. (Note here that Dr Zollars has some legitimate concerns about short periods of treatment, etc. -- see pages 32-34 of his article.) Dr Walker also recommends avoiding the treatment of breeding pairs whose youngsters don't develop canker, so that there is no interference in the development of natural resistance.

Speaking of natural resistance, I recall that when I worked in New Zealand during the early 1980s, a medical doctor there raced pigeons, but apparently didn't treat his birds for any disease. Instead he preferred to rely on the development of natural resistance to any virus, bacteria or parasite his birds might encounter.

For the past several years, I haven't used preventive canker treatments on any of my old or young birds, and touch wood(!), so far there hasn't been a detectable problem. It is probable that the natural resistance developed in these birds by repeated exposure to the strains of canker organisms that very likely reside in my birds has (to date) been holding the disease at bay. Based on information from Dr David Marx, I have also been examining the mouths of my birds during the racing season for evidence of reddening and excess stringy mucus, findings that could suggest multiplication of canker organisms and increased irritation of the oral cavity during this stressful time. So far, on the basis of finding clean, pink throats, I haven't felt a need to treat preventively during the racing season, although it is possible that deeper areas such as the crop, which I didn't examine,

may have been affected. I acknowledge the possibility, however, that if I had treated periodically for canker in spite of these normal findings, some racing performances might have improved. As far as canker is concerned, the idea "if it's not broken, don't fix it" seems to be working. If things change for the worst, I am ready to treat if I have to.

I hope that this look at the historical background of strains, along with the recent article by Dr Zollars, may stimulate thought on this subject among fanciers. As the risk of drug resistance by canker organisms (and other agents as well) increases steadily, I hope that fanciers may be better able to assess the facts surrounding natural immunity, and to use these facts to their advantage by recognizing the biological benefits of using any mild strains of canker organisms that reside in their birds as a major defense against deadly strains. In saying this, I also recognize the need to treat birds when or if the disease occurs. A combination of judicious treatment when necessary, plus strategies to allow for the development of natural resistance may well be the best approach. I also hope that information on the correct dosage of Emtryl -- and by extension, other drugs as well -- may help to reverse the trend of vastly underdosing our birds with these products.

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Can my pigeons make me sick?

Do Pigeons Spread Disease? In a word 'no'! All wild birds have the potential to pass on diseases to other birds and to human beings but the chances of this happening are a million to one, certainly in the case of human beings. Pigeons are no more likely to transmit diseases to human beings than any other species of wild bird.

Why then do we read horror stories in the media every day about the 60 or 70 fatal diseases that pigeons are capable of transmitting to human beings? Because the pest control industry and those that have a vested commercial interest in controlling pigeons have a very efficient propaganda machine constantly churning out scare stories designed to sell their products. Pest control is a multi-billion dollar industry worldwide and culling (killing or removing) pigeons and selling proofing products represents a large proportion of the profits within this industry. Because scientific research has proved that culling pigeons is a completely ineffective method of control the pest control industry has to scare the public into believing that they need to be concerned about pigeons. The best way to do that is to link pigeons with diseases.

We read more and more reports about scientific and medical research programs proving the links between pigeons and disease in human beings. What we do not ask and what we are never told is who funds these research programs? Could it be the pest control industry? It seems more and more likely that this is the case. If these research programs are funded by the industry that benefits from the control of the species that is being researched (in this case pigeons) can we really believe the statistics that we read?

What we do know, however, is that the real experts all agree that there is no tangible health risk to human beings from contact with pigeons:

Mike Everett, spokesman for the Royal Society for the Protection of Birds said, in The Big Issue Magazine, February 2001:

“The whole ‘rats with wings’ thing is just emotive nonsense. There is no evidence to show that they (pigeons) spread disease.

The Chief Veterinary Officer, when addressing the House of Lords in 2000 on the issue of pigeons in Trafalger Square was asked if the large number of pigeons in the Square represented a health risk to human beings. The Chief Veterinary Officer told The House that in his opinion they did not.

Charlotte Donnelly, an American bird control expert told the Cincinnati Environment Advisory Council in her report to them:

“The truth is that the vast majority of people are at little or no health risk from pigeons and probably have a greater chance of being struck by lightening than contracting a serious disease from pigeons.”

Guy Merchant, Director of The Pigeon Control Advisory Service (PICAS) says, when talking about the transmission of disease by pigeons:

“If we believed everything we read in the media about pigeons and the farcical propaganda distributed by the pest control industry we would never leave our homes. The fact of the matter is that there is probably a greater risk to human health from contact with domestic pets such as cats, dogs and caged birds.”

David A Palmer (B.V.Sc., M.R.C.V.S) said in an article entitled ‘Pigeon Lung Disease Fatality and Health Risk from Ferals’:

“Obviously, since all these Allergic Extrinsic Alveolitis disease syndromes rely on the involved person having a very specific allergy before any disease, involving respiratory distress and very unusually death, can possibly be seen, it really makes absolute nonsense for a popular daily newspaper to suggest that pigeons present a health hazard and presumably need eliminating for the well-being of the nations health. If there was any real chance of pigeons spreading disease to human beings we would see epidemics amongst pigeon fanciers that race pigeons and spend much of their time in dusty pigeon lofts. We would also see all those involved with the rehabilitation of pigeons in wildlife hospitals worldwide dropping like flies. The facts speak for themselves.”

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**The statistics of risk: How likely is it that I will get BBL, Farmer’s Lung, or any other form of Hypersensitivity Pneumonitis, if I am exposed to birds?**

## **United States**

Resistance or susceptibility to infection following exposure varies. The incidence also varies considerably.

The prevalence varies by region, climate, and farming practices. Hypersensitivity pneumonitis affects 0.4-7% of the farming population. The reported prevalence among bird fanciers is estimated to be 20-20,000 cases per 100,000 persons at risk. Studies document 8-540 cases per 100,000 farmers per year and 6000-21,000 cases per 100,000 pigeon breeders per year. Therefore, the risk of BBL for any bird fancier or keeper in the United States can be as low as 6% or as high as 20%. Please read the article by Gary Gleeson below very carefully and follow instructions to protect your health.

## **International**

The prevalence of farmer's lung in the United Kingdom is reported to be 420-3000 cases per 100,000 persons at risk. In France, the rate is 4370 cases per 100,000 persons at risk, and in Finland, the risk is 1400-1700 cases per 100,000 persons at risk.

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### **HEALTH IN THE LOFT: YOURS, NOT THE PIGEONS!**

*Guidelines for Preventing Pigeon Fanciers' Lung.*

*By: Gary Gleeson*

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The subject of this article is your health and how to keep it.

You will hear the condition of interest called many things including Pigeon Fanciers' Lung (PFL), Pigeon Breeders' Lung (PBL), Bird Fanciers Lung

(BFL) and Bird Breeders' Lung (BBL). PFL is the most accurate when dealing exclusively with pigeons. PBL implies that only breeders are affected, which is clearly not the case. Many pigeon fanciers have indicated that they experience typical symptoms in circumstances such as shows, an activity that has nothing to do with breeding (1).

PFL is a form of Extrinsic Allergic Alveolitis (EAA). The Americans call it Hypersensitivity Pneumonitis. EAA also affects people who keep other types of birds, particularly budgerigars in the house. Another form of EAA is "Farmers Lung".

### **SYMPTOMS:**

There are two distinct but overlapping phases of EAA, "acute" and "chronic".

The acute phase is the most common in pigeon fanciers. Typically sufferers experience intense flu-like symptoms of fever, chills, muscle ache, cough and/or breathlessness four to eight hours after high level exposure to pigeons such as occurs when cleaning the loft or basketing pigeons. A medical practitioner may be able to detect lung abnormalities using a stethoscope and X-rays. Blood tests may reveal high levels of antibodies to pigeon proteins. The symptoms usually pass within 48 hours but may persist for a week or more. Although the attack itself will probably pass without treatment it is important to visit the doctor whilst symptoms are still present, preferably on the day of onset, as if you delay there may be no symptoms for the doctor to discover. It is important that sufferers are identified as early as possible to prevent progression to the more serious chronic stage of PFL. If detected and appropriate measures taken early enough, acute PFL is reversible.

Make sure you inform the doctor that you keep pigeons and exactly how long passed between exposure to pigeons and the onset of symptoms.

If not detected or ignored the acute phase may be followed by the chronic phase, which is, characterized by a type of irreversible lung damage the doctors call "pulmonary fibrosis". This is very serious and in extreme cases may be fatal. The major symptoms detectable by the layman are breathlessness on exertion, cough and weight loss, which can be considerable.

If you think you might be affected do not panic. Seek medical advice. The doctor should order a number of tests to determine what the problem is. Remember that there are many other possible causes for your symptoms besides your pigeons. Make sure that your doctor has considered the alternatives as well. Do not be afraid to ask for a second opinion.

### **CAUSES:**

It was not until 1965 that Pigeon Fanciers' Lung was first described in the scientific literature (2). Since then considerable research has been done into this and other forms of "Bird-Breeders' Lung" and new material continues to be published.

There are several schools of thought in the scientific community about the precise disease mechanisms. None of them have been conclusively proved. There is however general agreement that pigeon fanciers are a high risk group and that inhaling pigeon materials causes PFL to develop in some susceptible individuals. Other fanciers with similar exposure to pigeons do not develop the disease. There is no reliable method to predict who will be affected and who will not. Hopefully the scientists will eventually develop a reliable method but so far they have not. Until they do everyone exposed to pigeons should consider themselves at risk and take precautions to minimize the amount of pigeon materials they breathe in.

Exactly which pigeon materials cause the disease has not yet been proved. The leading contenders are droppings and feather bloom, but whatever the cause, the most important characteristic is that the particles must be small enough for a high proportion of them to

reach and be deposited in the gas exchanging region of the lungs. For this to happen they must be less than 5 microns in diameter. A micron is one thousandth of a millimeter. For practical purposes this means that the particles with the potential to cause problems cannot be seen with the naked eye. Bloom particle size has been measured at approximately 1micron (3).

Every flyer has his or her own management methods. This paper cannot discuss them all. As you read this guideline consider what you do that puts you in a position where you may be breathing in pigeon materials.

### **COMMON RISK SITUATIONS:**

**Loft Cleaning:** Do not allow droppings to build up. Remember that it is the particles you can't see that are the most dangerous. The best way to remove dust is with a vacuum cleaner. It may be necessary to fit a filter over the cleaner's air exhaust to prevent dust simply passing through the machine and being pumped back into the loft. Wash the inside of the loft out periodically with a hose (after removing the birds). Do this first thing in the morning on a fine day so that it has time to dry. Don't forget the stock loft.

**Handling Pigeons:** Anyone who has handled pigeons, particularly racing homers, is familiar with what Colin Osman (4) calls "the dust which soils waistcoats". This is particularly noticeable on race basketing days at the club when birds have been individually examined at home and then again at the club. This material on clothing and hands is readily transferred to the breathing zone and then inhaled. See the section on protective clothing.

**Releasing Birds for Exercise:** Each downbeat of a bird's wings creates a powerful downdraught of air, consequently spreading dust. A recently published study (5) has found that when the flock is liberated for exercise the combined beating of all those wings as they leave their perches and strain for altitude stirs up any dust in the loft and it does not return to normal levels for ten to fifteen minutes.

The implications of this finding are that you should:

- \* leave the immediate area of the loft as soon as you release the birds,
- \* not return until the dust has settled,
- \* wear a mask if you have to go into the loft for any reason in this period.

### **Feather Sheath Particles:**

In breeding lofts where fast growing youngsters are located, and in all lofts during the annual moult, feather sheath particles occur in large quantities significantly increasing the amount of material in the loft environment.

### **Transport of Pigeons:**

Inhalation of pigeon materials must be avoided wherever they occur. However, many flyers who keep their lofts scrupulously clean will sit in a closed car for hours with dozens of pigeons when going for a toss.

In an ideal world we would all have special vehicles for our pigeons. A utility where the humans and pigeons ride in completely separate compartments of the vehicle is ideal. However in the real world most of us have to make do with the same vehicle we use every day. Nevertheless there are steps which can be taken to minimize exposure when tossing:

1. Keep crates clean. Do not allow dust and feathers to build up. Periodically wash them out with water.
2. Put the birds in the car just before you leave and remove the empty crates from the car as soon as you return home. Keep to an absolute minimum the time that birds are in the car.
3. When birds are in the car maximise ventilation. Arrange airflow to carry pigeon materials away from your breathing zone. The best way to achieve this will depend on your vehicle. As a guide the following has been found to work well in the author's station wagon when carrying just the driver and birds. The driver's side windows are closed and both passenger's side windows partly opened. Dashboard air vents, which draw fresh air directly from outside the vehicle are aimed into the driver's breathing zone and the fan turned to its highest setting.
4. Do not allow dust to build up. Vacuum the vehicle interior immediately following the transportation of birds.
5. Use low dust fillings in the crates (see "Loft Litter" below).
6. Individuals who have had previous acute attacks of PFL it may find it necessary wear a mask when transporting pigeons in their car.

### **Loft Litter:**

The same recently published study referred to above (5) found that lofts using the deep litter method had significantly higher levels of pigeon materials than lofts cleaned regularly (usually daily). Litters used in the studied lofts included hay, woodchips, sawdust or sand to which lime may have been added. Further testing was done in a purpose built experimental loft using sand, sand and lime, woodchips, woodchips and lime, hay and sepolite. Highest counts were observed for sepolite, lowest for wood/lime as litters.

### **Other Hazards:**

Be aware that other materials in the loft environment can also cause respiratory problems. Nesting material, shavings and grain dust to name just a few can cause problems just as serious as pigeon materials and need to be controlled or protected against.

## **HOW TO MINIMISE YOUR EXPOSURE:**

### **Loft Design:**

Health and Safety professionals employ personal protective equipment to prevent ill health only as a last resort. Before resorting to respiratory protection devices you should consider if you can adopt "engineering" solutions to solve the problem. Designing lofts to minimize the amount of pigeon materials in the fancier's breathing zone should be the first strategy employed to minimize the problem.

Many flyers spend a great deal of time and money devising means of improving airflow for the birds. Unfortunately, the classical solution as to what is good for the pigeons, stale air being vented at ceiling level, fresh air being introduced at floor level, is probably not that good for the flyer. The air is drawn in past the droppings, past the birds, through the flier's breathing zone, and then expelled from the loft. Ideally the fresh air should pass through the flier's breathing zone before coming into contact with any pigeon materials, including of course the birds themselves. Some form of artificial direction of airflow would be necessary to achieve this. Fresh air, if necessary drawn through ducting from ground level, would have to be forced into the loft at ceiling level by mechanical means. Stale air should be extracted from the loft, taking as much dust as possible with it, at ground level. These exhaust vents should not be located anywhere near the intake vents.

The ease of implementing this will vary according the nature of your loft and the depth of your pocket. In warm climates where lofts usually have at least one wall that consists mostly of wire mesh or doweling, ventilation engineering is difficult (but not impossible). In colder climates where the loft is frequently entirely enclosed ventilation control is much easier.

Self cleaning systems are now in use in some lofts. They range in sophistication (and price) from elaborate automatic machinery to the now increasingly common wire floored loft. The author is not aware of any research done in this area but they appear attractive both from the health viewpoint as well as a significant time saving device. You need to remember that any system is only as good as its maintenance. The droppings etc. eventually wind up somewhere however they are removed from the loft. Make sure that you are not just shifting the problem from one area to another instead of solving it.

Lofts should be designed so that there are no areas where dust can become trapped and build up. In particular ensure that perches are not fitted flush to the wall. Leave sufficient space so that any pigeon materials deposited at the rear of the perch can drop to the floor.

## **PERSONAL PROTECTIVE EQUIPMENT:**

### **Respiratory Protection (Masks):**

A small scale study (six subjects) published in 1981 (6) indicated that respirators "can offer substantial, and in most cases, complete protection against single exposures to

environmental dusts that may provoke EAA." This study is encouraging but needs to be verified and extended by a larger scale study.

Masks come in a variety of shapes, sizes and types. It is vital that you get the correct type and that it fits you exactly. Even small leaks around a mask can result in exposure. For this reason the masks need to fit snugly. There is no point in wearing an ill fitting mask. Masks are designed to protect the wearer from specific hazards. Ensure that the one selected for use with pigeons is designed to protect the wearer against "dust." A mask designed to protect against other hazards will not protect against the inhalation of pigeon materials.

Unfortunately there are a number of sub-standard devices on the market which look good but do not offer adequate protection. The best way of checking that you have the correct type is to ensure that the mask chosen is designed for protection against "dust" as defined in Australian /New Zealand Standard 1715-1994 (7) or international equivalent

Storage of respirators is important. They must be kept in a location where there is no possibility of them being contaminated. A large dose of contaminant can be inhaled if the inside of the mask is unclean. It is pointless to wear a mask as protection from materials that are inside the mask.

Beards and moustaches can create difficulties in achieving a proper fit. If you have one it may be necessary to wear a different type of device. Under these circumstances it is advisable to go to a reputable supplier of industrial safety equipment and be personally fitted.

Masks however have the disadvantage of being uncomfortable and of not being worn. Even with the best intentions it is difficult to remember to put the mask on every time the loft is visited. This is especially true if it is intended to be there for a few minutes to attend to a particular chore, or as frequently happens, one just arrives at the loft with no conscious forethought. Thus, whilst it is relatively simple to protect yourself with a mask when you know in advance that you will be exposed to large doses of antigen (e.g. during cleaning) this is not a viable long term strategy for protection against small but frequent exposures if it is not worn on each and every occasion.

### **Protective Clothing:**

Family members can be at risk from pigeon materials brought into the house on flyers' clothing. There are recorded instances in the scientific literature of a fliers wife contracting PFL even though she had nothing to do with the pigeons (8). The most likely explanation is that be contamination by pigeon materials brought into the house on the fliers clothing is sufficient to affect another person exposed to the clothing.

The answer to this to wear an extra layer of protective clothing (overalls or a dust coat) when in the loft or handling pigeons and remove the clothing before entering the house. The contaminated clothes should be placed in a sealed container when not in use. Special

easily removed footwear should also be used to visit the loft e.g. a pair of thongs left outside the back door of the house.

The only time this protective clothing is taken into the house should be for washing. It should be taken direct to the laundry and washed immediately. Do not allow it to contaminate other clothing.

### **Personal Hygiene:**

Pigeon materials also build up on the skin. You should wash your hands with soap and water after handling birds and shower after cleaning the loft.

### **Pigeon Behaviour:**

The activities of the birds themselves can be a problem as they fly about inside the loft. Each downbeat of a bird's wings creates a powerful downdraught of air, consequently spreading dust. Lofts should be designed so that as far as possible pigeons must walk rather than fly when moving about internally and cannot escape when you wish to catch them. Training pigeons to accept your presence in the loft can also substantially reduce this flying about. A bonus is that you will find that this training has a positive effect on their racing performance.

The flock instinct makes wild behaviour spread rapidly through the loft. The occasional idiot that flies madly about whenever you enter the loft should be eliminated.

### **Frequent Baths:**

Provide baths as frequently as possible, preferably outside of the loft. This can substantially reduce the amount of atmospheric bloom in the loft. You cannot give the birds too many baths. They will regulate this themselves. There is one exception to this rule. Birds should not be permitted to bathe within three days of racing as they will not have sufficient wax in their wings to protect them should it rain.

### **Pigeon Numbers:**

Do not keep more pigeons than you need. The more pigeons you have the greater the amount of pigeon materials generated in your loft.

### **FUTURE DIRECTIONS:**

This guideline is based upon data gathered during a formal academic research project into respiratory disease in avian based industries conducted by the author in the School of Public Health of Curtin University of Technology, Perth, Western Australia. Constructive criticism and suggestions will be gratefully received. They should be directed to the author at 93 Lake Monger Drive, Wembley, Western Australia, 6014, Australia. Serious

academic or medical researchers are invited to contact the author at the above address or by Email: [primarch@bigpond.com](mailto:primarch@bigpond.com) for further details.

### **ABOUT THE AUTHOR:**

Gary Gleeson has formal postgraduate qualifications in public health and is the Principal Consultant / CEO of Easipets and the Primarch Stud. He raced pigeons for 37 years with considerable success, usually finishing high in his Federations "Flyer of the Year", competition and is a former Federation President and Life Member.

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#### Part 7: PARASITES

Pigeon Flies/ Bugs

Worms & worming medicines

Mites and Ear mites

SCALEY FACE, SCALEY LEG

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#### PIGEON FLIES: Common Treatments

Ivermectin - one or two drops on a bare patch of skin. Each bird within the same cage needs to be treated.

Tea Tree Oil - one or two drops on a bare patch of skin. Each bird within the same cage needs to be treated. Use in well ventilated area, make sure air temperature is less than 85f. Warm essential oil fumes can be hazardous to birds. It is important to note that ANY substance that kills, prevents, or treats a disease MAY also be dangerous to an animal, or yourself. Tea tree oil is poisonous to felines.

Or use 5% Sevin Dust (garden quality) - DO NOT USE 10% Sevin. Place some Sevin in brown paper bag & put bird into bag. Lightly tap bottom of bag & gently shake bag, this stirs the powder up & coats the bird to be "dusted".

The pigeon louse fly, *Pseudolychia canariensis* (Macquart), is a common ectoparasite of pigeons and doves. The louse flies (Hippoboscidae) are obligate blood-feeding ectoparasites of birds and mammals. Both adult males and females feed on the blood of their host. They are adapted for clinging to and moving through the plumage and pelage of their hosts. Strongly specialized claws help them cling to the hair or feathers of their particular host species. Pigeon flies retain their wings for their entire adult life. Others species are wingless (like sheep keds) or lose their wings once the newly emerged adults find a host (deer keds).

#### Distribution

This fly is an obligate parasite of birds, especially feral and domestic pigeons and doves (Columbiformes). It is found wherever pigeons are encountered in tropical, subtropical, and temperate areas with mild winters worldwide. It occurs throughout Florida and the Southeastern United States.

#### Identification

Pigeon louse flies are brown dorso-ventrally flattened flies that live among the body feathers of pigeons and doves. They are about the same size as house flies (5 to 6 mm head and body length, wings 6 to 7 mm) and are very slow fliers. They have a tough exoskeleton that protects them from being crushed by the grooming host.

#### Life Histories and Habitat

Louse flies have a very interesting reproductive strategy. The female produces one larva at a time and retains the developing larva in her body until it is ready to pupate. The larva feeds on the secretions of a "milk gland" in the uterus of its mother. After three larval instars, the larva has reached its maximum size, the mother gives birth to the white pre-pupa which immediately begins to darken and form the puparium or pupal shell. The pupa of the pigeon louse fly looks like a dark brown, egg-shaped seed. The pupa is found in the nest of the host or on ledges where the birds roost. When the fly has completed its metamorphosis, the winged adult emerges from the puparium and flies in search of a host.

#### Hosts

Both sexes feed on the blood of the host bird. Theodor (1975) reported that it occurs primarily on pigeons and doves and has been found on many other types of birds in the Old World. He also reported that it only occurs on the domestic pigeon in America. However, it has also been collected from morning doves (*Zenaida macroura*) in Florida. Pigeon flies very rarely bite humans. Usually it is when a person is handling live pigeons and the flies abandon the birds and land on the person. Occasionally pigeon flies bite people after pigeons have been excluded from a structure. Newly emerged adults that are unable to find a bird host may go to humans in desperation and bite. Pigeon flies cannot survive on humans and are not known to transmit any diseases to humans. Their bites are comparable to stable fly bites and can be a painful nuisance.

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#### MITES on FLIES

Pigeon flies are commonly parasitized by the mite *Myialges anchora* (Myialgesidae) in the Old World (Theodor 1975) and this mite likely occurs in the Americas. The pigeon fly is the vector and intermediate host for sporozoite production of the protozoan parasite of pigeons, *Haemoproteus columbae* (Haemoproteidae: Haemosporidia) (Soulsby 1968). This malaria-like parasite has minimal effects on adult pigeons, but can be fatal to young birds.

Bird biting lice in the suborder Ischnocera (Phthiraptera [Mallophaga]) are often found riding on hippoboscid flies. This is a phoretic association and the lice do not feed on the flies. The lice clasp the legs or setae of the fly's body with their mandibles and hitch a ride to the next bird visited by the hippoboscid fly.

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#### Parasites

Oddly enough, some parasites have been documented to occur within eggs. Adult ascarids (roundworms) have been found within eggs. These worms get into the egg by moving from the cloaca up into the oviduct, where the eggshell is then placed around the

aberrant parasite. The fluke, *Prosthogonimus ovatus* can be found in the oviduct of Galliformes and Anseriformes, and may also be trapped within an egg, but the flukes are more likely to result in abnormal eggshell formation.

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#### WORMS AND WORMING

Doves and pigeons should be wormed at least once per year. Some fanciers worm their flocks twice per year. Most instructions state that a second dose is needed about two weeks after the first dose to get any eggs which may have hatched. Some of the most often used medicines are: Tramisol and Piperzine. Tramizol (levamisole hydrochloride) is an oral, broad spectrum sheep wormer that is effective against stomach, intestinal and lungworms. Piperzine is a hog wormer. Using these two products in conjunction with each other rids the birds of most worms. Tramizol is effective against certain worms species that Piperzine fails to eliminate and visa versa. Example of use: use Piperzine first - added to the birds drinking water - about 1 ounce per gallon and then retreat with Piperzine again in 10 days to 14 days to catch any eggs which may have hatched. Give the birds a one week break and repeat the procedure with the Tramisol/ one tablet per gallon of drinking water (make sure tablet is completely dissolved in the water).

Organic worming: A drop of Tea Tree oil in a 1/2 cup of seed, dusted with no more than 2% by ratio of Diatomaceous earth to seed, (a pinch of food grade DE, the tea tree oil makes it stick to the seed) is a proven effective wormer. If the aviary is not well ventilated, or the temperature is greater than 85f, substitute Neem oil.

Neem oil glistened on 1/2 cup of seed and a garlic clove in the water may prevent or kill several parasites.

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MITES - can be found in the feathers, on the beak (scaly face) or legs & feet (scaly feet or legs). The mites burrow into the feathers or under the ceres or scales on the legs and feet of a bird. Noticeable by the appearance of a swollen cere that have tiny holes in them, eventually, if left untreated, the cere becomes encrusted. The legs and feet often swell and the scales protrude outward at an angle. It is contagious. Isolate and treat the "scaly" bird or treat all birds in the same flight. **DO NOT PICK OFF THE CRUSTED SCALES - LET THEM HEAL NATURALLY.** Best treatment is the use of Ivermectin (place a single drop on each infected area).

Ear Mites -

This mite attacks the ear of the bird. Using an "oily" substance over the affected area will "smother & kill" the mites within a day or two. Such substances are: Vaseline (smear over area); Campho-Phenique (liquid in a green bottle - just a drop in the ear canal).

Olive oil with a dash of Neem oil is an organic way to kill mites in scaley leg cases. The oil also makes the legs of the bird look shiny and clean, like a show-stopper.

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PARASITES: Other  
Ectoparasites

This caused by parasites that live on the outside of the host's body. Anaemia, feather damage, respiratory problems (air sac mites) and poor growth in young birds may all result from external parasite infestation. Where cases of anaemia or reduced performance and agitation are obvious in birds, external parasites should be suspected and regular visual inspection of the birds should be undertaken to identify the presence of ticks and lice. The lice and mites that infest pigeons are the feather louse, the small louse, the quill or feather mite, the itch, body mange, or depluming mite and the red mite.

Long louse (feather louse): found on the flight feathers and guard feathers of the whole body. Long lice do not cause many problems since they feed on feather scurf and do not damage the feathers as was previously thought. Sick birds that are not able to control the lice are susceptible to heavy infestations. Young birds may have particular problems with this louse. The lice can easily be seen by spreading the wings. In heavy infestations the lice may be seen on the neck, head and back.

Small louse: it is small and round. It also feeds on feather scurf but does more damage than the long louse, causing much irritation (prickling, burning). The small louse must be controlled. It is found on the underside of the guard feathers on the throat. Free flight helps to keep these lice under control, since they are shy of the light. Feather or quill mite: it is the most important of the mites. It sits on the feather shaft of the flight feathers, especially the wider ones. It does not destroy feathers but causes much irritation. Feather mites can be best seen if the wing is held up to the light; they appear as small black specs on the sides of the shafts.

Itch mite: these mites cause feathers to fall out and are very dangerous. They burrow through the feather shaft into the follicle. If fallen feathers have a swollen root, itch mites may be the probable cause. The feather shafts swells and the feather is shed. Small pale spots appear on the undersides of feathers on the breast, wings, back and neck.

Red mite: it will not be found by examining the pigeon. During the day the mites hide in nooks and crannies in the cote and come out at night to suck blood. The mite causes irritation and damage through bloodsucking (hence the red colour). Pigeon and bird ticks and red bird mites can be detected with the naked eye in cracks in the loft - ideally in the early hours of the morning, when the parasites leave the birds in search of a hiding place. They are also found under feeding troughs and nest bowls.

Mange mites and scaly leg mites can be identified by a scraping from the skin

Control of ectoparasites

Clean feed and water vessels with hot water. Regular bathing in clean water - at least once a week - protects pigeons against parasite infestation. Administer Ivermectin injection or orally to the birds regularly and bathe the bird (below the neck) once in a month with Borax, or Pestoban added to the water.

The period of development and lifespan of the parasites is temperature-dependent. The times specified will therefore vary accordingly.

#### Endoparasites

There are parasites that live inside the body. The most important parasites in pigeons are the round worm, the threadworm and the fluke.

#### Roundworms:

The fully-grown roundworm lives in the small intestine and is approximately 2 inches in length. The female worm can lay hundreds of thousands of tiny eggs, which are visible only under a microscope.

The eggs are excreted in the pigeon's droppings. Outside, the eggs require 14 days to become infectious; they must first ripen. Any eggs taken up by another bird in this 14-day period will not develop. However, if the pigeon takes up eggs that are ripe, larvae will hatch from the eggs in the intestines. The larvae burrow into the walls of the intestine, where they stay for sometime.

The amount of damage caused by these worms depends on the degree of infestation. A single worm will not do much damage but a large number of worms blocking the alimentary canal can prove fatal. A pigeon should not have a single parasite in its body. The worms take a large proportion of nutrients from the pigeon and produce toxins that prevent normal digestion. The food does not stay in the intestine long enough to be digested, and this results in diarrhoea. In slight infestation, little or nothing will be apparent to the observer, but in serious infections, the pigeon will lose weight, have diarrhoea, molt badly, and quickly fatigue.

Should worms, about 2 inches in length, be seen in the droppings, you can be sure that the bird has a roundworm infestation, but in most cases the worm is not seen.

To prevent worm and other manifestations, strict hygiene in the pigeon cote is required. Floors, boxes, and perches should be kept very clean. The worm eggs are very resistant and difficult to eradicate. They require a damp medium at normal temperatures in which to ripen; in times of warm, damp weather, the worm eggs stand a much greater chance of ripening. They are less resistant to dryness. To destroy the eggs, the best method is to sanitize the floor with a blowtorch. To prevent infestation in the cote the pigeons should have their food served in clean containers.

#### Threadworms:

Threadworms are as thin as a thread and hardly visible to the naked eye. The threadworm lives in the walls of the intestines and, in spite of its much smaller size, can do more damage than the roundworms.

The worm eggs require similar conditions to those of roundworms to ripen-that is a certain amount of time in a damp medium before they are picked up by a pigeon and can develop further.

The symptoms of threadworms infestation are similar to that of roundworms and so are the preventive and hygiene measures to be taken.

Intestinal flukes:

they occur only in grassy areas. The pigeon can become infested only if it eats infested snails that live in such areas. The parasite is flat and almost as wide as it is long. It lives on the walls of the intestines and holds on tightly by biting, causing much damage. Blood vessels are destroyed and haemorrhage occurs. This can be so serious that a pigeon can die from blood loss in a few hours.

To prevent further infestations, do what you can to keep the birds from areas where the infested snails are. This is a difficult task. Take care that the young bird does not fly out with the adults.

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## Part 8: INJURIES

### Cat Victims

An antibiotic should always be given to suspected victims of cat or dog bites.

With "cat-caught" puncture wounds it is particularly important to ensure that antibiotics are likely to be effective against *Pasteurella multocida* as infection with this organism is very common. If antibiotics are not administered within 24-48 hours exposure to a cat bite, the injured bird will die from infection.

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### Broken legs

Providing they are mid shaft, they will mend easily in a few days, given the correct support.

For pigeons, wood pigeons, collared doves:

Wooden lollipop sticks are very cheap and can be used straight or cut and made into an L shape by using sticking plaster wrapped around the cross over.

Measure the leg and cut the stick accordingly.

It is much easier to strap a bird's leg if it has been anaesthetized. Use a small mask with tissue or swabs pushed in around the beak to prevent leakage.

### Anaesthetic

Use Isoflurane, as low a dose as possible. If this is not possible it then becomes a two person job as the bird will have to be held very firmly.

Make sure the leg is clean and any blood or dirt has been wiped away and dried. If the bone is sticking out straighten the leg so the bone is in the correct position.

Put a little Intracite gel on the wound cover with gelfnet and then wrap the whole leg with one layer of softban.

Place the splint on the outside of the leg; if it is the lower part of the leg a straight splint from ankle to knee will suffice, making sure the splint is longer than needed at the knee. Secure the whole thing with a thin net bandage, making sure that the toes are free to move and can be checked for swelling or reflex.

The piece of splint sticking out at the back of the knee can have the bandage anchored around it, and you will be able to see if the splint is slipping.

Lastly wrap a piece of band aid around it for extra support and anchorage at the top. If it looks too heavy or clumsy, remove and try again.

If it is the thigh bone use an L shaped splint, the cross over being at the knee. Apply in the same way, ensuring it doesn't poke into the birds body at the top by bandaging over the end.

Another way is to use the mesh Plaster of Paris bandage that one soaks in hot water.

This can be moulded over and around the leg, having first covered the leg in softban.

The back toe of the bird can be poked through the mesh and this proves useful when a bird has a break just above the foot.

Check the splint every day to make sure it isn't too tight (swollen foot) or rubbing any other part of the body.

#### Antibiotics

If it was a compound break antibiotics should be given:

Adult Feral Pigeon and Collared Doves

#### Wood Pigeons

The splint can be removed after 10 days and a supporting bandage applied.

If the bird appears to have no pain reflex when the toes are pinched, it is still worth splinting the leg as I have found the reflex returns after a few days.

Pigeons can get into all sorts of scrapes, but if the injuries do not ultimately affect their flying ability, they can recover well with a little care and attention.

Broken legs can be mended with a simple splint, from lollipop sticks to the more sophisticated honeycomb type plaster of paris bandage.

If the leg isn't quite as straight as it once was, providing the bird can fly well it will manage; there are many one legged pigeons around to prove it.

#### Broken wing

Any bird with a broken wing needs to be assessed carefully.

#### Simple fractures

If it is a clean break mid shaft it may be possible to strap the wing to the body. It will need to be strapped for 2 weeks.

Use Micropore as it is low tack and if removed carefully there will be few feathers lost.

#### Compound fractures

These will need an antibiotic cover. Use 0.1 Duphamox LA or 0.1 Baytril 2.5% for 5 days.

Small garden birds with broken legs can be splinted with drinking straws. Mid shaft breaks only.

If you cut a length of straw to fit the leg and slit the straw lengthways wrap it around the leg making sure the break is well supported.

Secure the straw with something sticky like micropore top and bottom.

Leave on for 5-7 days, remove carefully and hopefully the leg will be set. If not, splint it again for 5 days.

Owls and other birds of prey with broken wings need special attention from a licensed veterinarian.

If the wing mends badly and the bird cannot hunt efficiently they will starve.

If the break is mid shaft it can be mended but has to have an external fixing, so one can make sure the wings are the same length.

This involves anaesthetising the bird with Isoflurane and stitching a splint on top and underneath the wing, along the length of the broken bone.

The plungers of 2 or 5 ml syringes are excellent with a bit of altering.

Take two identical plungers and alter both by remove one lengthways ridge, the thumb plungers and the rubber bits on the other ends.

Heat a needle and push holes through the flat shafts, make three or four on both sides, making sure both match up.

If the ends of the cut syringe are sharp wrap them round with band aid or similar. Put these each side of the wing and stitch it through on either side of the broken bone.

X-ray the wing to make sure the bone is in line; if so leave on for at least 2 weeks.

Check daily for sore places or for slipping if the wing was swollen and this is now reduced.

Keep the bird in an enclosed cage for a day to check it is coping and then allow it into a large pen where it can perch and clean its feather properly.

If they are kept in small cages they spoil their tail and flight feathers and are unable to hunt proficiently when released.

Antibiotics will need to be given for 5 days, 0.1 Baytril 2.5% or 0.1 Duphamox LA.

If the break is on the joint or too near the body the bird will probably never fly again.

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Eye injuries

Damaged eyes can be treated with Fucithalamic ointment twice daily and washed with colliodal silver.

Gun shot wounds

Air rifle and shotgun pellet wounds can be cleaned out and packed with a small piece of gauze soaked in Proflavine.

The dressing needs to be checked daily and changed every 2-3 days.

Antibiotics need to be given, to prevent infection, but the wound should heal from the inside out in time.

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Deep wound and burn cleaning

#### Initial inspection and cleaning:

Careful inspection should be carried out for the presence of fly eggs or maggots and action taken to remove these.

For birds, feathers around the wound may be cut or may be plucked gently. Plucking will encourage regrowth of feathers; if feathers are cut they will not regrow until the next normal moult. The minimum area should be plucked and great care is required to avoid tearing the skin.

Plucking of feathers is painful; this may be best carried out on an anaesthetised bird if more than a few feathers are to be plucked.

Care should be taken not to damage the feather follicles and thereby prevent proper regrowth of feathers. This is imperative for the flight and tail feathers of birds of prey, and any other species with a high dependency on flight such as swifts and swallows. If there is any doubt, such important feathers should not be plucked until absolutely necessary (which could be due to damage to blood feathers or the proximity of physical damage).

It is important to minimise the area of feathers removed as these provide the bird with its protection against weather and water and loss of feathers may delay release until the feathers regrow.

The wound should be cleaned using a non-irritant antiseptic solution. Povidone iodine 0.5% solution is suitable. Savlon diluted 1:20 in water may be used. Product such as Dettol and TCP should be used only a last resort as they sting severely on open wounds. For extremely contaminated wounds, thorough flushing with sterile normal (0.9%) saline is recommended. When this is not available a suitable substitute saline solution may be produced by dissolving one teaspoon of salt in a pint of water (preferably boiled and cooled).

Hydrogen peroxide, diluted 1/10 with water, may be used for flushing contaminated wounds such as abscesses.

Considerable debriding of wounds may be necessary to remove contaminated and devitalised tissue. Anaesthesia will often be necessary for this process as it will often be appropriate to remove the damaged tissue as far back as to where there is an effective blood supply (and thereby usually pain sensors) to encourage healing.

Home Remedy: Mix 2 tablespoons of tumeric, and one or half table spoon of cooking oil. Sunflower, canola, etc. Mix it up so its a liquidy paste. Use a Q-tip and first wipe the wound with colodial silver. Then dress the paste all over the wound and surrounding tissue. It is messy, and your pigeon will look yellow, but it has worked wonderfully closing deep, necrotic, or open puncture wounds.

#### Suturing:

Puncture wounds should never be sutured.

Suturing may be appropriate with fresh lacerations or with older lacerations if the tissue deficit following debridement is not too extensive.

Absorbable sutures should be used to avoid the necessity for additional handling to remove sutures. Use the proper size of suture for the animal being treated.

Consideration should be given to wound drainage; the placement of a drain may be required.

Care must be taken to avoid attempting to suture wounds with a large tissue deficit which would place excessive pressure on the wound.

Encouraging healing by secondary intention:

In many cases it may be necessary to leave the wound to close by secondary intention.

The application of topical preparations that encourage epitheliogenesis (stimulate healing) may be useful, e.g. Intrasite Gel (Smith and Nephew).

Where possible, the use of dressings which promote healing may be used.

Many wild animal casualties, particularly adult mammals, may not tolerate dressings and bandages.

Antibiotics:

All wounds in wild animals should be considered to be contaminated and appropriate antibiotic treatment instigated.

Species/Group specific considerations:

In waterfowl:

Insect repellent should be applied to avoid myiasis (Maggots).

Systemic and local antibiotics should be given

Simple skin wounds may be cleaned, debrided as necessary, and sutured with non-absorbable sutures.

Freshly created (within eight hours), uncomplicated wounds should be treated by primary closure with anticipated first intention healing; however, this is not appropriate for the treatment of open, contaminated wounds.

Deep wounds should not be sutured. Remove necrotic tissue, flush twice daily, ensure ample drainage.

Small open wounds usually granulate if kept clean and fly-free.

Bite wounds should not be sutured.

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### OVERGROWN BILL

You can trim the beak back to near normal with a scissors or clipper. It is a genetic condition that needs study.

I use a pair of toe nail clippers and clip the top of the beak to match the lower beak. I put pick pots in the lofts and it has helped to keep the beaks trimmed.

Serve seed in a Matate to trim the beak naturally.

(The matate and mano are the Spanish names for the commonly used mortar and pestle.

The matate, or mortar, is a hollowed-out stone bowl used for grinding corn, seeds, and acorns. The mano, or pestle, is the smooth, cylindrical stone used to pound the seeds and grains.)

P.S. - if any type of clippers or scissors are used make sure you do not crush the bill when clipping or cutting it; also make sure you do not accidentally clip the vein that in in the bill (many times holding the bill under a strong light one can see the bill vein). A battery operated nail file or dremel wheel can trim the beaks.

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POISONING IS VERY SERIOUS.

The poisoned bird may vomit, have difficulty breathing, have a seizure or fall into a comma. If your bird has gotten a poisonous substance into its eyes, wash it out immediately with slightly warm water. If the bird's skin has been in contact with a toxic substance, flush it with large amounts of water.

Call your veterinarian immediately to let him know you are on your way in with a poisoned bird. Since the bird may go into shock, keep it quiet and calm until you reach the vet's office. If your vet is not available, call your local poison control center for assistance on dealing with your bird.

1. Remove the poison to prevent further ingestion.
2. Keep the bird quiet and warm.
3. Get immediate veterinary care.
4. Bring a sample of the suspected poison, any vomit, along with the most recent droppings.

If no veterinary care is immediately available, the bird is conscious, and you are sure that the poison was ingested and not just played with, the following medication can be given to coat the digestive tract and help prevent absorption of the poison.

#### TRY ONE OF THE FOLLOWING:

-Raw egg white mixed with Kaopectate or Pepto-Bismol

-Activated charcoal mixed with a few drops of mineral oil and enough water to give it a pasty consistency

NOTE: These can be given (dosage for a cockatiel would be 1-2 cc (1/5 to 2/5 tsp.) slowly with a plastic eye dropper or may have to force feed with a tube.

If any problems are encountered with the administration, STOP immediately.

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#### Homeopathic Success in Treating Poisoned Wildlife:

Most wild animals affected by poisoning are believed to die in the wild without any medical care; and, unfortunately, even many poison cases admitted to rehabilitation have been fatal.

In the last couple of years, some wildlife rehabilitators trained in Classical Homeopathy and working in collaboration with veterinarians have seen positive results in the use of homeopathy with some wild animals that were exposed to toxins. A sample of such cases follow.

#### Scrub Jay with Gastro-intestinal Problems

A homeowner spraying weeds with the herbicide Round-up™ accidentally drenched a Western Scrub Jay (*Aphelocoma californica*) nestling. The homeowner rushed the juvenile bird to the local wildlife rehabilitation center. Examination showed that he was dehydrated and had brown, smelly diarrhea. His vent was caked with feces. He was thin, lethargic, and did not gape when offered food. The rehabilitator placed him on heat, began hydrating him with lactated ringer's solution, and cleaned his vent.

The rehabilitator called the state Poison Control Center for treatment information. She was told to wash the bird, but no other treatments were suggested. She washed the bird and continued the rehydration. She prepared a thin diet used to force feed underweight,

non-gaping birds and supplemented it with a bacteria beneficial for birds with diarrhea. She force-fed the mixture to the bird as soon as it was fully rehydrated. After conferring with a veterinarian, she started the bird on Amoxicillin®.

The next day, the bird began to gape but less often than normal and was periodically force-fed to supplement the diet he took in voluntarily. He was continued on the same diet and medication throughout the day. While hydrated, the offensive smelling diarrhea continued. He remained underweight and lethargic. Late afternoon of the third day, a rehabilitator familiar with homeopathy came on duty and, finding his condition had not improved, she reviewed the case and, using Repertory of the Homeopathic Materia Medica (Kent) and Homeopathic Medical Repertory (Murphy). The rubrics used were:

Rectum; diarrhea; general; children, in

Generalities; weakness; diarrhea, from

Stool; odor; offensive

Stomach; appetite; diminished

Generalities; emaciation; children

T; Toxicity; chemicals, hypersensitive to

After reading the four homeopathic remedies with the highest scores to determine the best match, the rehabilitator selected Arsenicum album at a 30c potency. After conferring with her homeopathic veterinarian, she administered the homeopathic remedy in the late afternoon. The next morning the bird was gaping and eating willingly, but still had diarrhea. By afternoon, there had been no further improvement and the Arsenicum album 30c was repeated. By the next morning the diarrhea had stopped but the bird was still lethargic. The Arsenicum album 30c was repeated a third time. By afternoon the bird was behaving normally. He began to grow normally, fledged, and was provided prerelease conditioning in a flight cage. The fully recovered bird was released back to the area where it was found.

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#### Birds with Arching Backs and Convulsive Movements

An adult American robin (*Turdus migratorius*) was delivered to a wildlife rehabilitator in June. The rescuers explained that they found the bird lying in the middle of their yard. They suspected toxins since a nearby golf course had been intensively spraying pesticides on the trees and grass in recent days.

The rehabilitator examined the robin. The bird had rapid and difficult breathing and was shivering and trembling. She also was severely uncoordinated and her head nodded forward. She intermittently arched her back and neck, and had clenched legs and toes. She had dilated pupils and had a dazed look in her eyes. Her eyes alternated between staring and rolling back and forth. She was also vocalizing and had some diarrhea.

The rehabilitator had taken dozens of similar cases to several different veterinarians who indicated that such convulsive seizures after a suspected pesticide exposure were extremely difficult to treat. They had tried a wide variety of treatments, but the birds often died or had to be euthanized within a few hours. The veterinarians were supportive of her trying holistic treatments for possible poisonings, but were not optimistic.

The rehabilitator examined the case of the American robin using the Repertory of the Homeopathic Materia Medica (Kent). The rubrics she used were:

Back; convulsive, spasmodic drawing; cervical region, head bent back

Generalities; convulsive movements

Vertigo; fall, tendency to; forward

Respiration; difficult

Eye; staring

Eye; movement, eyeballs; convulsive

Extremities; contraction of muscles and tendons;

Head; motions of head; convulsive

Eye; pupils; dilated

The rehabilitator reviewed the eleven top remedies in the *Materia Medica with Repertory* (Boericke). Only one of the top eleven remedies seemed to be a close match: *Cicuta virosa*. It covered the back bent like an arch, the violent convulsions, respiratory difficulties, and eye symptoms. The rehabilitator dissolved the *Cicuta virosa* 30c and administered it orally. The convulsions stopped almost immediately, but resumed in 30 minutes. The *Cicuta virosa* 30c was repeated. Again the convulsions stopped, and then resumed, but they were a bit less severe. The *Cicuta virosa* 30c was given a third time. The convulsions stopped completely. The robin recovered fully and was released after being carefully monitored for any abnormalities for two weeks.

In a case similar to the American robin (above), a Rock dove (*Columba livia*; pigeon) was admitted after being found near an office building the owners of which had a history of trying to destroy pigeons by putting out corn laced with poison. The rock dove had similar symptoms to the American robin except it had a rapid increase in body temperature with the arched back and held his wings over his back. *Cicuta virosa* 30c was given twice (over a short period of time, based on Classical Homeopathic principles). The bird improved, but then the symptoms changed: the back was no longer arched, and the bird's eyes were no longer dilated or moving, but locked in a fixed stare. The rehabilitator repertorized again and selected *Cuprum metallicum* as the closest match. She gave the remedy in a 30c potency. The symptoms disappeared in 30 minutes. The bird recovered fully within hours. After being monitored in a flight cage for a week, the bird was released.

In the several years since these two cases, the rehabilitator has admitted over 150 birds with similar symptoms. Over seventy percent of those birds with similar suspected pesticide exposure with accompanying arching backs and seizures recovered and were eventually released after two to four doses of *Cicuta virosa* 30c, and occasionally *Cuprum metallicum*.

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## SPLAY LEG

The following treatments are from Helen Fahlsing, a great bird rehabber, in Texas. Helen's techniques can be used on most any specie of bird with excellent results. Check out Helen's web for tons of information.

I use several techniques to correct splay leg - depending on the age of the bird, severity and direction of the splay. Occasionally positioning the legs suspended under the birds body and propping the bird up in a padded container will be sufficient to re-align the legs. if this is not sufficient - other techniques are described below.

If you get the chick early enough, you will usually notice improvement within a few days. Some birds have responded in a few as three days - others have had the braces on for several weeks with no signs of improvement. Of course, the cause of the splay is going to have some bearing on the amount of time and the quality of improvement that can be expected. The severity of the splay and the age of the bird are also critical factors. None of these methods will work if the legs or hip sockets are deformed. This is why x-rays are so important when improvement is not readily noted. The x-rays may indicate a need for more intense splinting by medical personnel or surgery.

Once you find a chick with splay leg you need to start investigating the cause - lack of calcium, poor positioning in the egg, genetic deformity, trauma, were the parents sitting "too tight" (most often seen in the coldest part of winter) and the most common reason - nothing on the bottom of the nest box/container for the little feet and toes to hold onto. The weight of the chick pushes the legs out to the side.

1. If the chick is young enough, and the symptoms of splay leg are just beginning to show, simply placing a non-slip vinyl mat in the nest box may give the chick enough traction to correct the splay on it's own. For additional support, stuff a long sock full of sand and clip the top and bottom of the sock together in a donut shape. Place the 'sock ring' 'nest' on top of the mat and place the chick in the sock ring. Check for improvement within 24 hours.
2. Using a soft rubber (vinyl) medical tubing (purchased from a medical supply store); cut small pieces the length of the leg. Slit the cut pieces lengthwise so it can be opened and wrapped around the leg (one for each leg if this is the case). This makes a little soft rubber "cast" or leg support. DO NOT use the clear oxygen or fish air tubing, this can rub on the legs, cutting the fragile skin and leave open wounds. Cut a narrow piece of vet wrap (or any self-sticking elastic bandage) 4 to 8 inches long (length is determined from the size of the bird). "FIGURE-8" this wrap around the two legs, crossing in the middle. Go around one leg, cross in the middle, around the back of the other leg, cross in the middle, etc. continue until you have enough thickness in between the legs to keep them in a natural spacing. DO NOT stretch the wrap and pull it to tight, this may restrict circulation in the legs.

When using this method, you may have to prop the bird in a bowl padded with an absorbent material. I prefer using an appropriate sized flower pot with an old cotton wash cloth to pad the inside of the pot and it's rim. You could also use the 'sock ring', or washcloths or pieces of cotton diapers to make small "bed rolls" to hold the youngster in an upright position. Make sure you remove the braces at least once a day and check the circulation in the legs. Make sure the braces aren't too tight and rubbing sores on the legs. This is also a good time to do a little "physical therapy" by rubbing the legs, submerging them in warm water and working the toes, bending the knees, etc.

3. Using a small piece of a styrofoam meat tray, cut into a square (about 2" square - size again depends on the size of the bird). Cut a couple of small holes/openings in the middle of the square so that you can pull the feet through. This will work to keep the legs in

alignment until you can gather supplies for a better system. Remember that the styrofoam can rub sores on the ankles and older chicks will take an intense interest in pecking at the little white pieces of styrofoam. In lieu of pulling the feet through the holes, you can use paper surgical tape to tape the feet flat on the surface of the styrofoam. This will also work if you are working with toes that are out of alignment. This is only a stop-gap method.

Bubble wrap (the plastic bubble material used for packing breakables) can also be used as a temporary measure similar to the styrofoam. Pull the legs together in bubble wrap and secure with tape. Make sure you put something for spacing in between the legs. Also, remember, this is plastic and will not allow the skin to breathe. Remove a couple of times every day and allow the legs to "air dry."

4. Apply leg bands to both legs and use dental floss to tie the bands together, pulling the legs into alignment. Remember to put a folded piece of soft material such as sponge or gauze between the legs to keep them from pulling too close together. This is by far the easiest of the methods I use, however, it may also contribute to some "knee" deformities by pulling the legs too close together at the ankles. This is why a "spacer" between the legs is so important. Also observe closely for open sores where the bands rub the legs. You want the bands tight enough so the feet don't slip out, but loose enough to allow for good circulation. I find the small plastic spiral bands work for the tiny birds - or the colored plastic spiral bands (usually used for chickens and poultry) work for the larger birds or older chicks. Make sure the bands you put on are OPEN bands so they can easily be removed.

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#### String Injuries

String, cotton thread, fishing line, etc. can cause grave damage to pigeons' feet. String may cause loss of toes or entire foot. Infections can spread from foot through leg and beyond.

At a distance, birds may be seen attempting to walk and falling over. This may have various causes, but one can be feet tied together with thread. Feet with blackened, swollen parts may be a sign of embedded thread.

#### Treatment:

In cases of recent entanglement, and fairly loose thread, this can be relatively simple. When thread is embedded or of long-standing, it can be a delicate process. In the worst cases, the solution may be to have the entire foot amputated below the 'ankle' joint.

Many tangles can be resolved with a small kit comprising such items as a seam splitter, small nail scissors, and small tweezers.

Before you start examine the foot carefully. Yellow bits are a sign of infection that will need to be treated with antibiotics.

Blackened flesh is dead and dangerous to poke about in as it could cause a severe bleed. If the string has done significant damage to the foot then it might be a good idea to take it to the vet who will have specialised instruments to do the job and also be able to provide emergency treatment if there is a bleed.

I usually start by rubbing Bach Rescue Cream (available from Boots and Neals Yard in the UK) into the foot, this softens any muck and, in my experience, also loosens the string, probably because it reduces swelling.

I often have to improvise but these are some of the things I use when treating string injuries:

- \* Baby scissors with blunt ends, because these can be used to snip thread that is embedded into the skin without cutting the flesh.
- \* A seam splitter (a dressmaking tool for picking stitches which has a blunted end) for separating the thread from the flesh before cutting it.
- \* Antibacterial cream to rub in the wound.
- \* Painkiller - I use a single drop of Metacam (available from the vet) in the inside tip of the pigeon's beak as a painkiller
- \* Cotton buds, sterile gauze and cornflour to treat minor bleeds.
- \* A pair of small sharp scissors to cut the thread.

When you examine a bird always ensure that the head is raised so that there is no danger of regurgitation that could cause it to aspirate and die. It sometimes helps to lay a piece of gauze over its face to reduce struggling.

In a lot of cases the thread or string is visible and therefore quite easy to remove just by patiently snipping and unwinding. It sometimes takes several goes, with rests for the pigeon and the rescuer in between. I always cut the bit that links the feet together first, so that if the pigeon escapes it is that little bit better off. Then I start with the loosest bits, snipping and gently

unwinding, taking care not to pull so that the thread doesn't cut further into the flesh.

If there is any bleeding at all I stop what I am doing, apply direct pressure to the area and hold the foot up in the air to inhibit the blood flow. For major bleeds I have had to use a tourniquet, but the pigeon has also needed treatment for shock.

When all the thread is removed I treat open wounds with antibacterial cream, otherwise I rub Bach Rescue Cream into the foot immediately and continue to do that 3 times a day. I usually keep the pigeon for some time after the string removal, to treat any other related problems. Sometimes the thread or string will tie the back toe inward, or twisted other toes and splinting will be required. The only times I release immediately is when

there has been no damage to the foot because it has been caught early enough.

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## Part 9: HAZARDS AND TOXINS TOP TEN TOXIC FOODS

### 1. Chocolate

Chocolate is a wonderful treat to share with human family members, but it can be harmful or fatal to your pet bird. Chocolate poisoning first affects a bird's digestive system, causing vomiting and diarrhea. As the condition progresses, the bird's central nervous system is affected, first causing seizures and eventually death.

## **2. Apple Seeds**

Believe it or not, apples - along with other members of the rose family including cherries, peaches, apricots, and pears - contain trace amounts of Cyanide within their seeds. While the fruit of the apple is fine for your bird, be aware that in addition to the poisonous seeds, there may be pesticides present on the fruit's skin. Be sure to thoroughly cleanse and core any apple pieces that you share with your bird to avoid exposure to these toxins.

## **3. Avocado**

The skin and pit of this popular fruit had been known to cause cardiac distress and eventual heart failure in pet bird species. Although there is some debate to the degree of toxicity of avocados, it is generally advised to adopt a "better safe than sorry" attitude toward them and keep guacamole and other avocado products as far away from pet birds as possible.

## **4. Onions**

While the use of limited amounts of onion or garlic powders as flavorings is generally regarded as acceptable, excessive consumption of onions causes vomiting, diarrhea, and a host of other digestive problems. It has been found that prolonged exposure can lead to a blood condition called hemolytic anemia, which is followed by respiratory distress and eventual death.

## **5. Alcohol**

Although responsible bird owners would never dream of offering their pet an alcoholic drink, there have been instances in which free roaming birds have attained alcohol poisoning through helping themselves to unattended cocktails. Alcohol depresses the organs of birds and can be fatal. Make sure that your bird stays safe by securing him in his cage whenever alcohol is served in your home.

## **6. Mushrooms**

Mushrooms are a type of fungus, and have been known to cause digestive upset in companion birds. Caps and stems of some varieties can induce liver failure.

## **7. Tomato Leaves**

Tomatoes, like potatoes and other nightshades, have a tasty fruit that is fine when used as a treat for your bird. The stems, vines, and leaves, however, are highly toxic to your pet. Make sure that any time you offer your bird a tomato treat it has been properly cleaned and sliced, with the green parts removed, so that your bird will avoid exposure to any toxins.

## **8. Salt**

While all living beings need regulated amounts of sodium in their systems, too much salt can lead to a host of health problems in birds, including excessive thirst, dehydration, kidney dysfunction, and death. Be sure to keep watch over the amount of salty foods your bird consumes.

## **9. Caffeine**

Caffeinated beverages such as soda, coffee, and tea are popular among people - but allowing your bird to indulge in these drinks can be extremely hazardous. Caffeine causes cardiac malfunction in birds, and is associated with increased heartbeat, arrhythmia, hyperactivity, and cardiac arrest. Share a healthy drink of pure fruit or vegetable juice with your bird instead - this will satisfy both your bird's tastebuds and nutritional requirements.

## **10. Dried Beans**

Cooked beans are a favorite treat of many birds, but raw, dry bean mixes can be extremely harmful to your pet. Uncooked beans contain a poison called hemagglutinin which is very toxic to birds. To avoid exposure, make sure to thoroughly cook any beans that you choose to share with your bird.

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### **HOUSEHOLD HAZARDS FOR THE PET BIRD**

There are many things located in every home that can be fatal to a bird. The following list is a starting point for "Bird-Proofing" your home. After you've read this, see also The Top Ten Bird Killers from [ExoticPetVet.net](http://ExoticPetVet.net) for other dangers to your pet bird.

Teflon is THE most dangerous thing a bird can encounter! If Teflon is heated to 500 degrees or begins to burn, the resultant fumes can instantly kill a cockatiel. I've heard of one woman losing all of the birds in her house (6 of them) at the same time because a Teflon pan was left burning on the stove. Therefore, use only untreated stainless steel, glass, or ceramic cookware in your home. And always turn on the stove vent or fan when cooking to eliminate cooking fumes. Like carbon monoxide, Teflon fumes are odorless and invisible. It travels through the air unnoticed. In humans, it causes flu-like symptoms and in birds, it kills. There are household items that you may not think contain Teflon but do.

Certain plastic oven cooking bags (Reynold's and Durkee Cooking bags) may contain Teflon, as well as room space heaters, woks, self-cleaning ovens, hot air popcorn poppers, bread makers, laundry irons, pizza pans, waffle and pancake grills, and hair curling irons may also have a Teflon coating. If not sure, contact the manufacturer.

### **Toxic Foods and Chemicals**

Caffeine, chocolate, alcohol and avocado should NEVER be fed to a bird. Chocolate, coffee, and cocoa contain theobromine, which is very toxic to birds. Do not give these to

your birds and do not leave them out where your bird could get to them. Avocado is highly toxic. Guacamole can kill your cockatiel. Onions should also be avoided. Salt: Even though Birdie, our cockatiel just loves a salty potato chip or corn chip, parrots cannot excrete salt the way we can. High-salt foods can be harmful to them. An occasional nibble from a chip might be okay, but don't let them get into the habit. Junk food is not good for your bird. Avoid high-fat, high-sugar, high-salt snacks. Once in a blue moon won't kill them, but beware of always giving foods like this, and always provide water if your bird does occasionally eat these items. Parrots can get into bad habits just like humans. Resist the temptation to give in to them even if they "beg" for your chips.

Alcohol: Although it seems obvious, I will state it nonetheless. Do not give alcoholic beverages to your bird under any circumstances. It is cruel, not amusing, to get your bird drunk. Their liver cannot metabolize the alcohol. Nickel or lead plated jewelry is also toxic and lead can be fatal, so keep the bird out of your jewelry case.

Household cleaners, paints and glues: Please remember to read the directions on any spray you use in your home and exercise common sense. Do not spray things directly on pets or their bedding or cages. Air out rooms before returning birds to them no matter WHAT you use to clean. A more comprehensive list on toxic cleaners and scents can be found at: <http://www.parrotparrot.com/birdhealth/alerts.htm#scents>

There are also certain poisonous plants to keep away from your birds. Just remember, anything that emits fumes or scent can potentially be dangerous to your bird.

Toxic plants can be found at [www.cockatiel.com](http://www.cockatiel.com). Also do not give seed pits: almond, apple, apricot, cherry, peach, pear and plum, to your bird.

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Scented Candles, Potpourri and Essential Oils

Smoke of any kind is hazardous to a cockatiel's little tiny respiratory system. Some of the fumes emitted by scented candles can kill them as well. The hot wax from the candle is also dangerous and will burn the bird if she comes too close to investigate. Potpourri can also look very enticing to a bird, but the perfumes and oils used to give it scent are definitely poisonous if ingested. Plug in air fresheners are also a "no-no". If you are into the "holistic health" trend, please do not burn essential oils near your bird. Birds can succumb upon a single exposure if they are kept in a confined space where they cannot escape the fumes. Tea tree oil fumes are particularly hazardous to birds.

Also, do not add tea tree oil or other similar products to the water of humidifiers.

Cigarette Smoke, Nicotine & Tobacco

Never, never, never smoke in the house if you have a bird. Second hand tobacco smoke is bad for everyone, including pets. Avian veterinarians say that tobacco smoke can cause chronic eye problems, skin irritation and respiratory disease, such as coughing, sneezing and sinusitis. When a bird stands on a hand of a smoker, nicotine from the smoker's fingers can be absorbed by the skin of the bird's feet, which can lead to contact dermatitis. So if you do choose to smoke outside, be sure to wash your hands thoroughly with soap before handling your bird. Some veterinarians believe that tobacco smoke may be a contributing factor in feather plucking. Please do not smoke around your birds, or let others smoke around your birds. Again, if you do smoke, wash your hands thoroughly before handling your birds.

Aerosol Sprays

Never spray ANYTHING in a bird's room. If you need to use a cleaner or aerosol in his room, either move him out of the room or spray the can onto a paper towel in another part of the house. Do not spray hairspray or room freshener anywhere around a bird. Leather protectant sprays: A man took the leather coat into another room to avoid exposing his birds to the spray. He left the house for a few hours after this. He came home and all his birds were dead. Be also aware of glue guns which can emit toxic fumes. Any item that releases strong fumes to scent or "clean" a room should not be used while a bird is in the airspace. Put the bird in another room until you are sure the fumes have dissipated. Open the window to the room before returning your bird to his or her cage so it can be well ventilated and free of residual chemicals. Common sense is the best approach: if in doubt about an item, put your birds someplace safe where they won't be exposed to the fumes.

#### Ceiling Fans and other fans

Cockatiels are inquisitive by nature and will explore almost anything. If you use fans, be sure that they are located where your bird cannot get at them, and that they have a screen around them to prevent any accidents.

Never turn on a ceiling fan if the bird is in the room. This is one good way to decapitate a bird. Even a clipped bird will sometimes amaze you with its flying ability and can accidentally get hit by a rotating ceiling fan. If the bird is not in the room when the ceiling fan is on, make sure the bird cannot come into the room, and turn the fan off before you leave the room otherwise you may end up with "shredded tweet".

#### Stoves, Toaster Ovens

Keep the bird off of stove tops (even if they're off), one day the stove or toaster oven may be on while you're not around and the bird may accidentally land on it and burn himself severely.

#### Toilets, Jacuzzis, and Indoor Pools

Indoor pools, toilet bowls, and jacuzzis filled with water pose a hazard to clipped birds. They can easily drown if unsupervised. Close the cover on the toilet bowl if the bird is in the bathroom.

#### Toys

Buy bird safe toys that won't choke, entangle or harm your bird in any way. Keep away from toys that have sharp or pointy edges or nails, or things that have many small parts on which a bird can choke on. Always examine a toy before buying it and placing it in your bird's cage. Check out Hornbeck's Bird Supply page for lots of good safe bird toys.

#### Floors

Watch where you walk. Some birds, especially cockatiels since they are ground feeders, love to walk on the floor and pick up junk, carpet yarn, lick dust, or just march around on the floor. You don't want to step on your little darling, so watch where you walk. Recliners or sofas chairs that revolve or recline can also pose a danger to a bird. The bird may be walking under the foot-rest part of your chair and if you should pull it back upright suddenly without looking, you may squash your bird in between the foot-rest of the chair.

#### Open Windows, Doors, Skylights

Windows and doors to the outside world should be closed whenever the bird is outside the cage - cockatiels can and do escape, frequently, never to be seen again. Clipping your bird's wings is one of the best things that you can do to prevent him from injury. Cockatiels are very strong fliers, and many of them have been hurt or killed by flying into

a window, skylight, mirror or wall. When closing interior doors always check on top of the door before closing it to make sure your buddy is not sitting up there. Sliding glass doors have also been known to squash birds that have "slipped by" unnoticed.

Birds have also hopped off owners' shoulders and into open refrigerators and freezers.

#### Other Animals

Regardless of how friendly or well trained your other pets may seem, it is unwise to leave them alone with a cockatiel. Many pets are natural predators of birds, and no amount of training can overcome natural instinct 100% of the time. Cat bites should be considered the most dangerous, as the bacteria commonly found in the feline mouth, are extremely hazardous to birds. Even a simple puncture by a tooth can result in a fatal infection.

Scratches from claws are also extremely dangerous, as the risk of infection is very real. Additionally, other animals are larger or stronger, and may injure or kill the bird even if they were only playing. Always supervise interaction between your animals.

#### Bedcovers and Laundry

Our cockatiel Tiger has a strange habit of going under our bedcovers (sometimes while we're napping) and exploring under there. One day he came out breathless with a little blood on his nose. He could have easily suffocated. We no longer allow him to do this. Your bird should not be allowed to play on the bed unsupervised and make sure you don't fall asleep while he's on the bed with you. There is always the chance that the bird can get lodged between the bed-frame, mattress or you, smothered under a pillow, or be rolled over on during sound sleep. Although it is fun to read or watch television in bed or on the sofa with a pet bird, if there is a chance that you might doze off, it is time to return the bird to its cage.

Your laundry can also pose a danger. One bird who was playing in a pile of clothing in the laundry basket was drowned when its owner dumped the clothes into the washing machine, closed the lid, and "washed" the bird with the dirty clothes. Another bird climbed into the open dryer and the unsuspecting owner closed the door and turned on the dryer.

#### Electrical Cords

Cockatiels love to chew on just about anything they can reach. In addition to the danger of being electrocuted by chewing through a power cord, these cords contain metal that the bird could ingest. If the bird swallows these little metal shavings, it could easily be fatal. Always watch what your bird is doing - you have to be vigilant when the bird is out of the cage.

#### Children

Small children can scare the hell out of a bird if left unsupervised together. Make sure that the child does not grab, hit, tease or hurt your pet bird, or allow it to fly outside. Children can frequently make sudden and frightening movements that the bird may not expect. The bird will be traumatized for life he or she has a bad experience with a child. Our bird Tiger, whom we adopted from a former home with children, still does not trust the "small people" when they come over to visit. Birds are not good pets for young children. If you intend on getting a bird for a young child please reconsider. A young child may not be capable of handling a bird safely. Children who are too young are unable to understand the importance of gentle, respectful handling and that can end up with a tragedy pretty quickly. There should always be an adult around for supervision and

guidance as well as to make sure that the bird's needs are met with fresh food, water and a clean cage, etc.

#### Fly Paper

Those sticky fly paper strips should not be anywhere near your bird. If a bird flies into them, he will also get stuck, just like a fly. They can injure themselves trying to get "unstuck," the chemical on the strip is poisonous, and you will have a heck of a time trying to get all of the sticky stuff off their feathers.

#### Lamps and Halogen Light Bulbs

Have you ever tried touching a halogen light bulb after it's been on for a while? Hot, yes, very hot! Lamps that expose the bulb present a great hazard to birds. Your bird can land on the hot halogen light bulb and burn his foot. Some of these lamps are also a fire hazard because they do not have the protective grid to prevent contact with curtains and other materials should they fall over. Do not allow your bird to land on any lamps. Even a normal incandescent light bulb can generate sufficient heat to burn the delicate footsies of a curious bird.

#### Cold and Drafts

Keep your house at a pleasant temperature (for your sake and your cockatiel's). When it's cold or freezing outside turn the heat on. Keep the bird away from drafty doors and windows, since they easily can become sick if a draft blows on them. Air conditioning and directional fans too, in this sense, should be placed away from the bird's cage, so it's not blowing directly on the bird. A draft is different from just cold air. You could think of it as a "thread" of cool air. It cuts a path through warmer air. This is what is hard on birds. Their body has adjusted to the room's temperature, but they end up in the path of one of these colder threads air. If your bird is near a window, make sure it's well insulated. To check it, hold your hand around the edges of the glass to feel for any "threads" of cooler air. Do this a number of times, particularly when it is windy outside, to make sure you haven't missed a drafty spot.

#### Heat Stroke

Even though many of our feather friends are from very warm climates, over exposure to heat can kill them. If they are left in the sun with no place to escape the heat, they could easily become dehydrated and die. If you want to take your bird out for some fresh air, do not leave him out for long periods of time. As the sun goes across the sky, your bird may become trapped in direct sunlight. Also, you should never leave your bird alone in the car in warm weather.

#### Cage Bedding Material

Birds are intelligent and curious animals and many can find a way, no matter how hard we try to prevent it, to get at the bedding material in their cages. Unfortunately there are a number of products on the market today which, if ingested, are harmful to birds and can even cause death.

USE: The best and cheapest cage liner material you can use is an old newspaper. Change it at least once a week. Printed newspaper, paper towels, any plain paper and even brown paper bags can be used. Paper towels are expensive and very absorbent and are a better choice for chicks. If using printed newspaper, don't use the glossy pages or the pages with colored ink as these inks may contain lead and other harmful chemicals. Hence, don't use magazine paper. Paper and paper products are very easy to change and allow you to visibly monitor droppings.

DO NOT USE: Old walnut shells or dried corn cobs as they can be ingested (nut shells have sharp edges and can be painfully ingested into the bird's crop and dried corn expands in the gut causing pain). Do not use cedar or pine shavings as they are very toxic. Specifically, do not use "Kaytee Pine and Cedar shavings" and/or "Kaytee Natural Aspen and Walnut bedding". Don't use sandpaper either on perches or in the bedding. Do not use "kitty litter", leave that to the cats. Sandpaper is very rough and hard on the bird's delicate little feet. Despite what you may hear elsewhere, it will not "trim" your birds toenails. Get an avian vet to do this for you if you have no clue how to do it properly.

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#### Why Caffeine is Toxic to Birds

Chocolate contains a substance called theobromine. Caffeine & theobromine belong to a chemical class of alkaloids called methylated xanthines. These are found in coals, coffee, tea & in chocolate. As a class of drugs, Methylated xanthines cause central nervous system (CNS) stimulation, diuresis (flushing of fluids through the body), cardiac (heart) muscle stimulation, & smooth muscle stimulation.

Methylxanthines are absorbed very quickly & easily from the oral cavity & intestinal tract. The liver is needed to metabolize these chemicals, & the waste products are excreted in the urine. These chemicals primarily affect the CNS & kidneys. These chemicals cause increased motor activity & also result in tachycardia (too fast a heart beat.) Because of the increased motor activity, seizures may occur. The kidneys may be affected causing diuresis & very high urine output. This may lead to dehydration. Respirations may become too rapid, & hyperthermia (too high a body temperature) may occur, resulting in death. There is NO antidote for these drugs. We may only treat symptoms with supportive care & drugs to decrease their severity.

Toxic dosages for birds are not well established. In dogs the toxic dose is approximately 200 mg/kg of body weight. In cats the lethal dosage is only 80 to 150 mg/kg of body weight. (higher metabolism means that less is needed to cause toxic effects.) A cup of coffee may contain 35 to 85 mg. A 12 ounce bottle of cola contains approx 50 mg. Now these levels would mean that a 1 kg (2.2kg) cat would need to drink 1 1/2 to 3 colas for death to occur. However, since a bird has a much higher metabolism than a cat, & a much smaller body size than a cat, we can safely say that it would take a much smaller dose for toxic effects & possibly death to occur.

Since we are unsure of the toxic dosages in birds, one definitely should avoid ALL caffeine & chocolate consumption for pet birds. (theobromine & caffeine are both found in chocolate-- this means that chocolate packs a double whammy!) I recommend that these substances be avoided in ALL pet species.

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#### COMMON HOUSEHOLD POISONS

Many household substances and plants are toxic to birds. A pet bird can be poisoned either through inhaling or through ingesting a toxic substance. Airborne toxins include

aerosol sprays (i.e., insect repellent, hairspray), cleaning products, toxic glues, overheated nonstick-coated appliances, smoke, etc. Commonly ingested poisons can include, but are not limited to, toxic plants (i.e., bulb plants, azaleas, holly, English Ivy, etc.), items that contain lead (i.e., solder, old paint, leaded glass or framed doors/windows, fishing weights, costume jewelry, antiques, etc.), household cleaners, perfume, mothballs, weed killer, silver/brass polish, etc. Alcoholic Drinks, Ammonia, Ant Syrup or Paste, Antifreeze, Arsenic, Asbestos, Auto Products, Bathroom Cleaners, Bleach, Boric Acid, Camphophenique, Carbon Monoxide, Carbonated Drinks, Charcoal Fluids, Chlordane, Chlorine, Cigarette Smoke, Clinitest Tablets, Copper/Brass Cleaner, Corn & Wart Remover, Deodorants, Detergents, Diazon, Disinfectants, Drain Cleaners, Epoxy Glue, Drain Cleaners, Fabreeze, Felt Tip Markers, Flea Products, Floor Polish, Formaldehyde, Furniture Polish, Garden Sprays, Gasoline, Gun Cleaners, Hair Dyes & Sprays, Herbicides, Insecticides, Iodine, Kerosene, Lighter Fluid, Lye, Matches, Model Cement, Moth Balls, Mushrooms, Nail Polish Remover, Nitrogen Dioxide, Oven Cleaners, Over-heated Non-Stick Cookware (Teflon), Paint, Paint Thinner, Perfume, Permanents (Hair), Pesticides, Phot Solutions, Pint Oil, Poisonous Plants, Rodenticides, Rubbing Alcohol, Rx Drugs, Shaving Lotion, Shellac, Shoe Polish, Silver Polish, Snail Bait, Solvents, Spot Remover, Spray Starch, Strychnine, Sulfuric Acid, Suntan Lotions/Oils, Super Glue, Surgical Acrylics, Turpentine, Wax, Weed Killers, Window Cleaners, Wood Preservatives.

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#### COMMON ORNAMENTAL TOXIC PLANTS

Daphne Berries, Rhododendron Leaves, Azalea Leaves, English Ivy Berries & Leaves, Oleander Leaves & Branches, Yellow Be-Still Tree Nectar of Blossoms, Yellow Oleander Leaves, branches, nectar of blossoms.

#### POISONOUS FLOWER GARDEN PLANTS

Lily-of-the-Valley Leaves & Flowers, Delphinium, Iris Bulb All Parts, Monkshood Leaves & Roots, Purple Foxglove Leaves.

#### POISONOUS PLANTS IN WOODED AREAS

Jack-in-the-Pulpit (All parts), Vegetable Garden Plants, Black Locust (Bark, Sprouts, & Foliage), Yew (Needles & Seeds).

#### POISONOUS PLANTS IN THE FIELD

Jimsonweed (Leaves & Seeds), Nightshade (Unripe berries & Leaves).

#### POISONOUS CHRISTMAS PLANTS

Holly Berries, Jerusalem Cherry Berries, Mistletoe Berries, Poinsettia (Leaves & Flowers). NOTE: Wild mushrooms can also be poisonous. It requires an expert to differentiate between poisonous and non-poisonous wild mushrooms. They grow in gardens, lawns, and wooded areas. Any wild mushrooms should be considered poisonous until proven otherwise.

## TOXIC PLANTS

Amanita, Amaryllis, Ardisia plants (berries of Arum Lily), Asparagus berries ornamental, Australian Flametree, Autumn Crocus, Avacodo (Bark, Leaves, Seeds, & Skin of Fruit), Balsam Pear, Baneberry, Bean Plants (Castor, Horse, Fava, Broad, Glory) [as with MANY vegetable PLANTS], Bird of Paradise (White Flower, too), Bishop's Weed, Bittersweet Nightshade, Bleeding Heart, Bloodroot, Blue Bonnet, Blue-Green Algae, Boxwood, Brugmansia, members of the family formerly Datura, Buckthorn, Bulb Flowers (Amaryllis, Daffodil, Narcissus, Hyacinth, & Iris), Burdock, Buttercup, Cacao, Caladium, Calla Lily, Camel Bush, Cana Lily, Cardinal Flower, Castor Oil Plant, Chalice (Trumpet Vine), Cherry Tree (bark, twigs, leaves, & pits), China Berry Tree, Chinese Primrose, Chocolate, Christ's Thorn, Christmas Candle, Clematis (Virginia Bower), Cocklebur, Coffee Bean (Senna)(Rattle-Bush, Rattle Box, & Coffeeweed), Coral Plants (Nightshade family all members such as choral bush), Coriander, Corncockle, Cowslip, Coyotillo, Crotalaria, Croton (Codiaeum variegatum), Cutleaf Philodendron, Cyclamen, Daphne, Datura, Deadly Amanita (mushroom), Death Camus, Delphinium, Dieffenbachia (all species), Dutchmanas Breeches, Egg Plant, Elderberry, Elephant Ear (Taro), Ergot, Eucalyptus Dried, Dyed or Treated in Floral Arrangements, Euonymus (Spindle Tree), Evergreen Trees, False Hellebore, Felt Plant (Maternity, Air & Panda Plants), Fern (Bracken), Fire Thorn, Flame Tree, Floral Arrangements, Fly Agaric Mushrooms, Four O' Clock, Foxglove, Glottidium, Golden Chain, Grass (Johnson, Sorghum, Sudan, & Broom Corn), Ground Cherry, Hack-In-The-Pulpit, Heaths (Kalmia, Peires, Rododendron, Mountain Laurel, Black Laurel, Andromeda, & Azalea), Heliotrope, Hemlock (Poison & Water), Henbane, Holly (English), Honeysuckle, Horse Chestnut, Horse Tail, Hyacinth, Hydrangea, Indian Turnip, Ivy (Devil's, English, & others), Jack-In-The-Pulpit, Jasmine (Jessamine), Java Beans, Jimsonweed, Juniper, Ky. Coffee Tree, Lantana, Larkspur, Lily Family (Particularly Gloriosa, the flora lily, & Arum), Lily of the Valley, Locoweed (Milk Vetch), Locusts (Black & Honey), Lords & Ladies (Cuckoopint), Lupine, Madagascar Palm (Pachypodium), Madagascar periwinkle old Maid (Catharanthus), Malanga, Marijuana (Hemp), Mayapple (Mandrake), Mescal Bean, Mexican Breadfruit, Mexican Poppy, Milkweed (Cotton Bush), Meadow Saffron, Mistletoe, Mock Orange, Monkshood, Moonseed, Morning Glory, Mushrooms, Narcissus, Nettles, Nightshades (Deadly, Black Garden, Woody, Bittersweet, Eggplant, Jerusalem, & Cherry), Nutmeg, Oak, Oleander, Parsley, Periwinkle (Vinca minor), Philodendrons (Split Leaf & Swiss Cheese), Pigweed, Poinciana, Poinsettia, Poison Ivy, Poison Nut (Strychnos nux-vomica), Poison Oak (Western & Eastern), Pokeweed, Potato (New Shoots), Privet, Pyracantha, Rain Tree, Ranunculus (Buttercup), Rape, Rattlebox, Red Maple, Rhubarb Leaves, Rosary Peas, Sand Box Tree, Scarlet Runner, Mescal, Precatory Navy, Skunk Cabbage, Snow Drop (Orithogalum umbellatum), Snow Flake, Sorrel (Dock), Spurges (Pencil Tree, Snow-On Mountain (Euphorbia marginata), Candelabra, Crown of Thorns), Sweet Pea, Tansy Ragwort, Tobacco, Tropical House Plants (all members, whose leaves are prinkled with whitish or yellowish spots), Vetch (Hairy/Common), Virginia Creepers, Water Hemlock, Wattle, Wax Plant (Hoya carnosa), White Cedar Chinese, Wisteria, Yam Bean, Yellow Jasmine, Yew (American, English, Western, Chinese, & Japanese)The following plants are actually not poisonous, but secrete substances that irritate the mucous membranes and can be harmful to some birds, including Parakeets: Ivy, Monstera deliciosa, Flamingo Flower, Meadow Saffron

(Colchicum autumnale), Agalomema, Philodendrons, and Scheffera. Avoid: Birds can injure their eyes on Cactus and other plants with thorns or spines.

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#### BRANCH PERCH SAFETY GUIDE

#### BIRD SAFETY GUIDE TO BRANCHES, PLANTS, & POISONS -

Materials used in aviaries are not safe if toxic chemicals or insecticides have been sprayed on them. Before installing in any cage, scrub all branches with a non-toxic disinfectant (such as diluted chlorine bleach) then rinse and drain well.

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#### NON-TOXIC BRANCHES

Apple, Ash, Almond, Apricot, Peach, Plum, Prune, Nectarine, Any Citrus, Dogwood, Elm, Guava, Papaya, Pear, Madrone, Magnolia, Nut (Except Chestnut & Oak), Vine Maple, Willows (Goat, Pussy, Weeping), Thurlow.

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#### SAFE, NON-TOXIC PLANTS

Aarbustus, Abelia, Acacia Aloe, African Daisy, African Violet, Aloe, Aluminum Plant, Aralia, Areca, Aspen, Aspidistra, Baby's Breathe, Baby's Tears, Bamboo, Begonia, Bougainvillea, Chickweed, Christmas Cactus, Cissus (Kangaroo Vine), Coleus, Corn Plant, Crabapple, Dandelion, Date, Dill, Dogwood, Donkeytail, Dracaena varieties, Ferns (Asparagus, Bird's Nest, Boston & Maidenhair), Figs (Creeping, Rubber, Fiddle Leaf, Laurel Leaf, & Weeping), Gardenia, Garlic, Gloxinia, Grape Ivy, Grape Vine, Hen & Chickens, Impatiens, Jade Plants, Kalanchoe, Lilac, Magnolia, Marigold, Monkey Plant, Mother-in-Law's-Tongue, Nasturtium, Natal Plum, Norfolk Island Pine, Palms (Areca, Date, Fan, Lady, Parlour, Howeia, Kentia, Phoenix, & Sago), Parsley, Peperomia, Peppermint, Peperomia, Petunia, Phoenix sago, Psittosporom, Pothos, Prayer Plant, Purple Passion (Velvet Nettle), Rubber Plant, Scheffera (Umbrella), Sensitive Plant, Spider Plant, Swedish Ivy (I would suggest no spotted variety), Thistle, Wandering Jew, White Clover, Zebra Plant.

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#### Part 10: FERAL PIGEON RESCUE

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#### Recognizing and Catching a Sick Pigeon

The following is intended as assistance towards recognizing problems through elimination of possibilities until arriving at the most probable cause of illness and diagnosis - a 'Layman's' directory!

#### Assessing a sick Pigeon

Many pigeon ailments have similar symptoms and yet are completely different in their nature and severity. Many common pigeon ailments are equilibrium unbalance problems; that is to say that they are stress related. Bacteria live permanently in balance within the body until something reduces the individuals resistance and the natural balance becomes upset. A sick pigeon will fluff out it's feathers as if it is cold. The patient hides perhaps under a park bench or in a doorway, and is seen on the ground at dusk when its flock has

flown up high to roost. The droppings may appear green and watery, and signs of bullying injuries by other birds may be visible around the head. An injured pigeon may be in shock, limping badly, drooping a wing or bleeding. Pigeons suffer from a variety of ailments peculiar to themselves, the most common being the Paramyxovirus and throat canker. The virus causes birds to appear fluffed up, unbalanced or dizzy. They may walk in circles, throw seeds in the air when eating, hang their heads upside down (star gazing) or have fits. No veterinary treatment is available as far as we know but the pigeon can recover after a lengthy period of rest and care.

However, he or she must be kept separate from other birds for at least 6 weeks. Canker or Trichomoniasis seems most common in young pigeons aged between 2 and 5 weeks. It is detected by a swollen throat containing yellow/white button-like cheesy growths, wet or bad smelling discharge from the beak and unwillingness to fly. Depending on the severity, it may be very difficult for the bird to eat or breathe. This disease in young birds is fatal but can be treated with drugs such as flagyl (metronidazole) or spartrix (carnidazole). Crop-feeding may be necessary while healing is underway. Please do not attempt to scrape away these growths unless they are severely restricting breathing, as this may damage the lining of the throat. Keep the patient away from other birds. As with dealing with any animal, please observe common-sense hygiene. Wash hands thoroughly before and after handling any wild pigeons.

#### Causes of General injury/ill health

- Nestlings falling from nest
- String injuries/entanglement of fishing line or fine string from kites
- Cat/ dog/bird attacks
- Hit by a vehicle
- Starvation (weakness) they fall straight to the ground
- Guns, BB guns, arrows, darts etc
- Cold weather - frost bite
- Dehydration - insufficient water
- Bad or poisoned food
- Any disease that has put the bird in a weakened state

#### Catching the Pigeon

Pigeons are easier to catch than most birds because they are semi-tame. The flock to which the patient belongs can be attracted with corn or unsalted peanuts. A soft cloth, coat or towel is often helpful. Throw it over the bird from behind while its attention is distracted. The first attempt is the most important since pigeons (being preyed on in the wild) quickly become wary of attention.

Pigeons very rarely bite and their beaks cannot cause injury. One may be apprehensive of causing further pain or stress by a clumsy catch, but if you leave the pigeon where it is, a cat or other predator will almost certainly find it. If the capture was successful, line a cardboard box with something soft and make a few airholes in it. Pigeons will not die of fright through such confinement. Place the pigeon in a warm, dark area away from other

animals, children and loud noise. Warmth and quiet are vital to overcoming shock and will also help if dealing with the stress of illness or injury.

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### EXAMINING A SICK BIRD

This list of things to check for when examining a sick bird was compiled by fellow pigeons.com member, Marian. Being able to answer these questions is very helpful to people trying to help you diagnose your bird.

Terry Whatley

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(Info to include when describing a medical problem. This form is mainly for illness, not injury. However, an injury can result in illness, so if injury is known, include that info below. )

Pigeon help form:

Primary symptoms that you first noticed: (here, the owner just writes what primary symptoms he is seeing (The more specific info to fill in is below-fill in whatever is applicable)

How long have you had the bird?

Where did it come from?

Known circumstances?

Have the cages, food and particularly the water dishes

been kept clean?

If a long-standing pet, have any new birds been added?

Info on the new bird, as above?

When did you first notice the symptoms?

Are the symptoms worsening?

Is the bird baby, juvenile or adult?

Weight?

What does the diet consist of?

What do the droppings look like (color, odor, consistency)?

Attitude and Posture? ( alert, normal behavior, erect posture// or still, fluffed, quiet, eyes shut, uncaring of surroundings, slumped, drooping wings or tail)

Eyes? (clear, bright, open// or half closed, runny, dull, swollen area above, below or around eyes)

Sinuses? (nares and eyes clean, without discharge, close-mouthed and effortless breathing// or swollen area around eye, wet feathers around nares or eye, wet cere, from any discharge, sneezing. Any open-mouth breathing, respiratory distress, overall body movement when breathing. Any open-mouth breathing with slight exertion or fear. Shoulder feathers may be matted with discharge from bird wiping its eyes)

Mouth? (beak edges and inside of mouth pink and free of discharge, lesions, trachea clear and fully visible//or any paleness, dry membranes, swellings around beak edges or in mouth, any clumps of yellowish or whitish growths inside mouth, any seeds or objects lodged, any sour or other odor from mouth, weak jaw muscles)

Ears? (clean, no growths or lesions or blood)

Face and legs? (bare areas of body free of nodules//or nodules anywhere on face, legs, shoulders under feathers, lower abdomen under feathers)

Crop area? (normal filling and emptying, no odor from mouth// or hard crop, crop that doesn't empty, feels lumpy, enlarged)

Body mass? (plump, with fully fleshed breast area// or thin, with protruding keel, bruising) You can check skin surface for bruising by wetting the feathers with a gauze pad and wiping to reveal skin.

Feathers? (intact and free of parasites and parasite damage// or dull, breaking easily, fluffed, evidence of parasites, cloacal feathers matted with discharge or feces, stress marks on tail feathers, frayed feathers )

Wings? (held erect, symmetrical, smooth structure, folded over tail// or drooping, with swellings or nodules at shoulders, enlarged joints)

Abdomen? (firm, flat//or swollen, masses, fluid-filled, egg-bound.

Abdomen is felt very gently. Vent should be free of feces, with dry feathers. There should be no protruding mucosa from the GI tract.)

Legs and feet? (free of any nodules, pads of feet free of cuts, swellings, reddened patches, or other signs of bumblefoot // or nodules, red or swollen foot pad, smooth areas of pad surface, weak grip)

Neurological? (easy, coordinated movements and normal posture // or unsteadiness on feet, inability to hold head erect, twisting, spinning, star-gazing, seizures, tremors, uncoordination, head tilt, unresponsiveness to surroundings or stimuli)

Droppings? (white and dark portions clearly defined, no odor // or discoloration, runniness, excess fluid, odor)

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POOP: YEAH, POOP!

Poops...what do they REALLY mean

I'd just like to bring this subject up to one and all. It would seem that poop concerns are a HUGE topic of debate here in our forum and I would just like to say a few things about this. I know for myself in my "earlier" days of not being familiar with pigeon diseases, proper nutrition/health maintenance, medications, and the various forms of feces I was looking at, I was very bewildered at times. I've seen all kinds of pigeon poop; runny and

green, black with white urates, slimy and pea green, yellow liquid, mostly water, spaghetti feces in water etc. etc etc. What I'm trying to say is that I've been exposed to all forms that pigeon poop can take.

We as pigeon folks, even as bird people altogether have been predispositioned to watch, look, monitor and note what a bird's feces \*should\* look like at all times. It's very true that poop can be directly related to the state of a pigeons health but it's not the holy grail that we have become accustomed to hearing over and over.

There are nearly as many reasons for inconsistant poops in pigeons as the colours in which they come in. Watery feces can be attributed to excessive drinking (plain & simple thirst on a hot day), green droppings can be caused by hunger, high pea ingestion or certain other green legumes in excess. Large smelly droppings are often expelled from a bird after sitting on the nest for long periods of time. Slimy feces can be caused by a high fruit or vegetable intake.

Medications/supplements/temperatures/heat/cold/age/male or female all play into this equation too. The point is, droppings in our birds vary from day to day, week to week and month to month. What is important is to see "normal" droppings during these times....the classic nutty green/brown, firm droppings with a white dollup on top. I feel at times, we are being burdened by over analyzation of what all these different droppings mean. We as humans don't always have the same type of bowel movements and they can vary from day to day with diet, excersize, dietary changes, nervousness, overall nutrition etc, and the same is true for our pigeons. This however, DOESN'T mean that our birds are dying or in need of medical attention. It's also important to watch their overall behaviours, actions and day to day routines...this can also give us much insight of what is going on with their health.I have 2 younger pigeons (just over a year old), they are domestic, indoor birds that have never been exposed to the outdoors, they are separated from the my other pigeons, and have excellent dietary choices. They are given multi-vitamins 2 times per week, ACV 2 times per week and probiotics once a week or if needed more. I also give them brewers yeast tablets once per month & fish oil capsules once a month. The have special multi spectrum lighting in their room, the area is scrubbed meticulously every day and the room is well ventilated as well. These birds are robust, almost hyper active, eat well for hand reared birds but....they have droppings that (at times) have matched every one of the descriptions I've listed above. They've been treated for worms now and also coccidia (just in case). Pigeon droppings can be very inconsistant and unusual but it doesn't necessarily reflect bad or failing health.

It is important for us to realize that not all "suspicious" droppings mean doom and gloom. Everyone should have their birds feces taken to an avian vet for testing every 6 months and if all checks out ok, chances are, the birds themselves are just fine.

Some pigeons are more highly strung than others (just like humans) and a sudden change to green, rather wet poops (for example) can be just a temporary stress - maybe like when I pack a pidge in a carrier and drive him 20 miles to the vet, which is very good for producing a nasty-looking poop, as I and the vet's table found out.

The 'poop book' (more properly, "Problem Droppings Explained") also states that there are a number of valid reasons for changes, and not to go overboard at the first sign of 'not normal'. Whether or not there's a real problem, I believe, depends on (a)

the presence - or absence - of any other unusual symptoms, and (b) if the changed state continues for more than a day or, possibly, two.

I think that in some cases, where it is known that a bird has suffered some internal damage in the past but is otherwise healthy, we can tell why droppings are 'not right'. We have observed this in the aviary with birds who had PMV even a long time back, and where there has probably been some detrimental and permanent effect on the kidneys - they may still produce watery 'PMV droppings' even though long recovered from the other aspects of the illness.

The dreaded 'hen droppings' after a night on the nest have certainly been known to cause alarm for the new pigeon person - but as we know, it is a normal situation.

I'd suggest the two most immediate causes for concern could be (1) blood in the droppings, and (2) yellow instead of the white 'cap' and not much other component in the droppings.

It is always encouraging to see a roosting box in the morning with a neat pile of firm, rounded poops of the right color and a few down feathers attached.

Seeing blood in the poops is not very common either with coccidia or worms. Coccidiosis in chickens will show bloody droppings more often but it does also occur in pigeons at times with heavy infections.

With worms, blood in the droppings is most often caused by a heavy infestation of hair/thread worms. These tend to do a lot more damage to the intestinal lining than the larger worms do. They can develop in much larger numbers and through their numbers, they can/will wreak a lot of havoc, therefore causing the bleeding.

When I have got in Starved Birds, or have a Bird who has not eaten in some time, from what I have seen, they tend to poop little dabs of bright green, or that and some yellow or white chalky 'flat' dabs of liquid.

It may seem simple, but many times we find that people overlook the fact that how many and what size the poops are, is the result of how much and or what the Bird has been eating. People write in here with sick or injured Bird concerns, and when asked 'How are the Poops? can you describe them? To then say, more or less, 'Yea poops look fine, there were two little dabs of goo over the last day or so...'

I have seen some initial 'black' gooey small droppings from Birds with internal injuries, but not otherwise and not from privation. The bright 'green' that looks like dabs of Artist's Oil Paint is what I mean here, not average green or pale green or brownish-green or fibery-textured-light-green... but the bright green like little dabs of Artist's Oils paint, to me is associated with starvation. These are not turds or 'Raisens' but like as if someone went into the cage and was touching fresh from the tube Artist's paint to the towel or paper towel.

The odd anomalous poop is one thing, steady trends are another...

If yours has 'bright green watery part around the whole thing' I think there may be reason for concern, or inquiry anyway. Their poops, if fed healthy Seeds and Grit and the small amounts of veggies or shoots, should look about like firm, easy to pick up between the finger tip, 'Raisens', and be brownish-green and white and be the layers of squigs of both. Passing liquid as other than a rare event ( of clear water with the little 'ropes') is not right unless frightened a lot or marginally ill with something, as far as I know...

Phil

Las Vegas and other fans of POOP.

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#### SAVING A LIFE:

It is vital to stabilize an ill or injured pigeon or dove as soon as possible after rescue.

Three basic steps should be followed.

#### HEAT, ISOLATION & HYDRATION

##### PROVIDING HEAT TO ORPHANED/SICK BIRDS:

A bird must be warmed gradually to a normal body temperature and be responsive (able to swallow). It is not unusual for a baby bird presented for rehabilitation to be very cold. (If a bird is unresponsive, please seek the assistance of an experienced rehabber or avian vet immediately.) Give the bird a quick, superficial examination. Unless there is a critical situation, e.g., (severe bleeding) all birds should be covered and placed on a heat source\* (see below) for at least 20-30 minutes to bring the body temperature back to normal.

\* It is essential that orphaned birds be kept warm on a towel lined heating pad, set on low.

\* Since baby birds have difficulty regulating their body temperature, wrapping them in a towel or keeping them in a warm room is not enough. They need a heat source. (If no heating pad is available, a hot water bottle may be used or fill an old sock about 2/3 full of rice, microwave for a few seconds, making sure it isn't too hot & place it around the bird.

\* Do not turn the heating pad temperature too high thinking this will warm the baby bird faster. Low setting is recommended. Birds need to be warmed gradually until their body temperature has been maintained.

\* Do not put a baby bird in the sun to warm him. He will quickly become dehydrated.

\* Never attempt to feed a baby bird that is cold or in any type of respiratory distress.

Baby birds must be warmed before they can digest any food.

\* Keeping a baby bird warm is the most important step in saving his life.

\* Many birds that appear near death have been revived after 20-30 minutes on a heating pad.

##### ISOLATION:

Allow the bird to stabilize in a quite, dark, warm area. While the bird is warming, take the opportunity to prepare any other items you may need to care for the bird, e.g., International Rehydrating Solution (recipe noted below)

**A 'COLD' BIRD SHOULD NEVER BE GIVEN FLUID OR FOOD!**

##### HYDRATION:

Fluids should be given after, and **ONLY AFTER**, the bird has been warmed, examined for any injuries & a determination is made as to the severity of his dehydration.

All fluids should be warmed or at room temperature!

Description and degrees, of hydrated and dehydrated birds:

A well hydrated bird will be very alert, have elastic skin, bright eyes, moist, plump membrane inside the mouth and well formed moist droppings.

A moderately dehydrated bird will be less than fully alert, have dry, flaky skin, dull eyes, non-formed droppings and have a sticky membrane in the mouth.

A severely dehydrated bird will be lethargic or unconscious, the skin will 'tent' when slightly pinched, have sunken eyes, dry or absent droppings and have dry membrane in the mouth.

Depending on the cause and degree of dehydration, reversing this condition can take up to 24 hours. If the bird is alert, he may be rehydrated by mouth, using an eye dropper and putting drops along his beak every few minutes, making sure the fluids are room temperature or warmed slightly. Initially, a rehydrating solution should be administered. Plain water should not be given unless nothing else is available.

If the bird is not swallowing on his own or fully alert, he must be given fluids under the skin (sub-Q method).

**WARNING!!** This procedure should only be performed by an experienced rehabber or vet.

Please follow these simple, basic, yet most important Steps. The cells of the body simply don't work properly when dehydrated. Absolutely no digestive processes can take place if the gut CAN'T work. Absorption will not take place, food sits in the gut, undigested, and will eventually kill the bird.

\* Heat source suggestions:

Towel lined heating pad, set on low.

Towel lined hot water bottle.

Low wattage lamp, directing the light into the cage.

\* Emergency heat source substitute:

Fill an old sock about 2/3 full of rice. Microwave the sock for a few seconds. Making sure it isn't too hot, place it around the bird.

\* International Rehydrating Solution:

To a cup of warm water add a pinch of salt & sugar, mix well.

Use this solution to rehydrate by mouth.

\* Emergency rehydrating substitute:

Pedialyte, unflavored. By following these basic steps you have done your best to stabilize your little feathered patient until further assistance is available.

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**MORE ON FERAL PIGEON RESCUE**

**Fractures**

A pigeon limping or a leg which may be twisted out of shape should be taken to a wildlife centre or vet who can X-ray and set it. If this is impossible one can use the

diagram below as a guide. Fractures in the upper part of the leg are best attended to by an expert.

Extend the leg and wrap it in wadding to protect the skin from pressure. Cut a straw to a length that is shorter than the wadding so that the sharp ends do not cut the skin. Slit the straw lengthwise, fit it over the wadding then cover with adhesive bandage. Leave in place for 2-3 weeks, longer if necessary.

Bird's bones are hollow and very frail. Fractures near joints do not mend well, and compound or multiple fractures need experienced attention. The diagram below shows how a clean break to a wing can be treated.

Fold the fractured wing into its natural position. A figure of 8 bandage holds a broken wing in place then another bandage is wrapped over the damaged wing, around the body then under the sound wing. Leave for about a month.

Also, many pigeons lose toes or legs because of discarded tackle or threads, and can be injured by fishing hooks. Please pick up such dangerous debris and dispose of them safely. Bird feet can be disentangled using nail scissors and antiseptic spray from any chemist can be applied to the area afterwards.

#### Injuries/Shock

An injured pigeon may be suffering from shock. This means that blood vessels become inflamed and restrict the blood supply, particularly to the toes. These feel cold. To counteract this, keep the bird warm i.e. in a box with a wrapped hot water bottle. The condition should not last longer than 3 hours. Give the bird 5 drops of Stressvit morning and evening to come out of the shock quickly. Bach's Rescue Remedy is helpful. Use the same technique if you know the bird is concussed i.e. it flew into a patio door or car. Keep the box away from noise.

#### Kite Injuries

Many pigeons become a victim to kite strings. About 80-85% of pigeons get cuts on the wings and the remaining 20-15% on neck or legs.

Wing treatment: the bleeding part should be immediately placed under running cold water or keep ice cubes on the particular part of the wing. Press it with a handkerchief or any other soft clean cloth. Apply Betadine or any antiseptic liquid/cream and then bandage it. Follow the same procedure for an injured neck or leg though caution must be taken that the water does not enter inside the mouth.

#### Dehydration

In summers birds get dehydrated and often fall on the ground due to lack of stamina. Add a little glucose or pinch of sugar to the drinking water or any other electrolyte solution to rehydrate the bird.

#### Exhaustion/Starvation

Exhaustion generally applies to birds that have exercised beyond their endurance. If one comes down in your garden etc. it will appreciate some food. A pinch of sugar or glucose in water would also be of benefit. If the breastbone can be seen or easily felt, there is muscle wastage and the bird is suffering from malnutrition and needs help. In most cases the fatigued pigeon recovers in a day or two and will leave on its own.

#### Injuries/Shot

A puncture wound is generally painful and may bleed. Only a vet can tell if the pellet is still present and remove it to prevent infection. Part the feathers and clean the area with iodine. If the wound is bleeding, apply pressure for a full minute with a finger swab or cotton bud. This is vital since all birds have a small blood volume and movement accelerates blood loss. Keep the patient still. Heavy panting or laboured gasping may mean imminent death. Injuries/Cat Attacks

Pigeons are commonly caught by cats. Typical injuries are scratches or holes under the wings or on the back with considerable feather loss. In all cases, even if it seems recovered, antibiotics from a vet are necessary since cat's teeth carry bacteria. Clean the wounds with saline solution or antiseptic spray like Betadine or Gentamicin or Himax. Half an aspirin can be given if the pigeon seems in pain or inject Diclovet I/M .32 ml. Warmth and quiet are essential. Give the bird multivitamin solution like Vimral and Stressvit.

#### Medicines that You should Have in the medicine Chest

Baytril : for serious intestinal or systemic infections. This comes in tablet form and individual pigeons can be dosed at 5 mg per day for 5-10 days

Amoxicillin : safer alternative to Baytril. Can also be used for serious infections. Comes in tablet form of 50 mg which can be used once or twice a day

Tetracycline : (Terramycin, Aeuromycin or Doxycycline): good for respiratory infections

Tylan : Used with Tetracycline for respiratory infections. 50 mg per pigeon per day

Amprolium : Used for coccidiosis. 1 tsp per gallon for 3-5 days

Dimetridazole : for Trichomoniasis. Should be used in very low doses 1/4-3/8 tsp per gallon, for 3-5 days. Higher doses can causes seizures

Flagyl (Metronidazole) : for Trichomoniasis. 25-5 mg per pigeon per day for 1-3 days

Ivomec (Ivermectin) : wormer 500-1000 micrograms (ug) per pigeon) Not effective against roundworms

Pyrantel pamoate : 1-3 mg per pigeon for 1-2 days. For orund worm only

Fenbendazole : effective against 3 major but can cause feather damage. 5 mg per pigeon for 3 days

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### RESCUE RELEASE CHECKLIST

#### Release Criteria For Birds & Animals

This is an excellent checklist for determining if/when

to release a bird or animal. This is courtesy of  
<http://www.wildliferehabber.com>.

Terry

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A good rehabilitator agonizes over the following release criteria. You should be losing sleep like the rest of us, if you haven't met each of the requirements. If you answer no to any of the following (with the exception of appropriateness for species), you should seriously reconsider your decision to release.

Is it cautious of all humans and pets? (Death is imminent if it approaches either out of desperation or hunger)

Is it in 100% physical condition (no handicaps or missing limbs) or has fully compensated for it's "imperfections"? (completely recovered from any infections, and is parasite and mite free)

Has it been acclimated outdoors for at least two weeks?

Has it been reared and socialized with others of it's species?

(Improper socialization will result in rejection, or attacks from members of it's own species.)

Is it familiar with the release site? (Soft releases: animal has been housed in the area which it will be released. Can return to cage for protection and food if necessary.

Is familiar with the day and evening activity of other wildlife in the area.)

Has it been provided the proper diet with necessary supplements (protein, carbo, fat)? (Improper ratios of calcium : phosphorus can result in fractures following release) (If it's body can't sustain the imminent bumps, falls and collisions that occur during the first week of release, it won't survive)

More importantly, do you know what the proper ratios of protein, carbohydrates, fat, calcium : phosphorus are for that species? (shame on you)

Has it had access to it's natural foods and learned how to forage during captivity? (there are no rodent blox or Esbilac in the wild; does your opossum know to look under rotten logs for bugs?)

Is it familiar with natural substances and occurrences it will find after release? (will release be the first time it experiences blowing leaves, rain, etc.?) (Do your squirrels know that not all branches will hold their weight and could snap out from underneath them?)

Is the release environment appropriate to the species?

Have you evaluated the release site for possible overpopulation of same species or high predator or roaming domestic pet activity? (What are the animal's chances that it will be chased out of area by it's own species or attacked by a cat; are there large numbers of birds of prey?)

Is the time of release appropriate to the species?  
(bunnies: pre-dusk; herons: just before high tide; opossums: evenings when alert; squirrels: mid-afternoon; songbirds: when their wild counterpart species are most active)

Will a backup food source be available for an extended period of time?

Is it familiar with the materials and sites it should seek for shelter and protection in the wild? (will your bunny run out in the open, or under brush when frightened? Are you providing additional nesting boxes for squirrels at the release site? )

Does it know not to stay out in the open? (was it given adequate covered areas in cage to hide?)

Are the weather conditions favorable for at least 5 days? (no rain, high winds or temperature extremes)

Is the community receptive to that species? (releasing domestic ducks on a community lake without permission is a problem waiting to happen)

Is the animal mature and cautious enough for release?  
(not all animals emotionally mature at the same rate; being "brave and outgoing" is a characteristic that immature juveniles have which will inevitably put them in a dangerous situation)

Are you releasing it because the animal is ready? (or because you want to go on vacation, have guests coming, are burnt out, etc....What makes it ready now that didn't apply before?)

Has it had an opportunity to hear the distress calls of it's own and other species? (or will it be the only one still sitting around when everyone else runs for cover?)

When appropriate, release orphans with an adult of same species.  
When appropriate, release in small groups.

## BIRDS

Have migratory birds had access to view overhead sky and stars?

Has it had at least two weeks of flight practice?

Is it waterproofed?

Are birds of the same species in the area?

Will it be accepted by it's own species? (male cardinals, mockingbirds, crows, etc., may be chased out of the area by the resident bird or flock) (swans view an unfamiliar swan as an interloper) (crows, swans, pigeons, etc, should be released in groups)

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## Part 11: ADVANCED MEDICAL CARE MICROSCOPE TECHNIQUES

Use of microscope for pigeon health

A microscope is simply a tool and, as with most tools, it requires different techniques for different jobs. In fact, there is a bewildering amount of different techniques for isolating various pathogens. This will become clearer as you learn a few tests for your pigeons.

The first test you should do is for coccidia. A word about coccidia—it's an organism that invades its host as a community.

It's considered a parasite even though it doesn't assume the form of a multi-celled organism like a roundworm. Virtually all pigeons are infected with these things (actually, different species of them infect most animals on earth and you can use this technique on all of them—you can even check yourself and other family members!).

You can never completely clear a pigeon of them, but you can control it. Most of the time, a pigeon lives with it in something like a "dormant phase" and it doesn't bother them at all. It's only when they get stressed, sick with something else or have ingested too many of the oocysts (the "eggs" that you'll be looking for in your microscope) that the infection turns into a life-threatening disease.

I'd have to say that the majority of pigeons that I get that need medical help are dying of coccidiosis. And most of those are young pigeons that are having a hard time learning how to properly forage for food. They start starving and eating dirtier stuff and get REALLY sick.

The things that you're going to need for this simple test are your microscope, slides, coverslips, some kind of really small vial, a small bottle of saturated saltwater, a Q-Tip (toothpick, wooden matchstick, whatever) and a pretty good sized eye-dropper.

Some of this stuff could use some explanation:

**MICROSCOPE:** A good lab-quality microscope is NOT going to come cheap (not easily, anyway). I got a 30 year-old scope for US \$275 that only has three objectives but is binocular (two eyepieces) and that was actually a pretty good deal. You don't need a binocular scope but they sure are easier on the eyes (unless you only have one) if you're going to spend hours doing it. It's when you spend a LONG time examining things because you don't know what they are that you REALLY start getting eyestrain.

I did look through a kid's microscope to see if I could see the coccidia oocysts through it and I could. They weren't as sharp, but you CAN identify them. Remember, it's a tool—you're trying to save the life of a pigeon so if it's all you can afford and it works... it's good enough. Now, a cat, of course, would rather die than be diagnosed with inferior equipment so don't bother. (Oh, come on! I was just joking! Don't call the SPCA!!! I'm making out a check right now...)

**COVERSLIPS:** The little squares of flat glass or plastic that are used to cover the samples on some slide preparations. They come in different sizes as well as different thicknesses. A "No. 0" size is generally used if you're going to be using the 1000x oil immersion combination (10x eyepiece X 100x objective lens) because a No. 1 size is thick enough that the lens might adjust right down on it and break it as well as do possible harm to the microscope's adjustment gears (depends on the scope).

If you don't have coverslips for this test, then you're going to have to check to see that your microscope focuses with enough clearance above a two-slide stack in the 100x configuration. That is, you're going to use either a full slide or a broken piece of a slide (disclaimer: author not FINANCIALLY responsible for anyone cutting themselves with a broken slide) and put a hair in between the slides. Put the stack in the microscope with the lens adjusted up out of the way, center the hair where it should be visible through the smallest magnification lens and then begin to focus carefully until you can see it plainly. If your smallest lens is a 4x objective, then rotate the 10x objective into place and make sure it doesn't hit the doubled slide. Refocus carefully. If that won't work, get some real coverslips for this online through a scientific supply retailer or at an educational/scientific/laboratory store in a location near you.

VIAL: Think of a vial as a real small test tube. The vials that I use are from a commercial lab supply but you don't need anything that difficult to come by. It's best if they're pretty small—mine are glass and hold slightly less than one teaspoon. They're about 3/8" in diameter, 1-1/4" tall and flat bottomed. Another thing that could work is one of those plastic boutonniere water-holding thingies. I think they come on corsages as well. Everybody has one of those laying around, right? If you can't find anything in the house that'll work, you're going to have to search the drugstore until you find something that will. I just tried looking through the house for a suitable replacement and the only thing that I came up with was half of a ballpoint pen or pen cap. You can't see through them, but they'd work in a pinch. If it's a tapered pen half with a hole in the bottom for the point to stick through, you're going to need to make a base and seal the hole. I'd use fresh-chewed gum stuck to the tapered end with a piece of paper on bottom to keep it from sticking to anything else.

The idea here is to get achievable results RIGHT NOW instead of languishing in the throes of defeat because you've got to go shopping in some other city or online and wait for days, weeks or months for results. That's why you CAN substitute for decent equipment here. After all, you're looking at poop, not performing rocket science. The rocket scientists made the microscope and you've ALREADY bought that. This test is called a "float." They call it that because you're going to put a fecal sample in some saltwater and float the parasites to the top. They float for the same reason you would in the Great Salt Lake in Utah—you're lighter than the water. Worm eggs, coccidia oocysts and some other things tend to float right out of the poop when the saltwater solution is "saturated."

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## COMPREHENSIVE DRUG REFERENCE

Drug Chart - Drawn up by Nooti

Nooti/ Helen's drug chart had been archived.

Here's a list of drugs which I have used successfully for years and the ailments which are sensitive to those particular medications.

I have used the generic names first and the brand names in brackets which people will be familiar with. These brand names can be different in different parts of the world but the active ingredient is the same.

ENROFLOXACIN (Baytril)

Dose - 10-20mgs per kilo - BID (twice daily) 7 - 21 days

Effective against small surface wounds containing aerobic bacteria, oral E.coli and salmonella -(Paratyphoid) and some respiratory infections involving the bronchial tubes.

It is ineffective against anaerobic bacteria and should not be used for any gut bacterial problems or deep puncture wounds which involve anaerobics.

TRIMETHOPRIM/SULPHONAMIDES (Septrin, Bactrim, Co-trim,

Tribrissen, Septra, Sulphatrim)

Dose - 50-100mgs per kilo. BID 7 days

Effective against most anaerobic bacteria and therefore suitable for gut bacterial infections and coccidial overburdens. The very best of this family of drugs is Trimethoprim Sulphamethoxazole- (Septrin) which effects a cure in 99.9% of cases if caught early. Can be used in conjunction with penicillins. It is ineffective in the presence of necrotic tissue.

AMOXYCILLIN AND CLAVULANIC ACID (Synulox, Clavamox)

Dose - up to 50 mgs per kilo BID if injection or up to 125mgs per kilo TID (three times daily) orally- up to 3 weeks. Dose and dosing interval determined by infection site, severity and organism involved.

Used to treat severe or deep puncture wounds, and helps greatly in preventing the spread of necrotic tissue. Is also effective against gut E.coli.

It is not recommended that this drug be given orally in the case of critically ill patients as absorption from the GI tract is unreliable, however many people do not have access or knowledge to give by injection so orally is the only option and better than nothing.

This drug has a much broader spectrum than Baytril and therefore will treat a much greater range of ailments. Can be used in conjunction with Trim Sulphas. Refrigerate oral suspension and discard after 10 days or if liquid becomes dark. Avoid concurrent use with tetracycline, erythromycin and chloramphenicol.

METRONIDAZOLE (Flagyl, Torgyl, Stormogyl)

Dose 20-50 mgs per kilo BID or 40-100mgs per kilo OID (Once daily)- 14 days.

In very rare cases, liver damage can be caused by prolonged use over 14 days - but it is very rare and one must balance the risks.

If maintained for 14 days or more it is highly effective against a severe infection of trichomonas gallinae and in preventing an inside recurrence- (not reinfection from an outside source, ie another bird).Used for anaerobic, (flushing deep wounds), and protozoal infections. Can be given concurrently with Amoxy and Trim Sulphas.

DEXAMETHASONE (Duphacort Q, Colvasone, Dexadreson,

Dexafort)Dose 0.3-1mg per kilo OID or BID or q (every) 48hrs until not needed. Use higher doses for shock and trauma.

Dexamethasone is a corticosteroid whose anti-inflammatory potency is 7.5 times greater than prednisolone and is suitable for high-dose therapy. It is also an appetite stimulant.Used for concussion in the main but can be used if given on

alternate days as an appetite stimulant for birds who -despite showing no obvious symptoms or have been through a long drawn out illness, simply refuse to self feed. When discontinuing after chronic therapy, dose should be tapered off - ie every alternate day until cessation. Chronic use or abrupt withdrawal of drug may lead to development of Cushings Syndrome as the drug depresses adrenal gland function.

#### FENBENDAZOLE (Panacur)

Dose - 10-16mgs per kilo as a one off dose - can be repeated in 10 days if targeting nematodes. Give for 3 consecutive days if targeting Syngamus Trachea (lungworm) or microfilariae and trematodes. 5 consecutive days if targeting capillariasis. I often just give a one off dose but will repeat depending on severity of infection.

Note - if targeting Syngamus trachea - a course of Amoxy and Clav acid should be given for at least 14 days afterwards as the worms are in the lungs and not the digestive tract so are not excreted and the bodies will rot in the bronchial tubes where they lie, causing severe infection.

#### HARTMANN'S SOLUTION (lactated ringers)

This is used as a water/electrolyte replacement therapy. As a general rule 40-60mls per kilo per day is a maintenance dose. In cases of severe dehydration double or triple the dose. Can be injected IV, (intravenously) SQ (Sub cutenously)or IP (intraperitonium) (recommended for speedy recovery).

LECTADE - as above but for oral use only

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#### The Nitroimidazoles and other Therapeutic Agents Reviewed

We frequently discuss the antibiotic properties of Metronidazole here at PT, and wonder about the rest of the family and where they stand in terms of antibiotic activity against anaerobic bacteria.

Metronidazole has been studied the most which would explain why we hear about it more frequently as a treatment for anaerobic bacteria, though others in the family apparently do also. There may be other considerations in terms of what each member has to offer in treating for organisms such histomoniasis.

The 5-nitroimidazoles are a group of drugs that have both antiprotozoal and antibacterial activity. Nitroimidazoles with activity against trichomonads and amebae include metronidazole, tinidazole, nimorazole, flunidazole, and ronidazole. Metronidazole and nimorazole are effective in the treatment of giardiasis, while dimetridazole, ipronidazole, and ronidazole control histomoniasis in poultry. Several nitroimidazoles have activity against trypanosomes. Metronidazole, ronidazole, and other nitroimidazoles are active against anaerobic bacteria.

Metronidazole is the compound that has been the most studied and is discussed as the prototype of the group.

Metronidazole:

This has been used for many years in the therapeutic management of trichomoniasis, giardiasis, and amebiasis. It is active against obligate anaerobic bacteria. It is not active against facultative anaerobes, obligate aerobes, or microaerophilic bacteria other than *Campylobacter fetus* and *Corynebacterium vaginalis*. At concentrations readily attained in serum after PO or parenteral administration, metronidazole is active against *Bacteroides fragilis*, *B. melaninogenicus*, *Fusobacterium* spp, and *Clostridium perfringens* and other *Clostridium* spp. It is generally less active against nonsporeforming, gram-positive bacilli such as *Actinomyces*, *Propionibacterium*, *Bifidobacterium*, and *Eubacterium* spp. Metronidazole is also somewhat less active against gram-positive cocci such as *Peptostreptococcus* and *Peptococcus* spp, but the less sensitive strains are usually not obligate anaerobes. Metronidazole is bactericidal at concentrations equal to or slightly higher than the minimal inhibitory concentration. The precise mode of action is unclear, but it seems that after the drug enters a susceptible organism it is first reduced and then binds to DNA, causing loss of the helical structure, strand breakage, and impairment of DNA function. Only susceptible organisms (bacteria and protozoa) appear to be capable of metabolizing the drug.

The pharmacokinetic pattern of metronidazole generally follows that expected of a highly lipid-soluble basic drug. It is readily but variably absorbed from the GI tract (bioavailability 60-100%), with serum concentrations peaking within 1-2 hr, and becomes widely distributed in all tissues. Metronidazole penetrates the blood-brain barrier and also attains therapeutic concentrations in abscesses and in empyema fluid. It is only slightly bound to plasma proteins. Biotransformation is quite extensive, and parent drug and metabolites are excreted by both the renal and biliary routes. The elimination half-life in dogs is ~4.5 hr, and in horses, 1.5-3.3 hr.

The principal clinical indications for metronidazole include the treatment of specific protozoal infections (amebiasis, trichomoniasis, giardiasis, and balantidiasis) and anaerobic bacterial infections such as those that may be seen in abdominal abscesses, peritonitis, empyema, genital tract infections, periodontitis, otitis media, osteitis, arthritis, and meningitis, and in necrotic tissue. Metronidazole has been successfully used to prevent infection after colonic surgery. Nitroimidazoles also act as radiosensitizers, and metronidazole has been used as an adjunct to the radiotherapy of solid tumors. Side effects are not commonly associated with metronidazole.

High doses may induce signs of neurotoxicity in dogs, such as tremors, muscle spasms, ataxia, and even convulsions.

Reversible bone marrow depression has been reported. The drug should not be used in pregnant animals, particularly during the first trimester, although the evidence for carcinogenicity and mutagenicity is still tenuous. Metronidazole may produce a reddish brown discoloration of the urine due to unidentified pigments.

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## Avian Anatomy

As an avian veterinarian, I often use words like *choana* and *cloaca*, and when I do, I can easily visualize in my mind exactly what these body parts look like, and it's hard for me to realize that often, the owner doesn't understand what I'm saying. Let's take a learning tour through the bird, both externally and internally, so that bird owners will have a better idea of the anatomy.

In some areas, birds are similar to other animals, and in others, they are absolutely unique. For example, the bird has several unique adaptations that enables it to fly, including feathers, air spaces in bones, a beak in place of teeth and lips and the bones of the hand fused to support flight.

The head of the bird contains several structures that may confuse bird owners. The *bill* or *beak* is known anatomically as the rostrum. Now bear with me as I use some technical terms to explain common anatomical parts, but I think it's important that you see the scientific terms for the bird's anatomy, even if you won't commit them to memory on sight! The horny sheaths of the upper and lower beak can be called the *maxillary rhamphotheca* (or *rhinotheca*) and *mandibular rhamphotheca* (or *gnathotheca*). If you tip the head back, you will see a fleshy area under the lower mandible, and this is called the *interramal region* or *interramal space*. The tongue and related structures are nestled in this region. Sometimes, the first time an owner sees this region, they panic and think a piece is missing out of the beak. But, be assured, this space is normal. The maxillary rhamphotheca carries the paired nostrils or nares. Inside the nares of most parrots is a small, round, brownish structure called the *operculum*. Next time you take your bird out, closely examine the inside of the nostril, and you may see the operculum, which is quite obvious in the cockatiel and Amazon parrot. This may be mistaken for a seed or dried hand-feeding formula in the nostril, but the operculum is supposed to be there. However, if a bird is suffering from malnutrition or chronic sinus infections, a rhinolith (a mass formed of desiccated secretions and debris) may cause a physical obstruction to proper breathing, and it may disfigure the nares. Rhinoliths must be differentiated from the normal operculum found inside the nostril. In some birds (owls, parrots and pigeons) there is a fleshy band at the top of the rhinotheca that contains the nostrils or *nares*. This is called the *cere*. The cere is swollen, highly sensitive and may be feathered. In the budgie, the color of the cere in a mature bird may indicate the sex of the bird.

Inside the bones of the bird head are the *sinuses* and *concha*. These are hollow spaces normally, but with infection, they may become clogged with liquid, mucus, abscess material or debris. One sinus is found behind the eye, which is why some birds with respiratory and sinus infection may develop swelling and discharge from the eye.

Inside of the mouth, the *oropharynx*, contains the tongue, glottis, choana, palate, salivary glands, esophagus, opening of the avian equivalent of the Eustachian tubes (the *pharyngotympanic tubes*) and laryngeal mound. The tongue has a bone in it. The tongue is adapted for collecting food, manipulating food and swallowing. For example, the tongue of the birds in the lory and lorikeet families is the most specialized of the parrots. The lory tongue is called a "brush-tongue," which refers to a cluster of elongated papillae that

are normally only visible when the bird is feeding on liquid or soft foods, or when preening another bird.

At the base of the tongue, the glottis and the laryngeal mound are located. The larynx of mammals is used for vocalization, but it is the syrinx, located down much further, that is responsible for sound production in birds. The glottis is the opening to the windpipe, or *trachea*. The *choana* is located on the roof of the mouth. It is a slit that connects through some passages to the nostrils. One really neat difference that birds have is that the glottis will fit snugly into the choanal slit when the bird closes its mouth, and the bird will then have a closed connection from the nostrils to the windpipe. When a human breathes through the nostrils, the air goes through the back of the throat, which is an open area, to the trachea through the larynx. There are little projections, called *papillae*, that normally are found at the edges of the choanal slit. Other papillae, pointing towards the back of the throat, may be found in the oropharynx. A second, smaller slit is located behind the choanal slit. This is the opening to the middle ears, the *infundibular cleft*, of birds, connected by a tube, called the *pharyngotympanic tube*. Birds with middle ear infections often have a red, swollen cleft. This cleft is important for birds that fly at great altitudes, as it helps equalize pressure in the middle ear. I'll bet you never thought that birds ears might pop when they ascend during flight, like ours do when we humans fly!

In the past, it was thought that birds had a poorly developed sense of taste. Taste buds lie at the base of the tongue, in most species of birds. Some birds have taste buds on the inside of the tip of the lower and upper bills and there are several sites on the roof of the oropharynx, near the choana. In parrots, the taste buds are on the roof of the oropharynx on either side of the choana, and on the floor of the oropharynx at the front end of the laryngeal mound. Mallard ducks have less than 500 taste buds, compared to the 10,000 of a human and 17,000 in the rabbit. Birds do have a sense of taste, and do show definite taste preferences, as we all know!

Examination of the oropharynx is extremely important when a bird is evaluated by an avian vet. I use a strong, focal light source and magnification to closely evaluate the choana, papillae and infundibular cleft. It gives the experienced avian vet a tremendous amount of information regarding the overall health of the bird. If the choana is swollen, if the papillae are blunted or absent, if the infundibular cleft is reddened, if abscesses are present, or if thick, white ropy mucus is present, it gives the vet a good idea if malnutrition, vitamin A deficiency, bacterial or yeast infection or middle ear infections may be present, to name just a few. Internal papillomatous disease (papillomas) can occur throughout the gastrointestinal tract, and lesions may be present in the oropharynx. They may look like small, pink wart-like lesions. If your vet does not closely examine this area during a check-up, ask her why. It should be examined in every bird!

The oropharynx is variably colored in different species of birds. It may be pink, black or mottled. It takes experience to determine if the throat is blotchy pigmented, or if disease is present. For example, the oropharynx of the blue and gold macaw may be uniformly black, or it may contain pink areas. Pink areas could indicate internal papillomatous disease, or they could be normal. I always recommend that breeders get into the habit of examining the oropharynx of all of their baby birds daily, to look for changes that could be a problem. It is easy to begin learning the normals from the abnormal, if a breeder looks at the throats every day.

The rest of the head is divided into three regions, the *forehead*, *crown* and *back of the head*, and the three areas together are sometimes called the *pileum*. The *orbital region* is a narrow zone around the eye, and includes the eyelids. The *ear region* surrounds the ear opening, called the *external acoustic meatus*. The *ear coverts* are feathers that overlie the meatus, and have a different texture than the other head feathers. In most birds, the meatus is behind and slightly below the level of the eye. Next time you are scratching your bird's head, gently part the feathers in this area and take a peek at the external ear opening. There have been times when I was performing a new bird pre-purchase exam and I was the fourth or fifth vet to see the bird, and no one else had made a note of the fact that the bird was missing an external meatus on one side! This area is often overlooked when a bird is examined. Macaws that started out as stunted babies may have external acoustic meatus problems from infection or scarring. Lovebirds seem to be more prone to external ear infections (*otitis externa*) than other species of birds.

The meatus opening is often just a small hole, but in the owl it is huge. Some owls have a movable flap along the front edge, called the *operculum*.

Birds are almost all intensely visual animals. One indication of this is by the size of the eye, which is extremely large in relation to the rest of the head. Some owls and hawks have eyes that are absolutely as large or even larger than those of a human. The relatively large eye of the bird permits a correspondingly large image to be projected on the retina, which contributes to the excellent acuity of avian vision.

One interesting difference between the primate eye and the bird eye is that the primate lens filters out wavelengths of light below 400 nm which renders ultraviolet radiation invisible. However, the bird lens is optically clear and appears to transmit wavelengths of light down to about 350 nm, which makes near ultraviolet radiation visible to the bird, and absorbing only those ultraviolet wavelengths that are not dangerous to the bird. Current research indicates that birds may secrete a substance from the uropygeal (preen) gland that is spread on the feathers and is visible in the ultraviolet range. It is suspected that this may be one way that a bird may visually discern the sex of other birds, through the differences in ultraviolet color in the feathers. This has not been proven, yet, however. But it is known that birds can see the three visual pigments that normal humans can see, called *trichromatic*, and they may be *tetrachromatic* because they may be able to see in the ultraviolet range.

One would think that birds can see color, based on the spectacular plumage of many birds, such as the brightly colored lorries, flashy peafowl and gaudy macaws. And this is correct. There are two different types of cells found in the retina of the eye, the *rods* and *cones*. Rods are sensitive to the intensity of light, so it makes sense that nocturnal (night active) birds such as owls have mostly rods. The cones are responsible for visual acuity (the sharpness with which detail is perceived) and color vision. Diurnal (daytime active) birds have far more cones than rods.

Without going into detail, some birds have remarkable adaptations. For example, the eye of water birds and birds that live on open plains have a special area of the retina that can

fix the horizon accurately as a reference point. Isn't that amazing? The anatomical characteristics of the diurnal avian eye make it likely that it could see an entire panorama as accurately as a mammal could see a single detail. For example, both a bird and a human should be able to see a mouse from a height of 250 feet, but the human could only do so if his attention were accurately directed to it, but the bird should be able to see it without looking directly at it. Also, the bird should be able to see all the mice in the field with a single glance, whereas the human could only do this by scanning the area laboriously. Birds can assimilate detail much faster than a mammal, and should be better able to detect and follow movement. Owls can gather light much more effectively than humans, and would be able to see a mouse at the opposite end of a football stadium in what we would perceive as pitch darkness. Diving birds that must see underwater have two separate areas on the retina for focusing, since the eyeball becomes deformed by the water pressure when they are underwater. Aren't birds just remarkable?

Birds have three eyelids, and so do dogs and cats. The upper and lower eyelids have small bristle feathers that resemble eyelashes. Most birds only close their eyelids during sleep, and use the third eyelid alone for blinking. The third eyelid, the *nictitating membrane*, lies beneath the eyelids on the side of eye closest to the nostril. It darts across the eye about 30-35 times per minute in the domestic fowl, and also moves across the eye if an object approaches the eye suddenly or if something touches the head. The third eyelid becomes scooplike and sweeps excess fluid in to the corner of the eye where it drains. In most birds, the nictitating membrane is transparent, so vision is not impaired when the eyelid blinks, which is important since so many birds are prey animals. It helps to be able to see when blinking! It is suspected that some birds may fly with the third eyelid covering the cornea of the eye, which prevents it from drying out during flight, acting like birdy goggles.

The *iris* is the colored portion of the eye, and the pupil is the hole that allows light in. The iris often changes color as a parrot matures at a predictable time. Many baby parrots have a grey iris, which is one easy way to determine age in a young bird. The iris of the African grey parrot and blue and gold macaw is grey when they are babies, and gradually changes to a yellow color when the bird is between 10 and 16 months of age, although this is variable. Baby Senegal parrots also have a grey iris, that changes to a yellow-orange color by about 12 months of age, however, it has been reported that the iris of parent-fledged Senegals raised outdoors in Florida will have an adult colored iris upon fledging.

The *lore* (from the Latin, *lorum*), is a narrow elongated area between the eye and the maxillary rhamphotheca. This area is directly in front of the eye, and in many species of birds (songbirds, native American birds) there is a straplike line, the lore stripe or lore line, beginning at the maxillary rhamphotheca and running to the eye area. Behind the eye area, this stripe continues as the eye stripe. These two stripes together form the lateral stripe. The lore not only carries a stripe, but it may have special feathers, such as lore bristles, or it may be naked. The Red-Lored Amazon, (not Red-Lord, as I often see it written in newspapers) *Amazona autumnalis*, and the Yellow-Lored Amazon, *Amazona xantholora*, are both named for the color found in the lore area on the head.

There are many different adaptations of the bill in birds that vary tremendously in structure depending on the functions necessary and the diet consumed. The bill functionally replaces the lips and teeth of mammals. Another unusual feature of the upper jaw of the bird is that it is moveable, unlike that of mammals. This is made possible by elastic zones in the bones of the face. Psittacine birds have a very strong beak and are also known as hookbills, for obvious reasons. Some parrots have rasplike ridges that run transversely inside the upper bill which can reduce the hardest pits to dust. If you peek up into the upper beak of a macaw, these ridges will be very obvious. Seed-cracking birds such as finches and canaries have a stout, conical beak. There are birds called crossbills, with sharply-pointed upper and lower components of the bill that cross over to hold the scales of fir cones apart so that the tongue can remove the seeds. Hummingbirds consume nectar and pollen and have a bill adapted to penetrate deeply into the throats of flowers. The Hawaiian goose has a specialized bill that can crop vegetation. Flamingoes and many ducks have a series of plates in the bill that filter out small organisms by straining water. Pelicans have an extensive interramal region that has developed into a pouch-like dip net. Anhingas can spear fish with a daggerlike beak. The beak of birds of prey is a hooked bill that is powerful and sharp-pointed. One very interesting bill belongs to the European Nightjar. It is a short wide bill with *riotal bristles* for netting insects while in flight. The rictal area is along the sides of the upper and lower mandibles, and in the Nightjar, they appear as a moustache that acts as a net to catch insects when the bird's mouth is open.

The bill resembles skin microscopically, because it contains dermis and epidermis. But the epidermis is very thick and contains calcium and keratin, which gives the bill its typical hardness. Although the bill of most birds is thick and hard, it is soft and leathery in some waders. The bill is only hard at the tip in ducks and geese.

The beak has a *bill-tip organ* in the upper and lower bills. This organ is very sensitive and is used by the bird to feel the environment, and allows the bird to discriminate between food and other particles. It makes sense that a bird like a duck or goose that must sift through the mud to find food will require a method of feeling with its beak like how we might use our sensitive fingertips. Because the beak is so sensitive, no one should EVER intentionally cut a beak back short enough to make it bleed as a method of "attitude adjustment." The bird relies on its beak like we use our fingers, so it is dangerous and cruel to cut a beak to the bleeding point. Overgrown beaks are like our fingernails. The dead portion of the fingernail and beak have no feeling, but may transmit heat and vibration. So, the overgrown beak may be safely trimmed back to normal length without causing pain to the bird. A good avian vet knows what a normal beak shape and length should be, so that it can be properly trimmed. The nerve endings for the beak are in channels that can be seen as white dots in a black beak.

The newly hatched baby bird has a small pointed hardened process on the front portion of the upper beak, called the *egg tooth*. The egg tooth is used by the hatchling to pip into the air cell of the egg, and then to break and unzip the shell. It is then shed sometime after hatching.

The neck is another interesting area of the bird. Some birds have very long necks (think of the graceful swan, the goose and the flamingo). Humans have seven cervical (neck) vertebrae, which are the bones that surround the spinal cord. Birds have between 11 to 25 cervical vertebrae, which varies with the length of the neck. Nature designed the bird so that the minimum length of the neck is long enough to enable the bird to reach the uropygeal gland (also called the preen gland, found at the base of the tail in species that have one) so that it can properly preen. The neck is usually proportional to the length of the legs. So, long legs are generally found with a long necked bird, which enables the bill to reach the ground. But a long neck doesn't have to accompany long legs (think of the goose). The shortest necks are found in the small passerine birds. In the neck, the esophagus moves from the center of the mouth to the right side. This is the reason that some people recommend feeding baby birds from the left side of the beak, with the syringe pointing to the right, although, in reality, it shouldn't matter which side of the beak a baby bird is fed from. The trachea (windpipe) also curves to the right in the neck. Also found in the neck are the paired jugular veins, with the right jugular usually being much larger. Avian vets may use the right jugular vein to draw a blood sample.

Generally, the neck is carried in a double curve, which forms an "S". Since the forelimb has been completely committed to flight in birds (as a group, although some birds, such as the emu and ostrich cannot fly), the bill has assumed the ability to perform many functions normally carried out by the mammalian forelimb, such as grooming and nest building. Anyone that owns a parrot knows that the beak is used, along with the tongue, to explore its environment. A person unfamiliar with birds may pull away when a bird that has had a hand extended to it to be picked up, reaches beak-first towards the hand prior to stepping aboard. The novice may incorrectly assume that the bird is going to bite him, but the bird is just using the beak to test the waters, so to speak, prior to stepping up.

Since the neck forms an "S" curve, it protrudes forward in the front, above the level of the crop. Often, this may be mistaken for a tumor or abnormality in the neck, especially when the crop is empty and the bird is sitting comfortably. Because the neck has more vertebrae than a human's and mammal's, the avian neck is extremely flexible, mobile and strong. We've all seen how easily a owl can turn its head so much farther around than we can. When a bird is comfortably restrained by an avian vet, the head and/or neck is held. The neck is considered one of the strongest parts of a bird's body, and it is almost impossible to injure a bird by holding it by the neck (as long as the windpipe is not closed off), let alone break its neck, when it is properly restrained. Often, people think, when they pick up a limp, dead bird, that it must have broken its neck, because the neck is so limber. It rarely is the cause of death. Birds that fly into a window or other solid structure may die, often of a concussion or other trauma, but in all my years of practice, I have only seen two birds with fractures of the cervical vertebrae.

In the front part of the neck of parrots, the crop (or *ingluvies*) is found. It is actually an outpouching of the esophagus, the tube that carries food from the mouth to the stomach. Many people think that all birds have a crop, but some do not, including the gull and penguin. In the parrot, it is oriented transversely across the neck. In pigeons and doves, the lining of the crop is shed when they are feeding babies, for the first few days. This is

called crop milk, and it resembles mammalian milk in that it is rich in fat and protein, however, it lacks carbohydrates and calcium, and contains no milk sugar (lactose). The crop, in baby parrots, is very large, and shrinks down as the bird weans.

The trunk is the whole body of the bird between the neck and the tail. It is divided into the *thorax*, *abdomen* and *pelvis*. The thorax is bounded by the rib cage, sternum (keel) and vertebral column (backbones). The abdomen and pelvis aren't separated by any well-defined boundaries. The top part of the trunk is divided into the *back* and *rump*. The region between the right and left shoulder blades (*scapulae*) is called the *interscapular region*, and often carries distinctive streaks or colors. The whole back, combined with the top surface of the wings, is called the *mantle*. Often these anatomical descriptions are used by judges during bird shows. The side area of the trunk is called the *flank*. The underside is divided into the *breast*, *belly* and *undertail*. Another area, the *crissum*, refers to the general area around the vent, along with the undertail covert feathers. The term, *vent*, should only be used to describe the actual orifice, and not the general area under the tail.

The tail contains the flight feathers called *retrices* (which is Latin for rudders). The retrices are always paired, with the central one lying on the midline. The majority of birds have six pairs of retrices, but the number ranges from 6 to 32. *Tail coverts* are small feathers that lie over and under the retrices. Interestingly, the coverts are greatly enlarged in the peacock, and form the eyed feathers of the train. The *pygostyle* is the end-most bone of the spinal column. You may be more familiar with the term "the Pope's nose" for this extraneous piece found on a chicken thigh. If this bone has been fractured or injured, a male bird may not be able to successfully copulate with the hen.

Moving on to the wing, we find that it is unique, as it is adapted for flight. Many of the bones have become fused, and the skeleton of the hand (*manus*) has undergone considerable simplification. In addition to the bones of the wrist being consolidated, there are only three "fingers." The smallest one is called the *alula*, and the other two are called the *major digit* and *minor digit*. These "fingers" have reduced phalanges (our fingers have three phalanges each, except the thumb, which has two). Most commonly, the alula has one phalanx, the major digit has two, and the minor digit has one. The *propatagium* is that elastic triangular fold of skin on the leading edge of the wing. This is the area where a tattoo is placed when a bird is surgically sexed.

The feathers on the wing are divided into flight feathers (*remiges*), further divided into primary and secondary flights and coverts. The primaries are the last ten wing feathers on the wing, and are numbered from ten to one, outermost to innermost. The secondaries begin at the first bend of the wing, and are numbered one to twelve, from the bend inward. When wings are clipped, it should never be necessary to cut any feathers other than primaries, no matter which method is used.

The bones of the leg have also been modified. The thigh bone (*femur*) is the same as is found in mammals. The knee joint follows at the joint below the femur. The next bone is different from that found in mammals. Several bones have fused to form the *tibiotarsus*

bone. Basically, the ankle bones fused with the bones of the arch of the foot to form one long bone. There is still a small fibula bone present. The next joint is called the *intertarsal joint*, and humans don't have one. The bone below that joint is called the *tarsometatarsus*, which also consists of fused bones. Think of the flamingo leg and how when you watch one walk, it seems as if the "knee" is bending the "wrong" way. That's because the elongated tarsometatarsus looks like the shin bone, so you think that the joint (if it was the knee) should bend in the other direction. But actually the knee is up in the feathered area of the leg, which DOES bend the same way ours does.

In most birds, the digits (toes) I through VI are present (we have five digits, numbered I through V). In most birds, the first toe is usually directed backwards, and the other three point forward, and this is technically known as the *anisodactyl foot*. However, in parrots, digits II and III point forward, and digits I and IV are directed backwards. This type of foot is called the *zygodactyl foot*. Swifts have a foot adapted for climbing, and all four toes point forward, and this is called the *pamprodactyl foot*. Emus, rheas, many wading birds and some woodpeckers only have three functional toes, and in most of these birds, it is the first digit (the *hallux*, which is similar to the big toe of man) that is lost. The ostrich has only two toes, with digits I and II being lost.

Some of the bones of the avian skeleton are hollow and connected to the air sacs of the respiratory system. Most of the vertebrae, pelvis, sternum and rib bones are hollow and the marrow has been eliminated. The limbs vary in the degree of *pneumaticity*, and there are pneumatic spaces within the bones of the head, as well. This is important to reduce the weight of a bird to allow it to be light enough for flight.

The skin of birds is different from other animals in several ways. For one, only birds have feathers. Some birds have ornamental outgrowths, characterized by thickened skin that has many blood vessels. For example, some birds have a *comb*, a bright red vertical projection from the forehead and crown. Some birds also have *wattles*, which are naked folds of skin that hang down from the mandibles. Some birds have *ear lobes*, which are folds of skin, that may be red, white or purple. The *snood*, also called the frontal process, and is a distensible fleshy process arising on the head between the eyes and nostrils of the turkey. Turkeys also have *caruncles*, which are small protuberances of skin on the head and upper neck.

The skin of birds contains no sweat glands, so birds rely on evaporative cooling from the respiratory tract. The main gland of birds is the *uropygeal gland*, and is present in most birds and may be relatively large in some aquatic species. It is absent in the emu, ostrich, many pigeons, Amazon parrots, and the hyacinth macaw, for example. Another adaptation with avian skin is the *brood patch*, an area over the breast that becomes thickened, very vascular and the feathers are lost during the brooding period. These modifications promote the transfer of heat from the hen to her eggs.

There are seven types of feathers, the *contour*, *semiplume*, *down*, *powder down*, *hypopenna*, *filoplume* and *bristle* feathers. The contours cover the surface of the body, and arise from feather follicles. The follicle consists of a living part and a nonliving part.

Growing feathers, or *blood feathers*, have an active blood supply until the feather is grown out completely. If a bird plucks out a feather from a follicle repeatedly, it may eventually destroy the living portion of the follicle, resulting in a follicle that can no longer grow a feather. Feathers molt out when a new feather is developing in the follicle and the old feather is then pushed out. Normally, a plucked feather will begin to regrow from the follicle immediately, but a cut feather will not be lost until it is molted out. Most birds replace all their feathers yearly, and this is a continuous process, however, some birds molt during a particular time frame (for example, after breeding season, or in the summer).

The skin of birds has distinct, well-defined tracts called *pterylae* that contain the feather follicles for contours. The bare spaces between the pterylae are called *apteria*.

The digestive system has some unique avian features. We have already talked about the crop, the outpouching of the esophagus. The esophagus connects to the crop and then travels through the bones at the top of the keel. The esophagus then connects to the stomach. The avian stomach is unique. The first portion of it is called the *proventriculus*, and this is the part with glands in it that secretes gastric juice. The second part of the stomach is called the *ventriculus*, or gizzard, and it is where digested proteins are broken down and where grinding occurs. When a bird has PDD, proventricular dilation disease, the nerves to the gastrointestinal tract are usually affected, and the proventriculus will become dilated, thin-walled, and impacted with food items. The ventriculus may also become more mushy and less muscular.

Some birds have paired *ceca* (our appendix is really called the *cecum*, which is the singular of ceca). The big difference occurs when we examine the tail end of the digestive tract. Most people know that birds only have ONE external opening, called the *vent*, and the internal chamber, or cloaca, that is used for urination, defecation and reproduction. Inside the *cloaca*, there are three separate compartments, called the *coprodeum*, the deepest compartment, and is the terminal end of the rectum. The next cloacal compartment is the *urodeum*, and this is the middle section that collects urine and urates from the *ureters*, that drain the kidneys. In the hen, the left *oviduct* opens into the urodeum. When an egg is travelling through the reproductive tract of the hen, it enters the urodeum before it passes out through the vent. The last compartment, just inside the vent, is the *proctodeum*. This compartment contains the avian *phallus*, if one is present. The phallus differs from the mammalian penis in several ways, the major ones being that it is just a copulatory organ and that it does not function to drain urine. Male ratites (ostrich, emu, rhea), ducks, geese, swans and some domestic fowl and turkey possess a phallus. Male parrots do not. The proctodeum is also the site of the *Bursa of Fabricius*, an organ that produces cells to fight infections. The bursa is unique to birds and should always be harvested for histopathology if a baby bird dies, because it is often very helpful in diagnosing many avian conditions and diseases. The bursa begins regressing, called *involution*, several months after hatching, and will usually be completely involuted by sexual maturity, in most birds.

The urinary system of birds is different from mammals, as birds produce both urine and urates. The kidneys possess two different types of *nephrons*, the units that filter the blood to remove toxins and products of metabolism. Birds cannot concentrate their urine as well as mammals can. Birds also are *uricotelic*, meaning that they excrete the end product of nitrogen metabolism as *uric acid*, which is made in the liver and they excreted from the blood. Uric acid is the creamy white portion of the dropping. Urine is the clear portion. The feces constitute the third portion of a dropping, and this consists of the solid portion, usually brown or green, depending on what the bird has been eating. A bird is able to urinate independently of defecating, or passing feces, but most of the time, the bird will pass urine, urates and feces at the same time. And now we know the compartments where these are stored prior to being passed, right?

The respiratory system is very unique in birds. Although birds possess a larynx, as we do, they do not use theirs for producing sound. The *syrinx* is an organ found at the junction of the end of the trachea (windpipe) with the beginning of the large left and right *primary bronchi*. These are air tubes that allow the passage of air into the deeper portions of the respiratory tract. The lungs are found inside the bony ribcage, but not where they are located in a mammal. In mammals, they are found on either side of the heart, and have lobes. No bird lung has lobes, and the liver lies on each side of the heart, instead of the lungs. The liver is large in birds and is composed of a right and left lobe. Most parrots don't have a gallbladder. Bird lungs are located more against the bones of the back, and are relatively non-expandable. They are smaller by about 25% than those found in mammals. Birds do not have a diaphragm, as mammals do. Birds breathe by expanding the ribcage outward, which draws air in like a bellows. For this reason, it is vital that the chest not be prevented from moving outward when a bird is being restrained for examination or wing clipping, or it will not be able to breathe.

Without going into the detailed anatomy and physiology of the avian respiratory system, I want to mention a few differences between birds and mammals. Birds have *paleopulmo* and *neopulmo*, which are two systems of connections between the air tubes, the *bronchi* and *parabronchi*. The neopulmo system is absent in primitive birds, such as the emu and penguin. In the place of *alveoli*, which are present in the mammalian lung, birds possess *air capillaries* instead. The air capillaries are closely entwined with a profuse network of *blood capillaries*. This is where gasses are exchanged. Birds also have an *air sac system*. The air sac is connected through a hole in the lung called an *ostium*. Some bone cavities are occupied by outpouchings of the air sacs.

There are eight air sacs in most species of birds. There are one *cervical* and one *clavicular* air sac, and two *cranial thoracic*, two *caudal thoracic*, and two *abdominal* air sacs. Occasionally, an air sac may rupture, and the bird may develop air under the skin (*subcutaneous emphysema*) or a large swelling of air in the neck region. When a bird is surgically sexed, the left caudal thoracic air sac is entered by the endoscope. The air sacs allow for easily visualization of the internal organs, usually, and the membrane between the caudal thoracic and abdominal air sacs may need to be punctured by the scope, to better visualize the gonad. Usually the scope is entered to be able to visualize the left gonad. If the trachea is blocked in a bird having breathing difficulties, or if surgery must

be performed around the head and neck, it is possible to insert an *air sac tube* into one of the air sacs, allowing the bird to breathe through that, instead of the trachea. Our breathing only takes one breath to completely exchange the air in our lungs, while it takes a bird two breaths to completely exchange the air in the system. This is why an air sac tube can be used for breathing in a bird.

The female reproductive system is unique in birds. In most birds, the hen only has a left *ovary* and *oviduct*. However, two fully developed ovaries are usually present in birds of prey and the kiwi. Two oviducts may occur in birds of prey. In normal parrots and softbills, there is usually only a left ovary and oviduct. The ovary contains all of the cells that can turn into eggs. When *ovulation* occurs, the egg cell and yolk are released from the ovary. Since hens produce eggs, and do not develop the babies inside the uterus, as mammals do, the oviduct is the organ that receives the egg, and then applies the egg white, membranes and shell. There are five portions to the oviduct and each performs a different function. They are the *infundibulum*, which receives the egg after ovulation. This is where fertilization usually occurs. Sometimes a hen will lay eggs without a male being present, and in this case, the eggs will be infertile. Chicken eggs purchased at the grocery store are infertile eggs.

The next portion of the oviduct is the *magnum*. It is in this area that the bulk of the egg-white protein is added. The egg travels next into the *isthmus* where egg membranes are produced and calcification of shell begins. The next portion of the oviduct is called the *uterus*, but it is nothing like the uterus of a mammal. The uterus is also called the shell gland, as this is where the shell is put on the egg. The final portion of the oviduct is called the *vagina*, and it is here where the sperm are stored in the hen once copulation has occurred. It takes about 25 hours for the egg to travel down the oviduct. The oviduct terminates in the urodeum.

Unlike the hen's reproductive tract, the male usually has two functional testicles. However, they are located up inside the body near the kidneys, and are not found externally as they are in mammals. This is why most birds cannot be sexed by looking at the external characteristics of it, because the testicles or ovary are inside. Some birds have characteristics that identify it as male or female, such as different coloration of feathers. Eclectus parrots are an extreme example of this, as hens are predominantly red and purple and males are predominantly green. Other birds have more subtle differences. Birds that can be visually sexed are called *sexually dimorphic*. *Monomorphic* birds cannot be sexed by sight and must be sexed by chromosome analysis, DNA analysis or by endoscopy.

People often ask me about the heart in birds. It is relatively much larger than that of mammals. It also beats much faster than a mammal's. The heart of a bird can pump much more blood than a man or dog (about seven times as much!) The blood pressure is much higher in a bird, and it has a remarkable exercise capacity. The heart has four chambers, just like we do.

Blood cells in birds are different from those found in mammals. In birds, the red blood cells still contain a nucleus, and are very large in size, with a lifespan of only 20-35 days (120 days in man). Humans and other mammals have a type of white blood cell called the *neutrophil*, but in birds, these are called *heterophils*.

True *lymph nodes*, which are common in mammals, are not found in birds, except for certain aquatic birds. Birds and mammals do both possess a *thymus*, which is another organ of the immune system.

Birds possess remarkable abilities to navigate. Pigeons are notorious for their ability to find their way home when taken to strange, far-off locations and released. It is certain that the sun and stars are dominant orientational cues for birds. These provide compass information only. There is evidence that birds can tell the time of day by using their circadian rhythm with the sun's azimuth (direction from the observer). However, this does not explain how homing pigeons can orientate themselves accurately towards home from release points that are far distant and unfamiliar even when there is complete cloud cover. It is interesting to note that pigeons will miss their home base if they have been shifted six hours out of phase with true sun time. Pigeons may use polarized light or ultraviolet light to help them navigate, and they may use their sense of smell, as well. Homing pigeons can also detect sound frequencies below 1 Hz, which is much lower than many animals can detect. Birds may be able to detect the infrasound of waves breaking on the shore or wind whistling through mountain tops while flying, helping in navigation. Birds are also extremely sensitive to magnetic changes, and magnetic material has been found in a small area in the head of pigeons, which can aid in a bird locating the direction of the earth's magnetic field. Gravity and barometric pressure may also be used as clues to aid a bird in navigation. I am convinced that birds are very sensitive to environmental changes. For example, a friend has a pet Quaker parrot, Gaspar, and she had recently moved the cage to a location directly under her television set. The bird began feather picking immediately, and acted very agitated while the cage was in this location. Now, I'm no electrical expert, but I know that certain waves emanate from a television set, and this apparently really bothered Gaspar. Once she identified the cage location as a potential problem, she moved it, and voila, the picking ceased immediately. There are many mysterious features about birds that we have yet to learn, that's for sure.

Birds are fascinating creatures and possess many unique anatomical characteristics. I hope you now have a better understanding about the anatomy of these beautiful animals that we share our lives with.

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## SEXING PIGEONS USING GENETIC LINKS

Ever since man domesticated the rock dove, *Columba livia*, we have been able to manipulate the bird's behavior, physical attributes, and even alter the way they coo to our will. The traditional blue-bar rock dove, native to Europe and North Africa, has been genetically altered so much that today it is almost impossible to link some domesticated

pigeons back to their rock dove ancestry just by their physical appearances.

Take the English Carrier pigeon for example, long slender body, long flight feathers, long beak, a wattle that grows so enormously large that it looks as if it has a tumor, and eye rings so exaggerated that it looks as if it is going to engulf both the eyes. Another example would be the Short Face Budapest Tumbler pigeon. Its head on the other hand, is so small that it has a problem holding in its eyes. The beak is so small and short that it struggles to feed itself, not to mention it has no ability whatsoever to feed its own young.

Not only did we change their physical appearances, we even manipulated how they behave. For instance, the Birmingham roller, genetically bred to snap into a state of seizure in the sky which it rapidly spins backwards directly back down to earth at an exceptionally fast pace. In addition, we even found ways to breed them to coo a specific way. The English Trumpeter, hence the name, can coo a sound that closely resembles a trumpet. Another example would be the Thailand Laughing pigeon. Some say its coo sounds just like a small child laughing.

There is an ironic twist to these accomplishments though. Like the old saying, “you are only as good as your weakest link.” What is our weakest link you ask? Well don’t you find yourself asking sometime, if that bird you have is a cock or a hen. Yes, we all have. Whether you are experienced or inexperienced with pigeons, this will most likely be your number one question. We have found ingenious ways to manipulate the pigeon but yet we have never found a system to identify the basic and most simple question, how to differentiate between a cock and a hen.

I have encountered a handful of theories and methods of sexing pigeons throughout my timeline of keeping pigeons. Here are a few: the egg theory, pendulum theory, physical feature theories, behavioral theories, and genetics theory. Well sit back and relax, I am going to try to explain each one. I would give credit to the rightful owner of these theories but these theories are not from just one individual, they are just theories. So please don’t ask me why I don’t give credit.

**The egg theory:** This can only be determined at the stage where the hen lays the eggs of course. The theory says that if an egg is a bit longer, or shaped more like an oval than it will more likely be a cock. In contrast if the egg is a round, small and short than it will have a better chance of being a hen.

The problem with this theory is that some birds just don’t lay a perfect oval egg or a perfect round egg, for example my Italian owls lay very, very oval shaped eggs and they can both be male or female. Another problem with this theory is that nobody watches their birds hatch and or will not remember which bird came from which egg anyways.

**The Pendulum Theory:** This theory utilizes the supposedly different magnetic energy that male and female gives off. For the method to work, you are to tie a small metal object to the end of a string and hold it on top of the bird, the movement of the pendulum should dictate what sex the bird is. The object can be anything from a small paper clip to

a pen cap. Tie it to a small string about 6 inches long or so and hold it about half an inch to an inch above the birds back or tail. If the pendulum moves in circular motion then it is a hen. If the pendulum moves back and forth, it is a cock.

The problem with this theory is that it is all about the psychological factor of the person conducting the method. The fact that it is virtually impossible for the owner to test a bird unbiasedly destroys the whole theory. For example, I may want to test if my bird is really a cock. Unintentionally and unconsciously I proceed with the theory already presuming that my bird is going to be a cock, as I test the pendulum theory I may unconsciously persuade the movement of the pendulum. This psychological factor has it's own topic so I am not going to elaborate on it any further.

**The Behavioral Theories:** There are three that I know of. There may be more out there. The first one is the “holding the beak theory.” They say that if you pull the bird by the beak horizontally straight out, the bird should indicate its sex by its movements. If it is the cock, the bird should stand perfectly still. In contrast if it is a hen, the bird should struggle and try to pull its head back in.

The second theory is the “holding the bird by its wing”. If you hold a bird by its wings vertically the movement of the bird should tell you its sex. If the bird moves back and forth struggling while it is moving and kicking its feet, then it is a cock. If it just struggles and shows no sign of kicking violently with its feet than it is a hen.

When you hear about these theories you should immediately sense the human characteristics that are stained all over them. Why I say this? A man is suppose to be strong and show no signs of weakness, on the other hand a women is weak and should squirm or struggle when she is being forcefully handled. Or if a man is forced into an unwanted position he will kick and fight his way out, if a women is in that position she shouldn't have the strength to fight back. There are just too much human influences for you to even consider these to be worthy theories.

Now we come to the simple and plain behavior theory. This theory is most used by owners and most obvious. If the bird coos, puffs up, dances in a circle, fans out, and bows up and down then it is a cock. If it is quit and shy then it is a hen. This is very misleading because both hen and cock practices these behaviors. When I was young, folks would tell me this all the time. The fact that I had shy cocks and aggressive hens had me confused and running in circles.

Don't abandon this theory yet, because this theory is somewhat correct and very useful if you use it correctly. The key is to remember that if it is a cock it is going to be more aggressive (IF AND ONLY IF YOU GIVE HIM ENOUGH TIME TO GET USE TO THE SURROUNDING). Some cocks are shy and will only show dominance when he feels that he is ready. Hens will always submit to a cock if she is searching for a cock and she is used to the cock. If you put in a shy cock and an aggressive hen using this theory you will have cocks that lay eggs.

**The Physical Feature Theories:** There are a few that I know of. The first method is to identify the sex by the size of the nostril of the bird. If it has a larger nostril then it will more then likely be a cock. If it is a hen then it will have a much smaller nostril.

The problem with this theory is that it is only applicable to distinctive breeds that shows strong male and female features. These types of breeds consist of homers, dragoons, carriers, and etc. Even with homers, you will have hens with male features and cocks with female features. This theory falls short when you face a breed that doesn't present strong physical features between the sexes such as the owls, rollers, tumblers, and so on.

Likewise, another physical feature that only applies to smaller breeds such as rollers, tumblers, and owls is that the shape of the head can determine their sexes. The head of a cock should be flat at the top, whereas the hen should have a round smooth curve to it.

Again, the problem with this is that it is not consistence and it focuses on only particular breed. I have seen plenty of hens with flat head and cocks with round head. This theory does not correlate with larger breeds.

Another physical theory is to observe the hackle feathers of the bird. The amount and the texture of the neck feathers should imply the sex of the bird. If the neck feathers are thick, puffy, loosely intact, and very shiny then it is a cock. On the other hand if the neck feathers are tightly interlocked, smooth, the colors are a bit duller, the neck itself is long and not puffed out then it is a hen.

The problem again is that there are just too many strains of birds out there that consistently disprove this theory. I have birds that completely contradicted this theory.

Lastly another physical feature that many swear to have no flaws is the "pubic bone theory." The theory says that if you feel the pubic bone near the bird's vent, you will be able to tell its sex. If the pubic bone is spread about an inch or so, then it is a hen, if it is tightly closed together then it is a cock. The reasoning is that if the hen is going to be able to lay eggs, the pubic bones must be wide enough for the eggs to pass through.

Of all the physical features this one is the most logical and obvious one. Sadly, it has proven itself to have flaws just like the other theories. Some cocks do have a wide separation of the pubic bones, and some hens have smaller narrower opening. It just means that the hen is going to lay smaller eggs. My modenas both have wide pubic bones, both my cock and my hen. My Italian owl hen has an opening so small that her eggs are oval instead of rounded.

**Genetics Theory:** These theories work for me most of the time. Sometime it throws me off but I trust this theory more than any of the other theories I have presented so far. This is not to say you should too. You should find the one that works for you and stick with that. Maybe you should use all of them, it is up to you. I am not much of a color genetic guy but I am sure the color breeders know more than me. For the purpose of this archive, I am going to try to explain it to the best of my abilities.

This theory is based on the genetic coloring of pigeons. If you have a blue hen and a red

cock, when the young hatches, the blue chick should be a cock and the red chick should be a hen. In other words, the sex depends on the parent's color. If the hen is a certain color she will pass it to her sons. If the cock is a certain color he should pass it to his daughters. Of course this will be easier to identify if you have two different colored birds. This is as basic as it gets, if I add any other things to it is going to be difficult to understand.

*[I believe that this is the other way around. A blue cock and red hen produces red cocks and blue hens.*

*I know this, not because I really know anything about genetics, but I do have a Blue cock and Red hen mated together and they've been together for 4 years. EVERY SINGLE YEAR.....the red babies are cocks and the blue babies are hens. No exceptions. Note by Lovebirds]*

The second genetic theory only applies to ash-red, yellow, and silver birds only. This theory I find works for me just fine. When you get any type of a red, yellow or silver young the bird with dark, loose markings on it is going to be a cock. A hen should be clean of any markings. (Remember this only applies to red, some yellows, silvers but keep in mind this excludes grizzles.) These markings will appear as if someone has used a dark blue permanent marker and just marking the bird's feathers. These markings will be more and more apparent as the bird ages. The reason for these markings is the simple fact that cocks carries two colors. A red, yellow, or silver cock will always carry the blue trait inside of them, and it will show itself as the bird ages. Be very careful as some hens can have markings too, but their markings are small and are shades of reds and yellows. NOT BLUE OR BLACK.

So what did I do with these theories? I put them to the test of course. I will not explain the step by step process of my personal testing but I will give you an example of my experiment. I am not trying to make this a case study, therefore I will not include my tables and documents. That is for a different writing. This test was planned at the end of last year but officially started during the breeding season of this year.

### **Experiment:**

**Hypothesis:** If all these theories holds true: the egg theory, pendulum theory, physical feature theories, behavioral theories, and genetics theory.

**Prediction:** They will all fail except the genetic theory!

### **Testing the Hypothesis:**

Procedure: I will be using my own birds. (I know this would be considered biased and uncontrollable but hey just for the fun.)

The subjects are:

- 1) Ash-red cock x Ash-red checkered hen (homers)
- 2) Black Eagle cock x Blue-bar hen (homers)
- 3) Yellow-bar cock x Blue-bar hen (rollers)

- 4) Magpie cock x Dun-check hen (rollers)
- 5) White-marked cock x Blue-bar hen (modenas)
- 6) Black cock (homer) x Bronze hen (modena) this was to try to have something different so it is not specifically on pure breeds.
- 7) Splash Blue-bar cock x Blue-check hen (Italian owls)

**Procedure:** I will let the pairs lay their first batch of eggs. I will give each egg an identity, mark it on a small piece of masking tape and tape it on the bottom of the eggs. I will check them each day until they hatch and record them. Then use a timeline to record and test the methods. I will observe, and test each of the theories on my unsexed young. These testing will be tested over and over until I am 100% sure of the sex of each birds.

**Data for Homer pair 1:**

Ash-red cock x Ash-red checkered hen

2 eggs:

Egg 1a= rounded, very clean (presumed to be a hen)

Egg 1b= slightly oval, about the same size (presumed to be a cock)

At 3 weeks:

1a) looks like a red check. Small nostril, close pubic bones, no genetic markings yet, rounded head. Pendulum 10 times: 7/10 a hen. Beak testing 10 times: 0/10 a hen. Wing testing 10 times: Doesn't move at all!

2a) also a red check. Slightly larger nostril, close pubic bones, no genetic markings, rounded head. Pendulum 10 times: 3/10 a hen. Beak testing 10 times: 0/10 a hen. Wing testing 10 times: Doesn't moves at all either!

At 6 weeks:

1a) red check. Small nostril, close pubic bones, no genetic markings, rounded head. Pendulum 10 times: 11/10 a hen. Beak testing 10 times: 10/10 a hen. Wing testing 10 times: 10/10 a cock.

2a) red check. Slightly larger nostril, close pubic bones, small genetic markings (some dark red, few blue), rounded head. Pendulum 10 times: 9/10 a hen. Beak testing 10 times: 10/10 a hen. Wing testing 10 times: 10/10 a cock.

At 6 months:

1a) red check. Small nostril, close pubic bones, no genetic markings, rounded head. Pendulum 10 times: 8/10 a hen. Beak testing 10 times: 10/10 a hen. Wing testing 10 times: 10/10 a cock.

2a) Lost on a toss. Invalid subject to the project anymore, but I still think it is a cock.

At 9 months:

1a) red check. Small nostril, close pubic bones, no genetic markings, rounded head. Pendulum 10 times: 3/10 a hen. Beak testing 10 times: 10/10 a hen. Wing testing 10

times: 9/10 a cock. All the female features. Small signs of red marks, but not the blue or black marks. She was mated to a Blue cock and was on 2 eggs before I tossed them out. 2a) Lost on a toss. Never came back. Invalid subject to the project anymore, but I still think it is a cock.

I just copied the data quickly from my notes just for an example. I am only giving you guys this one data. I need to keep the rest for private use and because it would be impossible to fit everything on here.

### **My Conclusion:**

For centuries we have been manipulating pigeons to all different shapes, sizes, qualities, colors, performing skills, and for food productions. I find it amazing how we still can't find a way to automatically sex them. Everyone you talk to has their own method. These theories are not proven yet by any means but are our best effort to satisfy us for the moment. Some people swear that their method of sexing works for them 100% of the time, but you will always find a few where the methods not only disappoint them but completely wronged them. I find it fascinating and interesting when people fight over who's method is better. Truth is, each method has it's own flaws and it's own benefits. I guess this is what is fun about raising pigeons, each bird is a surprise. The only method I find that will work 100% of the time that I didn't mention was TIME. Yes if we all have the patience, only time will tell us the truth.

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### **Part 12: HOLLISTIC REMEDIES**

Holistic or home remedies should always be accompanied by a good nutrition program to support the healing and laying down of new healthy cells.

The products can be purchased at most nutrition stores, like Wild Oats, or Mothers Market. If you have never done this before please seek help of a licensed rehabber or avian vet who uses Natural Healing Products (Herbal or Homeopathic).

Remedies for common problems:

#### **AVIAN POX**

We know that the best way to avoid Pox is by prevention by innoculating your youngsters, but there are always exceptions:

**THUJA OCCIDENTALIS** This is a homeopathic herb used particularly for ill effects of vaccinations, blemishes, wart, polyps, fluid retention, tumors of Skin, gland, etc in people. It has proved to be a wonderful remedy for Pox in pigeons

Dosage: 3 small tablets for a good size pigeon, 2 for cockatiel size bird.

1. For the first two days: use above dose twice a day, preferably once in the morning and once at night.
2. Thereafter: use same dose once per day.

In two weeks this product will get the pox out of the organs, internally and kick the immune system in gear.

Topical treatment: You can use Thuja oil topically. This is NOT to be used around eyes or nostrils and beak. Lesions should be completely gone in 2 to 3 days. You can use Thuja oil on EXTERNAL LESIONS only, not internal.

You must use the Thuja pills for internal use. You can use Tea Tree Oil, deluted with water for external lesions of Pox and/or Canker. Use a Q tip and soak it up and dab on lesion gently. You cannot use the tee tree oil on any open wounds. Make sure the bird cannot pick at it and ingest it. You can also use Colloidal silver on internal and external lesions, as well as Neem oil.

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Broken Bones & Bruises

Once the break has been set Symphitum can be used for pigeons in order to encourage faster knitting of bones and healing of cartilage.

Arnica Montana is used for any type of trauma involving bruising and swelling. Helps clean up the blood, heals and reduces swelling.

Dosage: 3 small tablets twice a day for the first few days, then 3 once a day. For a smaller bird use 2 tablets. These are small tablets and easy to get down their throat.

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Detox of Liver-due to poisoning, mercury toxicity, over use of drugs

Barley leaf powder is a great liver detoxify for birds that swim and hang out around lakes and oceans that may have mercury toxicity.

Milk Thistle seeds can help detoxify the liver in all birds, in the long term, once they have been stabilized and had initial treatments to rid the poison from the body. You buy the seeds and crush them up only a small amount, as you need them. They can then be sprinkled on the seed and are readily picked up as the bird eats.

Reishi is also an excellent detoxifier (antibiotic), and important to use in overall liver health. Turmeric can also be used for detoxify.

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For infection you can put several drops of colloidal silver (Sovereign Silver) in the water or down the throat.

For purification of blood stream and increasing immune support, give adult pigeons 1 Garlic capsule (purifies the blood, also an anti fungal and anti bacterial), Now Brand, soft gel (2500 mg. with parsley) For youngsters: Echinacea drops & golden Seal drops for Children (with no alcohol in it) can be added to the formula.

I recommend pro-biotic for adult and young pigeons, and Multi-vitamins for pigeons, in strict dosage. The multi vitamins should be used in small quantities for young pigeons in extreme cases of PMV and/or Paratyphoid. Use a good pigeon multi like Herbal Multi, and give extra B-complex in the form of Brewers Yeast. Lots of calcium sources also

important to help relax muscles and it calms the bird. You can use the liquid form of calcium with vitamin D3 or, a 1/4 of a human capsule.

Offer the bird lots of water, and seeds in a deep dish, and a

Stress free environment. The bird should be kept isolated for 6 weeks or more.

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Central Nervous Disorder such as, PMV, Paratyphoid Belladonna is a great treatment for both youngsters and adult pigeons with central nervous system disorders and & also rids the system of poison.

Dosage: 2/3 times a day, for two days, then once a day. Use every day for several days, then re-evaluate. For youngsters you can crush up the tablets between two spoons and add to water and drop down the back of the throat.

When symptoms are gone, you can stop using it.

### Heavy Infestation of Worms

20cc in the crop of Chaparral Tea makes a wonderful de-wormer for grown up pigeons. I have NOT tried this one, but my rehabber has used it and it works very well. Always be careful with birds that are dealing with other health issues, this should be used for an otherwise healthy bird.

Robotics recommended immediately after treatment.

### CHAMOMILE TEA

This is a great tea to make if you are taking your birds on a long trip and are basketing (but not for a race trip) them. It calms them, and is a good nerve tonic, appetite stimulant, and digestive aid. Do not use for long periods of time.

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### APPLE CIDER VINEGAR (ACV)

#### PART I:

#### ACV RECIPES AND DOSAGE

Choose the right ACV

#### ACV IN THE AVIARY

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#### Part II: Scientific Evidence supporting ACV

#### VITAMIN AND MINERAL CONTENT OF ACV

#### PH BALANCE THEORY

--Diabetes

--Weight Loss

--Dandruff

--High Cholesterol

--Acne

--Blood Pressure

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#### PART III: Cautions and warnings.

#### ACV and IODINE

ACV and Low Blood Potassium, Osteoporosis, apple allergies

## BURNS AND SCARING

ACV tablets

ACV and drug interactions

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## ACV INTRODUCTION

Vinegar has been used to cure ailments for centuries. For hundreds of years, folk medicine practitioners have recommended daily doses of apple cider vinegar, not only for specific medical problems, but also for overall food health. In Asia vinegar is called the friend of Chinese herbs because it is often used to process herbal preparations. It is also successfully used in modern Chinese medicine. Apple Cider Vinegar is also wonderful for pets, including dogs, cats, and horses. It helps them with arthritic conditions, controls fleas & barn flies, and gives a beautiful shine to their coats!

Historically, the origin of vinegar was never specifically noted. Vinegar was probably discovered when one of our ancestors found that wine exposed to the air would turn sour, thereby creating vinegar. It is amongst the oldest of foods and medicines known to man. For its healing ways, vinegar has been used for thousands of years.

In 400 B.C, Hypocrites, known as the father of medicine, treated patients with vinegar, making it one of the world's first medicines. Throughout biblical times, vinegar was successfully used to treat infections and wounds. For centuries medical textbooks have listed various ways to use vinegar. These uses include everything from keeping a sharp mind to purifying the waters of the body and to easing pain and alleviating dozens of other ailments. Modern laboratory analysis verifies the antibacterial and antiseptic properties of vinegar. Many of the old-time uses are just as applicable now as they were centuries ago.

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## ACV RECIPES AND DOSAGE

Standard Dosage: 2 teaspoons of ACV in 8 oz of water. Add honey to taste.

Earth Clinic's Dosage: 2 tablespoons of ACV in 8 oz of water. No honey.

Note: 2 tablespoons may be too much apple cider vinegar for some people. We suggest you start with the standard dosage and see how your body responds to a teaspoon or two of acv. If all goes well, you can up the dosage over time if you feel a need arise.

"I took Apple Cider Vinegar with a shot glass of Welch's Grape Juice. It tastes a lot like wine to me this way. Much easier to take this way. I have a lot more energy already and I have only been taking it a few days."

"I have a small glass of about 1/4 tsp baking soda mixed with water ready, then I take 2 Tblsp ACV straight. After taking ACV, I swish with water, then swish with baking soda & water mixture & spit it out to clean all ACV out of my mouth to protect teeth.

Warm ACV beverages:

1 oz Apple Cider Vinegar  
1 tsp honey  
1-4oz glass of warm water

Warm up the water to a comfortable level and slowly stir in the honey. Once the honey is completely dissolved into the water, begin slowly adding the apple cider vinegar. Continue stirring, keeping the water at a warm level for a few minutes. Cool to a safe level and enjoy. The honey is there to offset the bitter taste of the apple

Cider vinegar.

1 oz Apple Cider Vinegar  
1 tsp sugar  
1-4oz glass of warm water

The method for this recipe is pretty much the same as above. This time it is better to boil the water first, as the sugar will mix in much faster. After the water has finished boiling, quickly stir in the sugar. After the sugar is completely dissolved, add the apple cider vinegar. Obviously you want to cool down the mixture a bit

before drinking.

ACV BRAN:  
2 tbsp Bran  
2 tsp Apple Cider Vinegar  
Porridge, Yogurt, or Fruit

Pour the bran into a mixing bowl. Gradually stir in the apple cider vinegar. Once the mixture is evenly distributed, pour it over the porridge, yogurt, or fresh fruit.

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ACV IN THE AVIARY:  
By Wanda Barras

"Many herbalists recommend the use of raw, unpasteurized, unheated, organic apple cider vinegar as an important dietary ingredient for humans, farm animals and pets, including birds. The Encyclopedia of Natural Pet Care describes apple cider vinegar in this way: "Long a folk remedy, cider vinegar has been shown to improve the health of dairy cows, horses, dogs and other animals. It reduces common infections, aids whelping, improves stamina, prevents muscle fatigue after exercise, increases resistance to disease and protects against food poisoning. Cider vinegar is rich in the vitamins, minerals and trace elements found in apples, especially potassium; it normalizes acid levels [pH] in the stomach, improves digestion and the assimilation of nutrients, reduces intestinal and fecal odors, helps cure constipation, alleviates some of the symptoms of arthritis and helps prevent bladder stones and urinary tract infections."

For the past year and a half I have routinely added apple cider vinegar, to my baby birds' hand-feeding formula, to all drinking water and sprinkled some on the food of the animals here at our aviary and small dairy farm. These animals include several species of breeding exotic parrots, chickens, ducks, dogs, cats and LaMancha dairy goats. The vinegar keeps the water bowls and bottles very clean and sanitary and the animals seem to love it. Of course, the nutritional and health benefits are a plus. Apple cider vinegar added to young birds drinking water encourages early weaning and healthy weight gain and they will feather out faster. Adding a little raw apple cider vinegar to the hand-feeding formula water can prove nutritionally beneficial and help to inhibit the growth of yeast, fungus and bacteria. In formula a ratio of about ¼ tsp per 4 oz water is best.

You may safely add cider vinegar to food and/or drinking water, starting with small amounts and building up to ½ to 1 teaspoon per 15 pounds of body weight or about 1 tsp apple cider vinegar (health food store variety best) to 8 oz water. That is about ¼ cup per gallon of water and/or you may sprinkle or spray small amounts on bird's food. Gradually add small doses to food over time, you can help even the most finicky eater to accept this. Do not use metal food or water dishes when using vinegar, stainless steel is OK.

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Choose the right ACV

The apple cider vinegar that contains all of the health benefits is not clear vinegar, but just the opposite. It is organic and unfiltered vinegar. It is not a clear liquid, but has got a brownish tinge to it. If you try looking through it, you will notice a tiny cobweb-like substance floating in it. This is known as "mother", and means just one thing. This apple cider vinegar is of good quality with all the nutrients and health giving properties intact.

Fermenting sweet juice makes vinegar. The juice turns to wine or cider which is allowed to ferment a second time until the alcohol mixes with oxygen in the air, changing it into acetic acid and water. Natural--that is, undistilled, organic, raw, apple cider vinegar is often called one of Mother Nature's most perfect foods. Apple cider vinegar should be made from fresh, organic, crushed apples that are allowed to mature naturally in wooden barrels. Natural apple cider vinegar, found in health food stores, should be a rich amber color with the "mother" quite visible as sediment on the bottom. The strength of vinegar is important. All varieties of vinegar contain about 4 to 7 percent acetic acid, with 5 percent being the most common amount. Acetic acid is what gives vinegar its tart and sour taste. There is nothing beneficial about commercial distilled vinegars except for pickling, cleaning and disinfection ---they have no health value! They do not contain the health values of organic, raw apple cider vinegar with the mother still intact and viable. Distilled white vinegar and cider vinegar sold in supermarkets are considered "dead" vinegars with none of the enzymes and other live factors that make raw, unpasteurized vinegars so valuable. Distilling removes the beneficial "mother" from the vinegar, thereby, destroying the powerful enzymes and life giving minerals such as potassium, phosphorus, natural organic sodium, magnesium, sulphur, iron copper, and natural

Organic fluorine, silicon, trace minerals, pectin and other powerful nutrients. Also destroyed are natural malic and tartaric acids, which are important in fighting body toxins and inhibiting unfriendly bacteria growth (Bragg 1- 4).

Apple cider vinegar has shown to be an extremely valuable constituent in the body's biochemical operations and an essential building block in the construction of many complex substances in the body. Vinegar is low in calories and carbohydrates but does contain small amounts of calcium, phosphorus, iron and, of course, lots of potassium. A cup of ACV is 98.8% water, has 34 calories, a trace of protein, and no fat. (Moore p.viii) Acetic acid, the principal constituent in vinegar, plays an important role in the release of energy from fats and carbohydrates. It is of primary importance in the body's metabolism.

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#### ACV and IODINE

Extended ACV consumption can remove iodine from the body, and can result in thyroid problems. (Salt also causes the same problems which is why commercial salt has added iodine.)

One case linked excessive ACV consumption with low blood potassium levels (hypokalemia) and low bone mineral density. People with osteoporosis, low potassium levels and those taking potassium-lowering medications should use caution.

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People with allergies to apples should avoid ACV.

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#### BURNS AND SCARING:

Undiluted vinegar applied to the skin may cause burns and scarring, damage the esophagus and other parts of the digestive tract, and deterioration of tooth enamel if sipped. ACV isn't recommended as a home remedy for acid reflux or heartburn, because it may damage the delicate lining of the digestive tract and it could possibly worsen the problem. If you have acid reflux or heartburn. Excessive doses of ACV have been found to cause damage to the stomach, duodenum and liver in animals.

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#### ACV TABLETS:

The quality of ACV tablets varies. A 2005 study compared eight brands of ACV supplements and found that the ingredients didn't correspond with the ingredients listed on the packaging, and that the chemical analysis of the samples led researchers to question whether any of the products were actually apple cider vinegar or whether they were just acetic acid. ACV tablets may become lodged in the throat or esophagus and cause serious damage to those tissues.

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#### Possible Drug Interactions:

Theoretically, prolonged use of ACV could lead to lower potassium levels, which could increase the risk of toxicity of cardiac glycoside drugs such as Lanoxin (digoxin), insulin, laxatives and diuretics such as Lasix (furosemide).

Because ACV may affect blood glucose and insulin levels, it could theoretically have an additive effect if combined with diabetes medications. Apple cider vinegar may also lower blood pressure, so it may have an additive effect if combined with high blood pressure medications.

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## COLLOIDAL SILVER

### IN THE AVIARY

The Rediscovery of a Super Antibiotic?

Early Research

Contemporary Studies

USES

CHOOSE THE RIGHT SILVER

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Colloidal Silver -

The Rediscovery of a Super Antibiotic?

Colloidal silver appears to be a powerful, natural antibiotic and preventative against infections. Acting as a catalyst, it reportedly disables the enzyme that one-celled bacteria, viruses and fungi need for their oxygen metabolism. They suffocate without corresponding harm occurring to human enzymes or parts of the human body chemistry. The result is the destruction of disease-causing organisms in the body and in the food.

### COLLOIDAL SILVER IN THE AVIARY:

A drop in the drinking water prevents bacteria build up in the water and reduces bacterial troubles in the birds.

### Early Research

Colloidal silver was in common use until 1938. Many remember their grandparents putting silver dollars in milk to prolong its freshness at room temperature. At the turn

of the century, scientists had discovered that the body's most important fluids are colloidal in nature: suspended ultra-fine particles. Blood, for example, carries nutrition and oxygen to the body cells. This led to studies with colloidal silver. Prior to 1938, colloidal silver was used by physicians as a mainstream antibiotic treatment and was considered quite "high-tech."

### How It Works

The presence of colloidal silver near a virus, fungus, bacterium or any other single celled pathogen disables its oxygen metabolism enzyme, its chemical lung, so to say. Within a few minutes, the pathogen suffocates and dies, and is cleared out of the body by the immune, lymphatic and elimination systems. Unlike pharmaceutical antibiotics, which destroy beneficial enzymes, colloidal silver leaves these tissue-cell enzymes intact, as they are radically different from the enzymes of primitive single-celled life. Thus colloidal silver is absolutely safe for humans, reptiles, plants and all multi-celled living matter.

### Ingesting Colloidal Silver

Taken orally, the silver solution is absorbed from the mouth into the bloodstream, then transported quickly to the body cells. Swishing the solution under the tongue briefly before swallowing may result in faster absorption. In three to four days the silver may

accumulate in the tissues sufficiently for benefits to begin. Colloidal silver is eliminated by the kidneys, lymph system and bowel after several weeks. If routinely exposed to dangerous pathogenic germs, some recommend a regular daily intake as a protection. In cases of minor burns, an accumulation of colloidal silver may hasten healing, reducing the possibility of scar tissue and infection. It is believed by many in the natural healing arts that the lives of millions of people who are susceptible to chronic low-grade infections can be enhanced by this preventative health measure.

#### Chronic or Serious Conditions

1 teaspoon of 5 ppm. colloidal silver equals about 25 micrograms (mcg.) of silver. 1 - 4 teaspoons per day (25 - 100 mcg.) is generally considered to be a "nutritional amount" and is reported to be safe to use for extended periods of time. Amounts higher than this are generally considered "therapeutic amounts" and should only be used periodically.

In cases of illness, natural health practitioners have often recommended taking double or triple the "nutritional amount" for 30 to 45 days, then dropping down to a smaller maintenance dose. Amounts from 1 - 32 ounces per day have reportedly been used in acute conditions.

If your body is extremely ill or toxic, do not be in a hurry to clear up everything at once. If pathogens are killed off too quickly, the body's five eliminatory channels (liver, kidneys, skin, lungs and bowel) may be temporarily overloaded, causing flu-like conditions, headache, extreme fatigue, dizziness, nausea or aching muscles. Ease off on the colloidal silver to a smaller amount and increase your distilled water intake. Regular bowel movements are a must in order to relieve the discomforts of detoxification. Resolve to reduce sugar and saturated fats from the diet, and exercise more. Given the opportunity, the body's natural ability to heal may amaze you.

#### Topical Uses

Some have used colloidal silver in a nasal spray mister - to reach the sinuses and nasal passages. Spray bottles have been used for topical use on kitchen and bathroom surfaces, skin, sore throat, eyes, burns, etc. Colloidal silver is painless on cuts, abrasions, in open wounds, in the nostrils for a stuffy nose, and even in a baby's eyes because, unlike some antiseptics, it does not destroy tissue cells. It's excellent as an underarm deodorant, since most underarm odor is caused by bacteria breaking down substances released by the sweat glands!

#### Some Common Uses of Colloidal Silver

Natural health practitioners have for years recommended taking one tablespoon daily, for four days, to establish a level, then one teaspoon daily for maintenance (proportional to body weight for children). After six weeks, a pause of several weeks has also been recommended by some natural healing arts doctors. Also, colloidal silver can be applied directly to cuts, scrapes, and open sores, or on a bandage for warts. It can be applied on eczema, itches, acne or bug bites. To purify water, add one tablespoon per gallon, shake well and wait six minutes. Mixed this way, it's tasteless. It is not an allopathic poison.

#### Veterinary and Garden Use

Colloidal silver has worked just as well on pets of all kinds. Used in proportion to body weight, it should bring the same results. In the garden, field or greenhouse, add enough to the water or soil - and the plants will do the rest.

#### Tolerance To Disease Organisms

We have all heard of the "super-germs" that are resistant to most modern antibiotics. Some believe that single-celled germs cannot mutate into silver-resistant forms, as happens with conventional antibiotics. Therefore no tolerance to colloidal silver would develop through mutation. Also, colloidal silver has not been demonstrated to interact or interfere with other medicines being taken. Inside the body, silver apparently does not form toxic compounds or react with anything other than a germ's oxygen-metabolizing enzyme. Colloidal silver may truly be a safe, natural remedy for many of mankind's ills.

Additionally, there has never been a drug interaction reported between colloidal silver and any other medication. It's difficult to overdose - unless large amounts are ingested. Colloidal silver has been reported by users to be both a remedy and a prevention for numerous infections, colds, flus, and fermentations due to various bacteria, viruses or fungi, even the non-apparent low-grade, general body infections many people have. Living organisms are in the colloidal chemical state, not the crystalline state. Substances already in that form may be more readily assimilated by the body. Colloidal silver is the most useable form of a reputedly effective germ fighter.

#### Colloidal Silver in Advance of Illness?

When the possibility of germ exposure is higher, colloidal silver can be taken orally each day or applied topically when there is a skin problem. It's like having a second defense system. The silver acts only as a catalyst and is stabilized. It is non-toxic, except to one-cell plants and animals, and is non-addicting. It also apparently kills parasites because they have a one cell egg stage in their reproductive cycle.

Older folks reportedly feel younger because their body energies are used for other uses than constantly fighting disease. Digestion has also been reportedly better.

Medical research has shown that silver promotes more rapid healing, with less scar tissue, even in the case of severe burns. Successes have been reported in cases that previously have been given up by established doctors. Colloidal silver is tasteless and won't sting even a baby's eyes, and won't upset your stomach.

#### More Than 650 Diseases Helped?

Colloidal silver has been reported to kill 650 micro-organisms, many of which are associated with human diseases. This does not automatically mean that taking colloidal silver will "cure" diseases "caused" by these germs. Colloidal silver only kills micro-organisms when they are in contact with it for a sufficient period of time.

The human body is a complex system which may prevent high enough concentrations of colloidal silver from reaching the "affected area". The basic guideline that has been

recommended for using colloidal silver is that it usually "works" if you can get a high enough concentration to the "affected area".

Some will want to experiment with "higher amounts" (such as 8 or more ounces at a time) to find out what it takes to accomplish this. Do not use colloidal silver if you are allergic to contact with silver metals, or if you notice any digestive upset after use.

The following is a partial list of the more than 650 diseases that colloidal silver has been reputed to be successful against: acne, AIDS (Reference 8), allergies, appendicitis, arthritis, athlete's foot, bladder inflammation, blood parasites, blood poisoning, boils, burns, cancer (References 2, 4, 7), candida, cholera, colitis, conjunctivitis, cystitis, dermatitis, diabetes (Reference 1), dysentery, eczema, fibrositis, gastritis, gonorrhea, hay fever, herpes, impetigo, indigestion, keratitis, leprosy, leukemia, lupus, lymphangitis, Lyme disease, malaria, meningitis, neurasthenia, parasitic infections: viral, fungal and bacterial pneumonia, pleurisy, prostate, pruritus ani, psoriasis, purulent ophthalmia, rhinitis, rheumatism, ringworm, scarlet fever, septic conditions of the eyes, ears, mouth, and throat, seborrhea, septicemia, shingles, skin cancer, staphylococcus and streptococcus infections, stomach flu, syphilis, thyroid, tuberculosis, tonsillitis, toxemia, trachoma, all forms of virus, warts, whooping cough, yeast infection, stomach ulcer, canine parovirus and other veterinary uses, and fungal and viral attacks on plants. Simply spray diluted silver on the leaves and add to the soil.

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#### CHOOSE THE RIGHT SILVER

True colloidal silver products are the least prevalent type of colloidal silver on the market due to high degree of manufacturing complexity and the resulting high cost of production.

In true colloidal silver, the majority of the silver content is in the form of silver particles. True colloids will typically contain more than 50% particles (often 50 – 80%), while the balance (20% to 49%) will be silver ions. When referring to colloidal silver, the word colloid means silver particles. The two critical factors to look for in determining true colloids are the percentage of silver particles and the particle surface area. Of all the types of silver marketed as colloidal, true colloidal silver products have the highest particle surface area. High particle surface area is achieved by a high percentage of silver particles combined with very small sized particles. Of the three types of silver on the market, true silver colloids have the highest particle surface area relative to the total silver content. The ratio of particle surface area to total silver content indicates how efficiently the colloid is able to produce particle surface area which determines effectiveness. Higher conversion efficiencies are more desirable.

The nanometer-sized particles in true silver colloids remain in colloidal suspension without requiring protein or other additives. It is the mutual repulsion of the particles created by the zeta potential charge that keeps the particles uniformly distributed in the colloid.

Determining True Silver Colloids

Because of the high concentration of silver particles, true silver colloids are never clear like water. True colloidal silver with a sufficient concentration of particles does not look like water because silver particles -- even very small particles -- block light from passing through, making the liquid appear darker.

A colloidal suspension is ultra-fine particles of one substance, suspended by an electric charge in another substance. Homogenized milk and aerosol sprays are colloidal suspensions. Colloidal silver is pure, metallic silver (not a chemical compound) of particles 15 atoms or fewer, each with a positive electric charge, and attached to a molecule of simple protein. This new particle floats in pure water. The electric charge is stronger than gravity so the silver particles don't sink.

Many brands of colloidal silver are inferior. The highest grade is produced by the electro-colloidal / non-chemical method where the silver particles and water have been colloided, i.e., dispersed within and bound to each other by an electric current. The super-fine silver particles are suspended indefinitely in demineralized water. The ideal color of colloidal silver is a golden yellow. Darker colors indicate larger silver particles that tend to collect at the bottom of the container and are not true colloids.

If a product contains a stabilizer or lists trace elements other than silver, or if it needs to be shaken, it is inferior. If a product requires refrigeration, some other ingredient is present that could spoil. The container and dropper must be glass, as plastic cannot preserve the silver in liquid suspension for any length of time. Some brands with high concentrations of silver may actually not be completely safe. High concentrations of silver do not kill disease germs more effectively than the safe range of 3 to 5 parts per million (ppm.).

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Dangers

Due to the very low concentration of ionic silver and small particle size, true silver colloids do not cause argyria, a condition that causes

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Diatomaceous Earth (DE) ARTICLES

DIATOMACEOUS EARTH WITH FARM ANIMALS

A Non Toxic Pesticide

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DIATOMACEOUS EARTH (DE)

Below is a report on Diatomaceous Earth (DE) that I have copied as a service to my readers and is a result of my studies concerning Diatomaceous Earth (DE). I have no permission from the FDA or the USDA to make any claims concerning Diatomaceous Earth (DE). These claims are from the my searches of the internet and from literature I have in my possession. I am using Diatomaceous Earth (DE) and I have seen good results but I haven't used it long enough to prove all of these claims and I can't guarantee you will share the same results. I do have the CFR numbers showing FDA and USDA approval for using Diatomaceous Earth (DE) as a feed additive. I have been studying

feeds and feeding for some time now and, about 6 months ago, I started learning all I could about diatomaceous earth. This is a natural pesticide and has no ill effects when used with animals. Be sure to get the food grade diatomaceous earth because it has been approved by the FDA and USDA. (The pool grade and filter grade have not been approved as a feed additive and it may be harmful to use them and they will not accomplish the desired results) This will kill all internal and external parasites, aid in feed conversion, control flies by killing the larvae in manure, control odor, and promote better health and egg laying. This will also kill other insects in your garden, orchard, home, and lawn. It is great for controlling ants. I recently became a dealer for DE because it is all natural and there were no dealers in my area. This kills insects and parasites by cutting their exoskeleton and they dehydrate. It contains no poisons.

Everyone told me that I should worm my birds every spring so I went and bought 25 pounds of Ivomec (the type you mix in the feed) about two months ago. I didn't use this because I had been reading about DE and wanted to see if it worked. I was going to get 50 pounds and try it. That idea changed to 14000 pounds and a dealership. I still have the ivomec and will never use it. (Terrible huh) I don't believe in treating a disease without proof that the disease exists. My birds look great, grow great, lay great, and hatch great. I have never had any problems at all but I was about to break my rule and feed them ivomec. I am really glad I waited. I do believe in giving them the best care possible and the diatomaceous earth will control both internal and external parasites, flies and odors. It is also 100 percent natural with no withdrawal prior to slaughter and no side effects so I will use it from now on. Also, and this is very important, the parasites can not develop an immunity to it. I am including a few test results done by veterinarians. To save space I will type the name of the DVM and then on the next line, the condensed results. I will not send all I have because it will take too much space.

M.F. Petty D.V.M. Alabama -

Test on feeder pigs eliminated internal parasites in the test group in 7 days. Odor was noticeably less offensive after 21 days. Fly population decreased markedly after 6 weeks.

C.S. Mangen D.V.M. San Diego, Calif. -

Tests on laying chickens.....less flies...8000 chicken groups 75 percent less deaths DE use vs non DE use 2-4 case increase in egg production

O.C. Collins D.V.M. Midland Animal Clinic and Hospital, Midland, Tx -

Tests on dogs over 35 lbs. 1 tbs within 7 days all ova disappeared and under 35 lbs. 1 tsp daily from stools. This includes Ascarids, Hookworms, and Whipworms

G.L. Maddox Northside Hay Mill & Trading Company, Glendale, AR -

Tests on feeder steers Control DE purchase wt/head avg 650.20 686.80 sale wt/head avg 846.70 945.60 gain/head avg 196.50 258.80 gain/head/day avg 2.33 2.84 lbs feed/ lbs gain 9.78 8.23 cost/ lb gain avg 24.28 cents 21.50 cents

Below is a note I wrote when I first started using Diatomaceous Earth:

I just mixed 20 pounds of diatomaceous earth with 1000 pounds of feed and used the other 30 pounds in 7 pens for my ostriches to dust themselves with. It is unbelievable how quick the birds started creating a dust cloud. It is also unbelievable how far 30 pounds of diatomaceous earth will go. Anyone want to buy any white ostriches? I have been wanting to buy some but now I don't have to. I know adult birds know how to dust themselves and they love fine sand for this but I wouldn't have thought they would know what I put this in their pens for. I, also, would not have thought 2 week old ostriches were smart enough to immediately start dusting. They sit just like the older birds and rake their neck through the DE and throw it up onto their backs. You have to see them laying in the center of the diatomaceous earth and their little wings really going. Anyone who raises ratites has to try this at least once. If there was no health benefits for using DE, it would be worth the cost of one bag just to watch them. Be sure that you have time to watch when you use it the first time.

Below are some advantages for using food grade Diatomaceous Earth and some disadvantages for using the recommended poison:

#### ADVANTAGES OF DIATOMACEOUS EARTH WITH FARM ANIMALS

1. No toxins- completely safe
2. Controls internal and external parasites
3. Mixed with feed it constantly attacks parasites
4. Better feed conversion
5. Odor & moisture control in the barns and pens
6. Fly larva are killed by (DE) left in the manure
7. Easy to feed
8. Decreased mortality
9. Can be used as a dust for external parasites
10. In cattle- increased milk production
11. In cattle- decreased mastitis
12. In food animals and dairy cattle- no withdrawal prior to use of products
13. Parasites and insects cannot build up resistance
14. Cost - for meat and milk animals it can be free to use assuming 4,8, and 10 are true

#### DISADVANTAGES OF USING RECOMMENDED POISONS WITH ANIMALS POULTRY AND SWINE

##### COMPETITIVE PRODUCT- PIPERAZINE

1. On the hit list of the FDA to be discontinued
2. Very toxic
3. Only kills internal parasites
4. Can only be used every 30 days
5. REINFESTATION BEGINS WITHIN 48 HOURS

#### SHEEP & GOATS

##### COMPETITIVE PRODUCT- TBZ

1. Not easy to dispense

2. Stress on animal
3. Not effective
4. Controls only internal parasites
5. REINFESTATION BEGINS WITHIN 48 HOURS

#### DOGS & CATS

COMPETITIVE PRODUCT- HARTZ WORMER- ONCE PER MONTH

1. Makes animal sick
2. Controls only internal parasites
3. REINFESTATION BEGINS WITHIN 48 HOURS

#### RATITES

COMPETITIVE PRODUCT- NONE APPROVED

#### HORSES

COMPETITIVE PRODUCT- IVERMECTIN

1. Cost- 11-12 dollars every 60 days for 1200 pound horse
2. Possibility of colic if overdosed
3. Cannot use animal for 48 hours after treatment
4. Parasites build up resistance
5. REINFESTATION BEGINS WITHIN 48 HOURS

#### BEEF CATTLE

COMPETITIVE PRODUCT- IVERMECTIN

1. Cost
2. Stress on herd to treat
3. Cost of labor to treat
4. Loss of gain due to stress
5. Toxic
6. Only kills internal parasites
7. 12 day withdrawal prior to slaughter
8. REINFESTATION BEGINS WITHIN 48 HOURS

#### DAIRY CATTLE

COMPETITIVE PRODUCT- SAFEGUARD OR IVERMECTIN

1. 10 day withdrawal prior to selling milk
2. Cost
3. Stress on animals
4. REINFESTATION BEGINS WITHIN 48 HOURS

The list could go on but you see many of the disadvantages of using your present products which contain poisons. Diatomaceous earth is all natural and is completely safe to use indoors or out.

### DiaFil (Fresh Water Diatoms)

These are the skeletal remains of the diatoms found in Safe Solutions, Inc. product. The picture was made by a Scanning Electronic Microscope (SEM). The SEM is a truly remarkable instrument which enables us to visually evaluate the quality of the many types of diatomaceous earth (DE) being mined today. There are many species of diatoms each with its own unique physical makeup and shape; ranging from barrel-like forms to flat discs. Before we go any farther let's find out how DE is scientifically defined:

“Diatomaceous earth is a mineral product mined from the fossilized silica shell remains of unicellular or colonial algae from the class Bacillariophyceae, better known as diatoms “

The diatomaceous earth pictured above shows a well preserved, impurity-free DE product. Not all DE's are of the same quality many variations are found. The wide disparity of quality that exists among various deposits of diatomaceous earth stem primarily from the following causes: the species of diatoms comprising the sample, the age of the deposit, the presence of various impurities and the extent of skeletal deterioration.

With so many grades and types of DE on the market is it possible for you to make an intelligent choice? What steps can you take to ensure that the DE you buy is safe for your animals, safe enough to protect your stored grain, and last but far from least, gives you the most value for your DE dollar? If you take the following steps you will be able to make the right decision.

#### Step One:

Make sure the DE you use is AMORPHOUS DIATOMACEOUS EARTH (ADE). In an article on DE in COMMON SENSE PEST CONTROL QUARTERLY, published by BIRC, Volume III, Number 1, Winter 1987, the matter of safety is explored. We quote:

“Both swimming pool grade and natural diatomaceous earth come from the same fossil sources but they are processed differently. The natural grades are mined, dried, ground, sled and bagged. The pool grade is chemically treated and partially melted and consequently contains crystalline silica which can be a respiratory hazard. Thus, IT IS IMPERATIVE THAT ONLY NATURAL DIATOMACEOUS EARTH BE USED FOR INSECT CONTROL. This noncrystalline silica is not a hazard as the human body apparently can dissolve it. “

“Silicosis refers to lung contamination and irritation by crystalline of free silica (SiO<sub>2</sub>). Crystalline describes the orientation of the SiO<sub>2</sub> molecules which occur in a fixed pattern in contrast to the non periodic, random molecular arrangement defined as amorphous. Exposure to free silica is an occupational hazard to workers. “

#### Step Two:

Make sure the DE you use meets World Health Organization (WHO) safety standards. WHO cautions that DE with a crystalline silica content over three percent (3%) is

dangerous for ingestion by humans or animals. Safe Solutions, Inc. DE has less than 1% free silica. Swimming pool DE ranges from 60% to 70% free silica.

Quote from Steve Tvedten's "The Bug Stops Here":

DIATOMACEOUS EARTH (DE) - Diatomaceous earth is a mineral product mined from the fossilized silica shell remains of unicellular or colonized algae from the class Bacillariophyceae, better known as diatoms. There are many different companies that sell DE. The Author recommends the product sold by Safe Solutions, Inc. Most registered DE has pyrethrin and piperonyl butoxide (PBO). Some unregistered (without pyrethrin and PBO) food-grade diatomaceous earth (DE) is safe enough to be eaten, yet will kill most crawling insects. Be sure you have the best quality. Make sure the DE you use meets World Health Organization (WHO) safety standards.

WHO cautions that DE with a crystalline silica content over three percent (3%) is dangerous for ingestion by humans or animals. Safe Solutions, Inc. DE has less than 1% free silica. Swimming pool DE ranges from 60% to 70% free silica. The Author does not recommend the use of swimming pool DE. Safe Solutions, Inc. food-grade DE can be used as a dry dust or wettable powder. To make a wettable powder mix, use 4 tablespoons of product per gallon of water and add a ¼ teaspoon of Safe Solutions, Inc. Enzyme Cleaner per gallon of mix.

Diatomaceous Earth: The "Silver Bullet" by Howard Garrett

".....Natural diatomaceous earth (DE for short) is the remains of microscopic one-celled plants (phytoplankton) called diatoms that lived in the oceans that once covered the western part of the United States and other parts of the world. Huge deposits were left behind when the water receded. They are now mined and have several important uses in toothpaste, beer filtering, and swimming pool filters. DE is approximately 3% magnesium, 86% silicon, 5% sodium, 2% iron and many other trace minerals such as titanium, boron, manganese, copper and zirconium. Natural DE also makes a very effective natural insecticide. The insecticidal quality of DE is due to the razor sharp edges of the diatom remains. When DE comes contact with the insects, the sharp edges lacerate the bugs' waxy exoskeleton and then the powdery DE absorbs the body fluids causing death from dehydration. Said more simply, DE kills insects by drying them up. You'll see how drying DE is if you handle it with bare hands. There is no residual danger of contamination. In fact, DE is actually beneficial to the soil. It's loaded with trace minerals. However, there are a few precautions. Diatomaceous earth is very dusty and can cause lung problems if breathed heavily, so when applying it dry always wear a good dust mask or stand up wind. The second precaution is that DE sold for swimming pool filters is ineffective for insect control because it has been heated and chemically treated. It won't kill insects and it is very dangerous to breathe. Finally natural DE will kill beneficial insects too, so use it sparingly to kill problem infestations of harmful insects and don't use it too often.

Diatomaceous earth can be applied in a variety of ways. to use for flea and tick control, apply a light dusting over the lawn, in dog runs, around pet bedding or favorite resting spots and sprinkle a little on your pet between baths of a mild herbal soap.

Is DE registered by the EPA and labeled for insect control?

Yes! Some people would have you believe that DE is untested, unlabeled and therefore unsafe for use. That's just one of the feeble arguments left to the organiphobes.

DE has been used for years in the food processing industry to treat stored gains to eliminate weevil and other insect infestations. There are currently dozen of registrations of DE with the EPA for various insecticidal and food supplement uses. DE, with and without pyrethrins and piperonyl butoxide, is registered and labeled for fleas, ants, roaches and many other pests."

<http://www.dirtdoctor.com/>

DIATOMACEOUS EARTH: A Non Toxic Pesticide

MACDONALD J. 47( 2): 14, 42 (May, 1986)

by Professor Stuart B. Hill

Department of Entomology and Ecological Agriculture Projects

"Probably the most effective naturally occurring protective powder is diatomaceous earth. This is a geological deposit made up of the fossilized skeletons and tests of siliceous marine and fresh water organisms, particularly diatoms and other algae. These skeletons are made of hydrated amorphous silica or opal. When crushed, they break up into tiny pieces of glass" (so tiny that the material feels like talcum powder). This is easily picked up by the hairy bodies of most Insects. whereupon it scratches through their protective wax layers; and they also absorb some of this material. the result being that the insects lose water rapidly . dry up and die Further protection is provided by the powder's property of repelling many insects. A similar principle probably accounts for the fact that birds frequently take dust baths, presumably to rid themselves of parasites.

Although patents for diatomaceous earth formulations were issued in the United States in the late 1800s it was not until the 1950s that the first commercial formulations of it became widely available, and between 1963 and 1970 a series of studies on DE were conducted by the U.S. Department of Agriculture. In several tests, DE gave better protection of grain than malathion, particularly over the long term, without exposing anyone to the dangers of toxic chemicals.

In houses it can be used effectively to prevent the entry of certain insects such as earwigs, ants, and cockroaches, and to control these and others that are present in cupboards containing food, carpets, basements, attics, window ledges, pet areas (for fleas), etc. In all of these examples it is important to place a small amount of the powder in corners, cracks, crevices. and other areas where insects might hide. Whereas with a contact pesticide the insect dies quite quickly, with DE control may take several days. The more

important difference is that the effect of the protection provided by the chemical is short-lived. DE will control the pests as long as the powder remains. In this respect DE is an ideal pesticide; it is residual but nontoxic. The only health precautions that need to be taken are that if large areas are being treated with a power duster, the applicator should wear a mask to prevent inhalation.

Another use is in animal production units for the control of external parasites and flies. This is achieved by dusting the animals and the litter or bedding area. It has also been included in the diet (two per cent in the grain ration) to control certain internal parasites, and this practice is said to result in lower fly populations in the resulting manure."

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## GARLIC INTRODUCTION

### GARLIC DOSAGE

Choose the right GARLIC

GARLIC IN THE AVIARY

SCIENCE BEHIND GARLIC

--Antibacterial

--Antifungul

--Antiparasitic

--Antiviral

--Common Cold

--OTHER BENEFITS OF GARLIC

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The Goodness of Garlic (Stabilized Allicin)

Allcidin, Allicidin liquid, Allicidin complex

Garlic is one natural food that not only has tremendous healing building potential, but amazing disease fighting ability as well.

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### GARLIC DOSAGE

I have used the soft gel garlic caps and have seen noticeable results in my pigeons. I have used it daily for birds in rehab and see better results the longer it is used. It can be used to treat birds in general, for injuries and disease, in any case, it strengthens the immune system and plays a vital roll in recovery. If it was economical and didn't take so much time, I probably would pop a soft gel garlic cap down each of my birds daily as it is so beneficial. In the future, I hope to try the stabilized allicin, upon approval of the manufacturer.

As is the case, for prevention, I use the garlic clove in the birds water a few times a week. The problem is the smell will cause the birds not to drink as readily as they should. If you do use it in their water start with a clove to a gallon, and if they refuse to drink the amount they normally do, use less. If you use a plastic drinker, the smell may permeate the plastic, (if it is a poor quality plastic) and that may further repel the birds to drink

enough of it. It is best to use a ceramic drinker, or even a galvanized drinker, (available thru the pigeon supply houses). The point is, for the birds to get enough of the "goodness" of garlic, they need to drink their normal drinking quota.

When using garlic for medicinal reasons, it is better to double the amount used for preventive purposes. The garlic capsules enable the birds to get a more concentrated dose of garlic than the clove in the water.

The only time I don't use garlic, is when the bird has an upset stomach, or if it is a youngster under 6 weeks of age.

I'm also looking into using other garlic products in the future, that are actually stabilized allicin. I hope this will help those of you who are not using garlic, or those of you only using it for prevention, to take a second look at both its prevention and healing qualities.

Question:

"I went into your link on Allicidin Complex and found this information on the potency: 385 mg/capsule. Is that the amount of milligrams you use?"

I ask because it seems like a lot and I want to make sure I use the same amount that you yourself have had success with. I don't know if you can "overdose" a bird with too many mg. of garlic.

Answer: I administer that one once a week, or more.

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#### CHOOSE THE RIGHT GARLIC:

The key to medicinal garlic is stabilized allicin. Sniff a garlic bulb and you won't detect any odor. That is the odorless amino acid, alliin in the clove. Once the clove is crushed, you can smell it, that is when alliin comes in contact with an enzyme allinase. The reaction of these two compounds produces allicin, which is the key to its characteristic odor, as well as its healing properties. Allicin is then transformed into several additional sulfur compounds which also have healing and medicinal properties.

Because the odor is a key to goodness be careful when purchasing one for your pigeons, as some brands that do remove the odor will also remove its healing power as well. The most effective form of garlic in supplement form should use a cool-dried process. Look for a stabilized allicin, usually in capsule, it has a proven track record to gently clear harmful pathogens, especially those contained in miniature, multicompartmented cities called biofilms-99% of all infections in the body live in biofilms.

\* I'm using the Now brand caps, because they have proven to work over long periods of time in my pigeon rehab, I no way solicit to sell or make profit on the product, I just use it as an example of a garlic product that has worked for me. I encourage everyone to use a natural garlic product of their own choice, just make sure it is pigeon-friendly

UPDATE: The Alli-Supreme has a new name now, it is called Allicidin Complex, because it is a complex of different species of garlic.

I have been using this product since December, and even though it does not have as much garlic as the Now brand gel caps, it seems to be as effective and more so.

The effectiveness is attributed to the way it is processed as well as the different species used. Another benefit of using it is that it does not have a lingering smell of the Now brand caps. This is a big plus for in-home rehabbing.

It dissolves instantly as it is a vegetable cap, so once water is used to lubricate it, make sure to pop it down the bird right away.

Reti has been using it as well as I, and she has been very happy with the results. She includes it in her supportive care and especially with the hardest cases.

Garlic is absolutely wonderful for building up the immune system and should be a part of the supportive products for PMV pigeons.

I have not heard of adverse effects. However, I would give the products at different times. I pop a whole capsule down, and slick it down with a tiny bit of Neem oil, or cod liver oil, depending on that birds particular needs.

Put the capsule in the back of the throat behind the tongue, then push gently as far back as it will go, allow the bird to close its beak and swallow, and gently rub under the beak in downward motion. That is all it takes.

I have given Allicidin Complex or Now brand garlic soft gel caps, both work fine.

The important thing with PMV birds is to stress them as little as possible, so the least disruptive measures is best for them.

NOTE: I cannot recommend the use of any kind of garlic powder, especially the kind that is used for seasoning. This product should only be used for seasoning food, but it has lost most of the actual nutritional value, due to processing, heating, and storage. It probably will not deliver the results that an actual garlic clove or health store capsules will.

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#### SCIENCE BEHIND GARLIC:

Antibacterial

Antifungal

Antiparasitic

Antiviral

Common Cold

#### OTHER BENEFITS OF GARLIC

Stabilized allicin has demonstrated significant antibacterial, antifungal, larvicidal and antiviral properties, according to the following information extracted from Premier

Products literature:

#### Antibacterial Activity of Allicin

Various researchers have shown that garlic extracts exhibit a wide spectrum of antibacterial activity against gram-negative and gram-positive bacteria, including species of Escherichia, Salmonella, Staphylococcus, Streptococcus, Klebsiella, Proteus, Bacillus, and Clostridium. Even acid-fast bacteria such as Mycobacterium tuberculosis are sensitive to garlic. Research shows that garlic extracts are effective against Helicobacter

pylori, the cause of gastric ulcers. Garlic extracts can also prevent the formation of Staphylococcus enterotoxins A, B and C1 and also thermolysin. Research shows the antibacterial action of garlic is mainly due to allicin. Interestingly allicin has also been proven to be effective against various bacterial strains resistant to antibiotics such as Methicillin Resistant Staphylococcus Aureus as well as multi-drug-resistant enterotoxigenic strains of Escheria coli, Enterococcus, Shigella dysenteriae, S. flexneri and S. sonnei cells.

#### Antifungal Activity of Allicin

Garlic extracts have also shown, in research, to have a strong antifungal effect and inhibit formation of mycotoxins like the aflatoxin of Aspergillus parasiticus. Another study showed the fungistatic and fungicidal activity of a highly concentrated garlic extract against Cryptococcus neoformans. Pure allicin was found to have a high anti-candidal activity and was effective against various species of Candida, Cryptococcus, Trichophyton, Epidermophyton and Microsporum. Allicin inhibited both germination of spores and growth of hyphae.

#### Antiparasitic Properties of Allicin

Freshly crushed garlic has been used to treat intestinal worms as it has an antiparasitic effect. Recent research shows that allicin is also effective against Entamoeba histolytica, a human intestinal protozoan parasite. Stabilized allicin has also very efficiently inhibited the growth of other protozoan parasites such as Giardia lamblia, Leishmania major, Leptomonas colosoma and Crithidia fasciculata.

#### Antiviral Activity of Allicin

Fresh garlic extracts in which allicin is the main component have shown in vitro and in vivo antiviral activity, including effectiveness against the human cytomegalovirus, influenza B, herpes simplex virus type 1, herpes simplex virus type 2, parainfluenza virus type 3, vaccinia virus, vesicular stomatitis virus and human rhinovirus type 2. The allicin condensation product, ajoene, appears to have more antiviral activity in general than allicin. Ajoene was found to block the integrin-dependent processes of human immunodeficiency virus-infected cell system.

#### Allicin and the Common Cold

Research shows that garlic extracts are effective against numerous viruses that cause colds and flu. Evidence points towards allicin and ajoene as the main components responsible for this antiviral activity. Studies showed that daily intake of stabilized allicin produced significant protection from the common cold virus as well as benefits of prevention, treatment and reduction of re-infection from colds.

#### OTHER BENEFITS OF GARLIC

- \* Strengthens blood vessels and lowers blood pressure
- \* Great natural antibiotic-protects against & fights infections
- \* digestive aid & disorders
- \* anti-inflammatory
- \* to combat respiratory problems
- \* to treat fungul/yeast infections
- \* to alleviate sinus problems
- \* immune system stimulant
- \* aids in circulatory problems
- \* purifies the blood
- \* Detoxifies the body
- \* Aids in arteriosclerosis,ulcers, liver disease, & heart disorders

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NEEM OIL (*Azadirachta indica*) INTRODUCTION

NEEM FOR PETS

NEEM IN THE AVIARY

Neem oil vs. Mosquitos

Neem oil in the garden

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Neem is a compound that has a long medical history of use as a herbal remedy. Many of the popular herbal medicines are still derive from it. All parts of the neem tree have medical references. In India, neem is sometimes called "the village pharmacy". Over 100 pharmaceutical active substances have been identified in the neem tree, and it has many medical references for human and pet medication.

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NEEM FOR PETS:

Neem is a herbal remedy for the medication of fever, gastrointestinal disease, skin disorders, respiratory disease, intestinal parasites, immune system disorder, and yeast infections in pets.

It may inhibit the development of viruses and prevent them from entering and infecting cells. Neem appears to be an appropriate herbal remedy for numerous skin disorders. The anti inflammatory and pain relieving activity of neem make it potentially useful for pet medication against scalp psoriasis, eczema, seborrheic dermatitis, and yeast infections. The neem leaf has been shown to have activity to suppresses the fungus that cause ringworm in dogs and pets.

Neem oil and Neem leaf extract may be applied externally in the form of Neem cream and Neem soap. Both external and intestinal parasites may be sensitive to the effects of herbal neem remedy. Neem tea is used for pet medication against intestinal parasites, including worms. Neem oil and Neem shampoo are excellent treatments for scabies! Perhaps one of the most interesting success of neem is its use as a herbal remedy for malaria.

Neem is a proven anti-inflammatory that decreases histamine and other mediators of inflammation in the body. Some of the important chemicals in neem that contribute to

this effect are azadirachtin, nimbidin, limonoids, and catechin. Warmed neem oil is also recommended for external use to reduce pain and inflammation in affected joints.

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#### NEEM IN THE AVIARY:

Neem has been certified by health authorities in the USA and Europe as being non-toxic to birds, animals and humans. The properties of neem oil support the effectiveness of garlic and ACV. Neem oil can be mixed in with the oil you might place on perches to water proof them. A few drops of neem oil will keep pests such as mites and mosquitos off the perches.

Neem is good support for PMV cases, and makes great preventive treatments for parasites and many diseases. A few drops in the seed dish once a week keeps bugs out of the seed.

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#### Neem oil vs. Mosquitos

Neem Products repel and affect the development of mosquitoes. In a study, two percent neem oil mixed in coconut oil, when applied to exposed body parts of human volunteers, provided complete protection for 12 hrs. from bites of all anophelines. Kerosene lamps (Not for use around birds) containing 0.01-1% neem oil, lighted in rooms containing human volunteers, reduced mosquito biting activity as well as the mosquitoes resting on walls in the rooms; protection was greater against Anopheles than against Culex. Effectiveness of mats with neem oil against mosquitoes has also been demonstrated; the vaporizing repelled mosquitoes for 5-7 hrs at almost negligible cost. The seed kernels of the Neem tree are rich in limonoids, bitter tasting chemicals that effectively block development, feeding and egg laying in many species of insects.

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#### Neem oil in the garden:

A broad spectrum insecticide, miticide and fungicide, 70% Neem Oil controls numerous diseases as well as insects and mites. Use on vegetables, fruit trees, ornamentals and more. OMRI Listed for use in organic production.

#### Unique Features:

- Broad spectrum insecticide/fungicide/miticide
- Controls insects and mites including whitefly, aphid and scale
- Controls fungal diseases including black spot, rust, mildew and scab
- For indoor/outdoor use on ornamental plants, flowers, vegetables, trees, shrubs and fruit & nut crops.

#### Directions for garden Use:

Mix at the rate of 2 tablespoons (1 fluid ounce) per gallon of water. Thoroughly mix solution and spray all plant surfaces (including undersides of leaves) until completely wet. Frequently mix solution as you spray.

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#### MELALEUCA INTRODUCTION

## MELALEUCA IN THE AVIARY

### ATHLETES FOOT

### COLD AND FLU SEASON

### ORAL THRUSH

### LICE

### OTHER USES OF MELALEUCA

### DEADLY TO CATS!

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## TEA TREE OIL (*Melaleuca alternifolia*)

### INTRODUCTION:

Tea tree oil has three remarkable properties which make it a powerful healing substance. Some controversy exists regarding the safety of Tea tree oil on animals, you may prefer to us Neem oil, which has no toxic warnings regarding birds.

First, it is a strong organic solvent. It dissolves the lumps of white blood cells which make pus and allows your blood stream to clean them away, helping to clear infections like boils, sores and ulcers. It also penetrates through the skin and reaches otherwise inaccessible sites such as under the fingernails.

Second, it is an efficient antiseptic. It kills bacteria fast, even stubborn germs like *Staphylococcus aureus*, *Pseudomonas aeruginosa* and *Escherichia coli*. This has been proven in laboratory testing by Associated Foodstuff laboratories of Australia (AFLA) and E.M.L. Consulting Services. What's more, tea tree oil kills bacteria even more effectively in living tissue than in the test tube, unlike many synthetic antiseptics. It works well in the presence of organic matter. Tea Tree oil does this without damaging healthy cells.

Third, tea tree oil is an effective fungicide which means that it has countless applications for skin conditions. And as an added bonus, tea tree oil is soothing on application. It takes away pain.

Clinical Studies have shown some Antiseptics don't penetrate below the skin's surface, where it really counts!

Tea Tree Oil gets deep below the skin's surface to kill germs, remove pus and soothe the skin. And best of all, it's 100% natural!

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## MELALEUCA IN THE AVIARY

As an antiseptic, fungicide, and infection/pus remover, Tea Tree Oil should make a great treatment for bumblefoot and scaly leg. (Staph and mites)

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### ATHLETES FOOT

The most common form of athlete's foot is "Tinea Pedis" commonly known as athlete's foot. This attacks the warm, moist areas between the toes and the side and soles of the feet, and is highly infectious. Tea Tree Oil has been successfully applied to a number of fungal infections and is particularly good for relieving the symptoms of athlete foot.

"Australian Melaleuca Alternifolia oil successfully relieved or eliminated foot symptoms in 58 out of 60 suffering patients. This study was carried out by Dr. M. Walker, 1972.

The conclusion was that by using tea tree oil in various dilution's daily, Tea Tree Oil will eradicate or improve the symptoms of athlete's foot with continuous daily use".

Apply two (2)- three (3) drops of Pure Tea Tree Oil to nail infection twice (2) daily and apply Tea Tree Antiseptic Cream to surrounding skin area that is continuous daily use."

To eliminate athlete's foot we would suggest you do the following: take shoes and sneakers and wrap in plastic and put in the freezer overnight. This will kill the bacteria in the footwear.

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#### COLD AND FLU SEASON

Tea Tree Oil is an extremely effective and natural antiseptic and germicide. It penetrates to the site of infection and heals while being kind to healthy tissue.

COLD & FLU - for sore throats and coughs add 10 drops of tea tree oil to a cup of warm water and gargle. Do this morning and night, and it will assist in clearing mucus and killing bacteria. You can use Tea Tree Therapy Alcohol Free Mouthwash to gargle and we would suggest you add an additional 5 drops of the 100% pure tea tree oil when you have a cold or sore throat. Do not forget to apply 2-3 drops of 100% pure oil to your toothbrush before you apply Tea Tree Therapy Baking Soda or Whitening Toothpaste. Not only will this assist in keeping your mouth, breath and gums healthy it will kill the bacteria and stop you from re-infecting yourself.

A vaporizer in the bedroom, (Do not use with birds in the house) with 10 drops of Tea Tree oil to the water reservoir is also suggested to relieve congestion.

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#### FOR THE RELIEF OF ORAL THRUSH, COLD & CANKER SORES, TOOTH ACHE & GUM INFECTIONS

ORAL THRUSH: Make a mouthwash of 1 capful of Tea Tree Therapy 15% Water Soluble Tea Tree Oil to 12 oz of water. Gargle and rinse mouth 3 times a day. Apply 2-3 drops of 100% Pure Tea Tree Oil to your toothbrush before applying either Tea Tree Therapy Whitening Toothpaste or Baking Soda Toothpaste. Repeat this treatment regularly and it will soothe and give relief for oral thrush.

CANKER SORES: Apply Tea Tree Oil to site twice a day with a cue tip. Gargle regularly with Tea Tree Therapy Mouthwash.

COLD SORES: When you first experience the pain at the site of the cold sore begin immediately by applying the 100% Pure Tea Tree Oil 3 times a day. It should stop the cold sore from appearing. Should it breakout after applying the 100% pure Tea Tree Oil, apply Tea Tree Antiseptic Cream and continue to use as often as necessary. (Editor's Note: Cold sores are a VIRAL eruption, not a fungal or bacterial infection. Other research suggests Lysine cream or Neem oil is more effective.)

**TOOTH ACHE & GUM INFECTIONS:** Should you be unable to get to a dentist and you are suffering from a toothache, apply Pure Tea Tree Oil directly to the site. By doing this the tea tree oil will penetrate the gum or tooth and will kill the bacteria that is causing the pain. Gingivitis can be treated with 100% Pure Tea Tree Oil by applying the oil directly to the gums twice a day. Apply 2-3 drops of oil to your toothbrush before applying the toothpaste. This will stop you from reinfesting yourself.

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#### LICE

The effective arsenal of tea tree oil products for the prevention and treatment of heavy lice infestation. Tea tree oil is a natural product distilled from the tea tree plant unable to overcome this natural oil because of its complex molecular properties. It is virtually a non-irritant to most humans.

**Directions:** Simply add 10 drops of Pure Tea Tree Oil to the dispensed quantity of Tea Tree Shampoo required in one shampoo. The wetted hair and scalp are then thoroughly lathered for 10-15 minutes then combed through with fine tooth comb before shampoo is rinsed off. Avoid contact with eyes. Then apply required amount of Tea Tree Therapy Conditioner and comb through before rinsing.

The hair may have to be washed intermittently in this manner subject to the presence of lice infestation until eradication is achieved. A thorough disinfecting of clothes, bedding and soft toys likely to harbor lice or their eggs should be carried out concurrently with hair treatment. Add two (2) capfuls of 100% Tea Tree Oil to wash. Make up a solution of one (1) capful of 15% Tea Tree Water Soluble Tea Tree Oil to 1 cup of water, shake vigorously and spray sofa lightly, then apply heat by using hair dryer to area, then vacuum. Regular washing with Tea Tree Shampoo is essential to prevent reinfestation with lice from the home, school or work environment.

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#### OTHER USES:

##### HOUSEHOLD GENERAL CLEANSING

###### General Antiseptic & Cleanser:

Add 1 teaspoon of 100% pure oil to 5 liters of water when washing windows, floors, toilets, bathrooms and kitchen surfaces. Add 2 teaspoons of 100% pure tea tree oil to washing machine for a fragrant, fresh wash. This is particularly helpful when washing woolens, as it deters moths and silverfish.

Household ants and others pests hate tea tree oil, so a few drops put at the point of entry will deter them. Similarly, when you wipe cupboards out with an oil and water solution, you will find that cockroaches will move out!

Apply a few drops of pure tea tree oil to damp cloth wipe over mattress to deter dust mites. Remove scuff marks from a vinyl/linoleum floor by rubbing with a damp cloth to which pure tea tree oil has been added. Put a tissue with pure oil drops on it into your vacuum cleanser bag to freshen your rooms and kill dust mites as you vacuum.

###### Being a Germicide:

Refrigerator gaskets stay fresh and clean if you wipe them over occasionally with a tea tree oil/water solution.

Shower curtains stay mildew free if soaked in a tea tree oil/water solution before washing. Add a few drops of pure oil to rinse water.

Shower doors stay cleaner if you wipe them over with a tea tree oil/water solution.

Helps prevent soap scum build-up.

Add a few drops of pure oil to furniture polish to prevent blue mold growing with a tea tree oil/water solution to prevent mildew regrowth.

Similarly, put a tissue with a few drops of oil on it into your leather shoes when you store them away to prevent mildew growth.

Use pure oil on cloth to remove tar from feet.

To remove chewing gum from hair, apply pure oil.

### IN THE GARDEN

Tea Tree Therapy Antiseptic Cream or Hand & Body Lotion makes a great precautionary hand cream before you put on gloves to tackle the garden. It provides a protective barrier against cuts and scratches.

### DENTAL USAGE

Apply 2 to 3 drops of Tea Tree Therapy 100% Pure Tea Tree Oil to your toothbrush before you brush your teeth, then apply toothpaste to brush. Not only will this addition assist in keeping your mouth, breath and gums healthy but it aids in fighting plaque. Dab pure oil onto mouth cankers, abscesses and site of toothache for relief.

### OUTDOORS

Fisherman will find relief from sand fly, mosquito and other irritating bites by dabbing pure oil on site of irritation. It acts as a repellent to some bugs. Anyone who enjoys the great outdoors should carry a bottle with them as it truly is "A Medicine Kit in a Bottle."

### Pets-Dogs Only

Tea tree oil is **DEADLY TO CATS**.

Apply Tea Tree Therapy Antiseptic Cream directly to hot spots twice daily. To help deter fleas add one (1) capful of pure tea tree oil to Tea Tree Therapy Shampoo and shampoo. Apply two drops directly onto tick and gently remove tick with tweezers, apply one (1) drop of Pure Tea Tree Oil to area to stop to any infection. Add 10 drops of Pure Tea Tree Oil to dogs sleeping blankets, will help to deter fleas.

### WEST AFRICAN BAY (*Pimenta racemosa*)

*Pimenta racemosa* var. *ozua* (Myrtaceae) is a tropical plant, used in different inflammatory processes by the folk medicine of the Caribbean region. From the methanol extract of the leaves a terpenic compound identified as lupeol has been isolated for the first time in this species. The anti-inflammatory activity of the extract has been evaluated against two experimental models of acute inflammation: paw edema in rats, using carrageenan or dextran as proinflammatory agents, and ear edema in mice, inducing the

inflammation with 12-o-tetradecanoylphorbol acetate (TPA). Myeloperoxidase activity (MPO) was also assayed as an indicator of leukocytary migration in the inflamed ears. In the carrageenan test, the methanol extract (125 and 250 mg kg<sup>-1</sup> p.o.) had a dose-dependent and significant effect at different time intervals. On the contrary, when the dextran was injected in paw, the extract did not reduce the inflammation provoked. This behavior was similar to indomethacine (25 mg kg<sup>-1</sup>) used as a standard drug. In the TPA-induced ear edema, the methanol extract (0.5, 1 and 3 mg ear<sup>-1</sup>) significantly reduced the inflammation. In the MPO assay a significant inhibition of the enzyme was observed in the inflamed tissue in all the samples assayed. These results show that the methanol extract from the leaves of *Pimenta racemosa* var. *ozua*, is effective against acute inflammation processes, by oral route and when topically applied. The anti-inflammatory behavior of the extract was similar to that exhibited by the selective cyclooxygenase inhibitor, indomethacin. The antibacterial activity of essential oils of *Pimenta racemosa* var. *terebinthina* and *P. racemosa* var. *grisea* was determined against Gram (+) and Gram (-) bacteria. *P. racemosa* var. *grisea* demonstrated a more pronounced activity. These data would indicate the potential usefulness of the variety *grisea* as a microbiostatic, antiseptic or disinfectant agent.

Confirmed beneficial in MILD forms of canker only, not proven for advanced stages of disease in distressed birds. Needs more scientific data to expand uses.

Current use in the aviary: A few drops in the pan of bath water kills germs and fungus to keep bath water clean just in case the birds decide to drink from it. Neem oil or tea tree oil can be used instead.

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### Manuka Honey

#### Exceptional Antibacterial and Healing Activity

The unique properties of manuka honey can help heal a huge range of conditions from stomach ulcers to infections, as well as increasing your energy levels and general well-being.

Honey is one of nature's oldest folk remedies. Ancient civilisations used honey to help heal wounds.

There are many reports in medical literature of honey being successfully used for problems such as wounds, burns, skin ulcers, boils, infections.

Scientific university research is showing the reason why honey could assist natural healing and that Manuka Honey has even greater healing qualities because of its enhanced antibacterial potency.

#### How Manuka Honey Can Help...

##### Infections & MRSA (superbug)

In the laboratory the antibacterial properties of Manuka Honey have been found to be effective against infections such as MRSA (*staphylococcus aureus*), strains of bacteria which are notoriously resistant to antibiotics and sometimes responsible for closing hospital wards.

University Research Confirms Honey as a Healer

Dr Peter Molan, MBE, Associate Professor in Biochemistry at The University of Waikato, Hamilton, New Zealand, has researched the ancient healing properties of honey since 1981. He has found that honey heals primarily because of a natural hydrogen peroxide antibacterial property present in varying levels in most honeys.

Bees gather nectar from flowers. Back in the hive to help preserve the honey they add an enzyme, glucose oxidase, to the nectar when they are processing it into honey.

When honey comes into contact with body moisture the glucose oxidase enzyme slowly releases the antiseptic hydrogen peroxide. This is released at sufficient levels to be effective against bacteria but not tissue damaging.

In the research laboratory a catalase was added to honey samples to remove the hydrogen peroxide and then the honeys were tested to see if there was still any antibacterial activity.

Some manuka honey samples were found to still have significant antibacterial activity - a non-peroxide antibacterial activity.

This special non-peroxide antibacterial activity is called UMF (Unique Manuka Factor).

But the hydrogen peroxide antibacterial activity in honey can vary widely according to:

1. Honey floral type. Some floral nectars produce a catalase which destroys the glucose oxidase enzyme.
2. How the honey has been handled, especially during processing. The glucose oxidase enzyme is easily destroyed by heat, fluid and sunlight.
3. The hydrogen peroxide can be broken down by a catalase enzyme present in body tissue and serum, so reducing the antibacterial potency when used on a wound or infection.

#### Minor Burns & Pressure Sores

Research has shown that high activity UMF Manuka Honey is very effective for topical use on burns, pressures sores and other wounds.

Not only is UMF Manuka Honey antibacterial, but it nourishes and promotes tissue regrowth. Its osmotic effect draws a thin film of moisture to the surface creating a barrier between wound and dressing, allowing easy removal without damaging regrowing tissue. The healing is more rapid and there is minimal scarring.

#### Skins Ulcers, Wounds, Boils, etc

Studies have shown that high activity UMF Manuka Honey provides an optimum germ-free moist wound-healing environment which supports and facilitates the natural healing of varicose and skin ulcers, diabetic ulcers, pressure sores, wounds, burns, boils, cracked skin, cuts and grazes.

UMF Manuka Honey can assist wound healing because:

1. It is antibacterial and rapidly clears infecting bacteria, including antibiotic-resistant strains.
2. It can diffuse deeply into skin tissues, so that it can reach deep-seated infections.
3. It does not require oxygen, so it can remain effective even when smothered by wound dressings or in wound cavities.
4. It cleans wounds, has a debriding effect and the osmotic effect of honey lifts dirt out of the wound bed.
5. Dressings do not stick to the surface of the wound allowing easy removal of dressings.

The osmotic effect of the honey keeps the wound moist, clean and prevents the dressing sticking to the wound. Tissue damage and pain are reduced when dressings are changed as there is no tearing away of newly formed tissue. Healing is more rapid.

6. It reduces scarring. The honey draws body fluids and nutrients to the wound area and so assists cell growth and prevents a scar forming as the wound is kept moist.

Honey provides nutrients (vitamins, minerals and amino acids) to tissues

7. It promotes more rapid healing because the honey stimulates tissue regeneration.

\* Angiogenesis is stimulated new blood vessel growth giving oxygen and nutrients to the tissues.

\* Fibroblast growth is stimulated by hydrogen peroxide.

\* Epithelial cell growth is stimulated these cells grow level with the skin so that no scab is formed and so no scarring and hypertrophication.

8. Acidity of honey releases oxygen from haemoglobin new growing cells need oxygen. Honey stimulates the white blood cells.

9. Hydrogen peroxide in honey has an insulin-like effect and promotes wound healing.

10. Anti-inflammatory action of honey soothes and promotes healing, reduces pain and swelling

11. Honey forms a protective barrier to prevent cross-infection of wounds.

12. Honey removes malodour from wounds by killing the bacteria which produce ammonia

13. Honey does not damage the surrounding tissue

14. Honey minimizes the need for grafting

Sore Throats & Colds

Research is showing the UMF property of active Manuka Honey is effective against Streptococcus Pyogenes, a bacteria which causes sore throats.

Propolis is an antibiotic collected by bees and used in the hive to protect the bee colony from disease and bacterial contamination. The quality of New Zealand propolis is known to be one of the highest in the world. It is very high in bioflavonoids and is renowned for its high levels of antibacterial activity.

Research has also shown that UMF rated Manuka Honey promotes rehydration of the body causing the earlier clearing of diarrhoea, vomiting and stomach upsets.

How to Use:

When the first feeling of a cold comes on, take a teaspoon of SummerGlow UMF16 Manuka Honey from time to time throughout the day.

Stomach Ulcers and Related Conditions

Laboratory tests have shown the UMF antibacterial property present in UMF Manuka Honey inhibits the growth of the bacteria helicobacter pylori. This bacteria is believed to cause most stomach ulcers, dyspepsia and peptic ulcers.

In clinical trials patients taking UMF rated Manuka Honey all experienced considerable relief from their stomach ulcer symptoms.

The peroxide antibacterial activity of other honeys (including ordinary manuka honey) was found not to be effective against helicobacter pylori. Studies are also showing that the good bacteria in the stomach are not affected by the UMF property.

How to Use SummerGlow UMF16+ Manuka Honey For Digestive Health.

- Try having a teaspoon to a tablespoon of the honey three to four times a day, ideally one hour before meals and again at bedtime.
- Try to have nothing to drink immediately after having the honey so as not to dilute the honey.
- Having the honey on bread, toast or cracker biscuit holds the honey in the stomach for as long as possible.
- Many people have experienced good results if they have the honey straight from the teaspoon.
- It is pure honey so it does not interfere with regular medications.
- Adjust the amount and frequency to suit your own needs. Most people have a generous amount of the honey initially, then reduce it as they feel warranted.
- A little discomfort was experienced by a few for a very short period.

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### HEALTH BENEFITS OF STEVIA

The herb, *Stevia rebaudiana*, has been used for centuries by the Guarani Indians of Paraguay, who had several names for the plant, several of which are Kaa'-he-E, Caa'-ehe, or Ca-a-yupe- all referring to the sweet leaf or honey leaf. It is commonly known in South America as yerba dulce meaning sweet herb. The Guarani used stevia nutritionally and medicinally.

The plant came to the attention of the rest of the world when South American naturalist, Bertoni, "discovered" the plant in the late 1800's. After his report, the herb became widely used by herbalists in Paraguay.

Stevia's most obvious and notable characteristic is its sweet taste. However, the sweet taste is not due to carbohydrate-based molecules, but to several non-caloric molecules called glycosides. Individuals who cannot tolerate sugar or other sweeteners can use stevia. The first glycoside molecule was isolated from stevia in 1931 by two French chemists named Bridel and Lavieille and called stevioside.

During WW II, sugar shortages prompted England to begin investigation of stevia for use as a sweetener. Cultivation began under the direction of the Royal Botanical Gardens at Kew, but the project was abandoned in the aftermath of the war. Japan began cultivating stevia in hothouses in the 1950's. By the 1970's, Japan started using stevia commercially and today, they are the biggest users of the extract, which has captured 50% of Japan's sweetener industry.

Other aspects of stevia are capturing people's attention. The herb is sold in some South American countries to aid diabetics and hypoglycemics. Research has shown that a whole leaf concentrate has a regulating effect on the pancreas and helps stabilize blood sugar levels. Stevia is therefore useful to people with diabetes, hypoglycemia, and Candidiasis. Other traditional uses of stevia are: lowers elevated blood pressure (hypertension), digestive aid that also reduces gas and stomach acidity, and for obesity. The herb acts as general tonic which increases energy levels and mental acuity.

Stevia has been shown to inhibit the growth and reproduction of bacteria that cause gum disease and tooth decay, making it an excellent addition to tooth pastes and mouthwashes. Many people have reported improvement in their oral health after adding stevia concentrate to their toothpaste and using it, diluted in water, as a daily mouthwash. Stevia is useful in healing a number of skin problems. Whole stevia concentrates may be applied as a facial mask to soften and tighten the skin and smooth cut wrinkles. Smooth

the dark liquid over the entire face, allowing it to dry for at least 30-60 minutes. A drop of concentrate may be applied directly to any blemish, acne outbreak, lip or mouth sore. Stevia concentrate is also effective when used on seborrhea, dermatitis, and eczema. Reportedly, cuts and scratches heal more rapidly when stevia concentrate is applied. Stevia concentrate added to soap eliminates dandruff and other scalp problems and improves the health and luster of the hair, also helping to retain natural hair color.

This review of the therapeutic properties of stevia in no way constitutes an endorsement of such uses. Please consult a qualified physician before experimenting with this herb. At this time the FDA permits stevia to be sold only as a dietary supplement and in skin care products.

Stevia extract is a super-sweet, low-calorie dietary supplement that helps regulate blood sugar and supports the pancreas. It is valuable for anyone with diabetes and hypoglycemia.

It is a wonderful aid to weight loss and weight management because it contains no calories. In addition, research indicates that it significantly increases glucose tolerance and inhibits glucose absorption. People who ingest stevia daily often report a decrease in their desire for sweets and fatty foods. It may also improve digestion and gastrointestinal function, soothe upset stomachs, and help speed recovery from minor illnesses...

Stevia also inhibits the growth of some bacteria and infectious organisms, including those that cause tooth decay and gum disease. Many individuals using stevia have reported a lower incidence of colds and flu. Many who have used stevia as a mouthwash have experienced a significant decrease in gum disease.

When topically applied, it softens the skin and smooths out wrinkles while healing various skin blemishes, acne, seborrhea, dermatitis, and eczema. When used on cuts and wounds, it promotes rapid healing without scarring.

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#### Seven Reasons Why Bifidobacteria Are Vital to Health

1. They produce substances that stop the growth of harmful, toxic gram-negative and positive bacteria in the intestines
2. They crowd out invasive toxin-generating microorganisms, such as *Clostridia perfringens*.
3. They slow down the production of damaging protein breakdown products, such as ammonia. This lowers blood ammonia levels that can be toxic to the human body
4. They produce B vitamins and folic acid
5. They produce digestive enzymes, like phosphatases and lysozymes
6. They stimulate the immunity and spur immune attack against tumor cells.
7. They increase the absorption of the essential minerals magnesium and calcium. As we age, magnesium levels in the body decline, contributing to high blood pressure and diabetes.

Technically a fiber rather than a sugar, FOS is totally unlike conventional sugars because it feeds the beneficial Bifidobacteria while selectively starving the parasitical yeast, fungi, and bacteria that contribute to disease. Most toxin-producing microorganisms in the intestines are unable to use FOS as food. Conventional sugars, on the other hand, do

the opposite: Sugars, like sucrose and lactose, tend to feed harmful bacteria and beneficial bacteria alike.

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Homeopathic Gunpowder: Big Bang from a Small Remedy

Shirley J. Casey, WildAgain Wildlife Rehabilitation

Wildlife rehabilitators frequently see wild animals arrive for rehabilitation with a variety of wounds. These wounds may be from a variety of sources: fish hooks, barbed wire, lawnmowers, traps, tree branches, cats, dogs, bullets, or, even other wild animals. They include abrasions, lacerations, punctures, crushing, degloving, burns, compound fractures, and more. Some of the wounds may be recent and fresh; some are older. Some of the wounds may be relatively clean and unlikely to become infected if untreated; others may be developing infection. Some animals arrive with severe abscesses or septicemia.

Rehabilitators work closely with their veterinarians on establishing wound management protocols. Minor wounds are generally thoroughly cleaned and flushed by the rehabilitators. More severe wounds are likely to be cleaned and treated by the veterinarian, such as those needing suturing or surgery. The continuing treatment may include soaking, debriding, and other treatments. Veterinarians may prescribe antibiotics for wounds, especially those that are severe or already infected.

In the last few years, rehabilitators and veterinarians alike have become increasingly concerned with problems related to antibiotics. It has not been unusual for wildlife on antibiotics to lose their appetite or develop gastrointestinal difficulties (e.g., diarrhea). In many cases, the antibiotics have been prescribed without the bacteria being cultured – so the effectiveness may be limited. There is growing concern about rising antibiotic resistance in wild populations. Holistic veterinarians have also expressed concerns about suppressing symptoms.

While there may be cases when antibiotics are necessary, these and other concerns about antibiotic use with wildlife have prompted wildlife rehabilitators to explore alternative treatment options. Homeopathic literature has many descriptions about the use of homeopathic medicines used with wounds, such as *Hypericum*, *Ledum*, *Calendula*, and *Staphysagria*. Other homeopathic medicines are commonly described for infections, such as *Hepar sulphuris*, *Lachesis*, *Crotalus horridus*, and *Pyrogenium*. Wildlife rehabilitators have used such homeopathic medicines with wildlife after consulting with homeopathic veterinarians. These homeopathic medicines have demonstrated their effectiveness as part of an overall wound management protocol.

Several years ago, the author read about homeopathic Gunpowder in Morgan's *Homeopathic Medicine: First Aid and Emergency Care* and Sheppard's *The Magic of the Minimum Dose*. After reading Dr. John Clarke's monograph, *Gunpowder as a War Remedy*, the author discussed this homeopathic medicine with a small group of rehabilitators. While Gunpowder was not well represented in homeopathic repertories, Clarke and a few other homeopaths described homeopathic Gunpowder as highly effective with infected wounds. Clarke wrote:

“The great sphere of action of gunpowder is in cases of septic suppuration - or, in other words - of wounds that have become poisoned with the germs of putrefaction. ... But Gunpowder may [may] also be used as a prophylactic.

That is to say, it will not only cure septic suppuration when present, but it will afford such protection to the organism against harmful germs, that wounds will be less likely to become septic in one who is under its influence....

Now the great point about Gunpowder is that it has a broad and clear indication that hardly anyone can miss - blood - poisoning. ...

The poison quickly finds its way into the blood - boils, carbuncles, eruptions, abscesses, or other manifestations appear, showing unmistakably that the blood has been poisoned. To all these conditions Gunpowder acts as an antidote.”

This group of wildlife rehabilitators was particularly interested in Gunpowder since it could be used prophylactically, at least according to Clarke. Many very small animals, such as young birds, rabbits, and squirrels are commonly admitted to rehabilitation with wounds caused by animals. Even after aggressive wound cleaning and the use of *Ledum* and *Hypericum*, and even some antibiotics, some of the wounds still became infected, especially wounds from cats. In some cases, even wounds treated with antibiotics became infected. Waiting until the symptoms of infection were apparent in order to select *Lachesis*, *Hepar sulphuris*, or other homeopathic medicines meant the infection could be well established and more difficult to treat, particularly in such small or young animals. A homeopathic medicine that could be given immediately after the wound, but before the infection had become serious was obviously of high interest.

The Gunpowder with which we are concerned is the traditional Black Gunpowder, whose three cardinal constituents are sulphur, carbon, and nitre or saltpetre. ...As sulphur, carbon, and saltpetre are three potent medicines known to pharmacy and physic, it is not surprising that a combination of the three should be a medicine of great potency. There is a certain piquancy in the fact that gunpowder is a remedy for the accidents of warfare....”

Gunpowder as a War Remedy by John H. Clarke, M.D.

Clarke and Sheppard described using low potencies of homeopathic Gunpowder and repeating it regularly. However, rehabilitators want to minimize handling of wildlife to reduce stress and risk. Plus, wildlife often arrives with high vital force, and with serious, acute injuries that need immediate attention. As a result, the group believed that the higher potencies might be more appropriate. So the group ordered Gunpowder in 30c and 200c potencies from Natural Health Supply (Santa Fe, NM).

#### Sample of Cases

In the last couple of years, the homeopathic Gunpowder has been used with over a hundred cases of wildlife admitted for rehabilitation. The group of rehabilitators and their veterinarians found the Gunpowder to be effective with a variety of wounds. The following describes several of the cases. All of the rehabilitators using homeopathy had the appropriate state and federal rehabilitation permits, were experienced with the species admitted, and followed effective rehabilitation practices (diet, caging, etc.). They had attended training on the use of classical homeopathy with wildlife, had repertories and materia medicas, and consulted with veterinarians. Most had Clarke’s monograph on

Gunpowder. They also used effective wound management protocols, such as thoroughly flushing the wounds and keeping the wounds clean. In all of the cases, the homeopathic medicines were dissolved in water and administered orally unless otherwise described.

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#### Pigeon Injured by Dog

A fledgling pigeon (*Columba livia*) was rescued from a dog and taken to a wildlife rehabilitator later that day. While the bird's vital force was high, he was in shock and seemed terrified. As a standard treatment, the rehabilitator immediately administered *Aconitum napellus* 1m for the severe fear and placed the bird in a quiet, warm cage. A short while later, the bird seemed considerably calmer. The bird still showed some signs of shock and seemed to have pain when touched, probably from bruising. Since *Arnica montana* is excellent with traumas and shock from injury, the rehabilitator gave the pigeon a single dose of *Arnica* 1m. A deep, wide laceration on the right chest and under the right wing was cleaned with a dilute Betadine® solution. The bird was placed back in the cage to rest.

A couple of hours later, the bird's wounds seemed to have become extremely painful. She repertorized and selected *Hypericum* for its effectiveness with lacerations and extreme pain from injuries. She gave *Hypericum* 1m and placed *Calendula* gel on the wound. Within an hour, the bird was starting to eat, seemed more alert, and was moving more comfortably.

The rehabilitator was also concerned with the potential risk of infection from the wound. She decided to give the *Gunpowder* 200c since it could help prevent infection. Within a couple of days, the wounds healed with no signs of infection. The bird was released when he was able to fly effectively.

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#### Juvenile Crow with Abscess

A member of the public delivered a juvenile crow (*Corvus brachyrhynchos*) to a veterinarian. The bird had a large abscess on the left side of its head that had broken open and was draining. After thoroughly flushing and cleaning the abscess, the veterinarian transferred the crow to a rehabilitator. He sent along an antibiotic in case the rehabilitator needed it.

On arrival, the rehabilitator noted that the bird, in addition to the abscess, had some bruises and seemed painful when touched. While it was uncertain what had caused the wounds, it appeared to have resulted from some kind of trauma. The bird had high vital force. *Arnica montana* is well known for its ability to address general trauma, soreness, and pain when touched. *Arnica* is also listed in bold in Generalities, Abscesses, suppurations. The rehabilitator administered a single dose of *Arnica* 1m. Within hours, the bird seemed more comfortable, especially when handled.

The next morning, however, the abscess looked much worse and smelled putrid even after it had been thoroughly cleaned. The etiology of the wound was unknown. Her first impulse was to give a homeopathic medicine known to be effective with severe infections.

After repertorizing, she read descriptions of *Lachesis*, *Arsenicum*, *Silicea*, *Hepar sulphuris*, *Mercurius*, and *Pyrogenium*. However, these remedies did not seem to be a close match to the case. While *Gunpowder* was not well represented in the repertory, she decided to use it due to Clarke's description of its effectiveness with infection. Since time

was of the essence, if signs of initial improvement were not noticeable in 12 hours, she would select another remedy or begin the provided antibiotic. Since the bird had high vital force and the condition was grave, she wanted to give a significant stimulus to healing. She administered a single dose of Gunpowder 200c.

Within hours, the abscess seemed smaller and the odor decreased. The crow started eating and moving better. Within a few days, all signs of the abscess were gone and the wound healed. The bird was released with others of its age.

#### Robin with Deteriorating Wound

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A juvenile robin (*Turdus migratorius*) was admitted to a rehabilitation center with several deep cat bites on the body and under its left wing. The wounds were thoroughly washed with a Betadine® solution. Baytril® was administered twice a day on the veterinarian's instructions. While the wounds were cleaned daily, they did not seem to be healing. The robin's appetite decreased. The bird was kept in a small cage with supplemental heat. On the fifth and last evening of the Baytril®, the rehabilitator found the wounds under the wings had deteriorated. There was considerable black and necrotic tissue on the wound under the wing. The wound also had a highly offensive smell.

As she cleaned the wounds again, the rehabilitator considered the options. The veterinarian would not be available until the next day. She felt that if the Baytril® had not begun to control the infection, other antibiotics might not be effective or able to start fast enough to help the robin. Or, she could try a homeopathic medicine. While not very experienced with homeopathy, she had some homeopathic Gunpowder and knew it had been effective with some severe infections. She decided to give a single dose of Gunpowder 200c that evening. If the bird lived until morning, she would discuss further action with her veterinarian.

The following morning, the wounds looked smaller and no longer contained any black tissue or noticeable smell. The rehabilitator was absolutely astounded with the bird's improvement. The wounds healed completely within a couple of days, with the Robin released a short while later.

#### Conclusion

Two of the cases described above show how homeopathic Gunpowder was used successfully as a prophylactic to try to prevent infection from occurring. In the other two cases, the homeopathic Gunpowder was used with wounds that were already infected, with one that had deteriorated even after antibiotics. The homeopathic Gunpowder was quite effective as part of a wound management protocol in these four cases. There are additional successful cases where rehabilitators have used homeopathic Gunpowder, such as with the Pelican with the fourteen inch laceration in his chest and ground squirrel with a septic leg that had not responded to antibiotics. That is not to say that homeopathic Gunpowder is an appropriate for all wounds or a substitute for antibiotics. Nor does this suggest that use of homeopathic Gunpowder ensures a positive outcome. Rather, these cases suggest that homeopathic Gunpowder and classical homeopathic protocols are one more option that might be considered as part of a wound management protocol.

While Gunpowder is not well represented in the homeopathic repertories or a match for all wounds, it seems worth considering. As Lyle Morgan says in *Homeopathic Medicine*:

First Aid and Emergency Care, homeopathic Gunpowder "... is a valuable, but all too often ignored remedy."

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### Part 13: Columbiaform Behavioral Science

1. Summary of Dove Behavior
2. Development of Pecking in Doves

#### SYNOPSIS OF BEHAVIOUR TRAITS OF THE RINGNECK DOVE

Knowledge of normal behavior of a species is of great value in interpreting results of experimental studies. For some purposes, it is desirable for a student to be free of preconceived ideas when he begins a study of natural behavior. Nevertheless, it is useful in other cases to acquaint a worker quickly with the units of behavior for any particular species so that he may go on to more advanced studies. Concise descriptions of the voice, postures, and movements of a species of bird, for example may accomplish this, with a brief indication of how such traits fit into the general life history. Such an outline also would help biologists and animal caretakers in handling and understanding their experimental animals. The following brief synopsis presents original observations on the ring neck dove, *Streptopelia risoria*, a domestic dove also known as Barbary or blond dove. The senior author has maintained reproductively active groups of this dove in captivity for the past fifteen years and has made continuous observations during six years on the large dove colony maintained by the Department of Genetics, at the University of Wisconsin.

The various displays and postures are grouped under six headings indicating the phase activity in which they occur. The units listed are heterogeneous but in a number of cases (e.g. B 1, 2, 3, 9 and C 1, 8) it seemed more prudent to group a number of related traits than to list each separately. The names are primarily descriptive but at times include reference to the situation of occurrence. An attempt has been made to minimize subjective interpretation in reporting observations; however, often it seems useful to indicate the apparent function of these movements.

A study by Craig (1909) on "emotion" in this species has been published. This work was stimulated by the earlier observations of Whitman (1919). Goodwin (1952) supplemented the earlier studies with a report on doves kept at semi-liberty, and presented comparative studies in 1956. The present authors were pleased to find so many points of agreement

with Craig and Goodwin. There are a few minor areas of disagreement, but these are relatively unimportant to the present approach. In an outline such as this, it is difficult to indicate properly the sequence of postures in a given situation; therefore the reader is urged to read the more fluent but less complete reports by Craig and Goodwin. Another pertinent study is that by Lehrman (1955) which is concerned mainly with parental feeding behavior. A few disagreements of the present authors with statements in the latter paper have been reconciled by personal communication. The studies by Bennett (1939, 1940) on behavior in ring neck doves are also interesting and significant, but are not pertinent to the approach of the present study.

This list of "unit" behavior movements is not regarded as complete. For example, the authors are aware that parent birds may assist their young in hatching, resulting in a "T-shaped" shell breakage line. The frequency and details are not known sufficiently, however, to describe it satisfactorily.

#### A. Infantile and Juvenile Behavior (in approximate order of development)

1. Clutching. The newly hatched squab clutches the nest sticks or toes of its brooding parent with its feet, and hangs on tightly if disturbed. This behavior persists until the squab is nearly full fledged (about 3 weeks). It might serve in providing a solid purchase for the vigorous regurgitation feeding (B 9).

2. Head Waggle. Very young squabs (decreasingly true for older ones) may shake or waggle the head as if the muscles were unable to properly maneuver the head. It apparently occurs when the squab is searching for food or seeking a new position.

3. Squab Note. Apparently when hungry, the squab will give a prolonged shrill, sometimes ascending whistle of low intensity. Rarely the whistle tends to descend the scale. The duration is 1-3 seconds, but it may be longer in older squabs and repeated several times. It is usually accompanied by the squab wing shake (A 4) and bill searching (A 5). A very faint "peep" occasionally may be heard in the piping egg, and the strength of this squab note increases with each day of growth.

4. Squab Wing Shake. The squab may shake its wings rapidly (perhaps two or four shakes per second) for a few seconds and repeat intermittently in food begging movements (A 3, A 5). It becomes increasingly obvious beyond the first week after hatching.

5. Bill Searching. Accompanying A 3 and 4, an older squab thrusts its bill towards the parent's body in rapid "wiggling" movements. The squab learns to aim at and thrust its bill near and into the parent's mouth (see B 9), but very hungry older squabs will thrust at the tail, rump, legs or wings of the parents, the nest mate squab or even their own wings. It may represent a more advanced form of the head waggle (A 2).

6. Nest Defecation. As the squabs grow they tend to back toward the edge of the nest to defecate. Not until the pinfeathers are well developed do the squabs manage to defecate out of the nest.

7. Bill Snapping. Squabs and immatures may "click" or snap their bills one or more times when closely accosted by an unfamiliar object or movement. It develops rather suddenly (as the pin feather open) as does the fight or flight stance (see D 4) which appears with bill snapping and hissing (A 8). Bill snapping may be given by nesting adults in an extremely soft version.

8. Hissing and Puffing. Squabs and immatures may fluff the feather, especially those of the breast, and "hiss" when accosted as above. The wings may be raised as in the fight or flight stance (D 4). Nesting adults may express a faint hiss.

9. Squeaker Notes. Immature birds about four to eight weeks of age are termed "squeakers" by fanciers. Their voice is "squeaky", somewhat harsh and variable. As they become older, a similarity of the squeaker notes with the adult alarm note (E 6), "challenge" note (D 3) and the bow-coo (C 1) becomes evident.

#### B. Reproductive Behavior (Non-sexual)

1. Stick Nest Building. (May belong with sexual behavior C). Either sex, but more often the male, may walk around the ground picking up "suitable" (small, irregular shaped) sticks with its bill. [Nevertheless, pine needles about 6 inches long are favored.] Many sticks are discarded. The sticks are carried, a single stick at a time, to the nest site and placed near the partner. Usually, a longer section of the stick as held by the dove is carried projecting forward and down. Sticks beneath the nest site are ignored. The female predominates in arranging the sticks. However, a reversal of the roles occurs to some extent. Frequently the partner will "grab" the stick before it is placed and a short "tug-of-war" usually results. Juveniles have been observed to "play" with sticks.

2. Egg Laying. During oviposition, the female will stand and slowly raise the fore body. She appears to be straining for perhaps half a minute before the egg drops. She may ease the straining briefly and start again with a faint "ptk" expressed. During the straining period and especially near its termination, the eyes may be partially closed, or covered by the nictitating membrane. Also, the wings may droop, perhaps to assist the bird maintain balance. As the egg drops, the head may be thrown up and back. The bird usually "rests" five to ten minutes standing over the egg before leaving the nest, or before starting incubation, if the second egg was laid.

(Usually the female will lay the first egg in the afternoon and the second egg about 42 hours later. In this species a clutch usually consists of two eggs, occasionally one.)

3. Incubation. The parent crouches over the eggs, more or less orients then in a fore and aft position with the aid of the bill, the sides of the legs, and the keel, fluffs the ventral feather which exposes bare skin, and then settles down on the eggs. Eggs in an unsuitable position may be retrieved by gently placing the bill over the egg until the egg can be rolled carefully underneath the bird.

(The female parent sets during the night and contiguous light periods. The male sets six to fourteen hours during the middle of the day, 9:30 a.m. to 4 p.m. being typical, and the duration depending largely on the photoperiod. The length of the incubation period to hatching is 14 days.)

4. Feces Retention. During incubation, the faces of the settling parent are retained until the bird has departed from the nest, when a relatively enormous load may be released.

5. "Hiding". When closely approached either sex may remain motionless (crouch and freeze) on a nest of eggs or very young squabs. The head is drawn in and the feathers held tightly. This may be an alternative to the fight-or-flight stance (D 4) which also may be exhibited by a nesting bird. It is characteristic for any one bird to exhibit only one of these reactions in such a situation.

6. "Squared". When hiding (B 5) either sex may further tighten one wing (occasionally both) to the body so that the wing and back nearly form a right angle and tiny coverts near the shoulders are not smoothed to the rest of the wing but stand out.

7. Broken Wing Ruse or Injury Feigning. (Very rare.) When the senior author disturbed its nest, one white ring neck female clearly exhibited this behavior common to mourning doves and other birds in which one or both wings are held awkwardly extended and shaken as the bird hesitatingly moves away from the nest site.

8. Shell Removal. After emergence of the squab from the egg, a parent frequently removes the two shell parts one at a time with the bill and flies some distance from the nest before dropping them.

9. Regurgitation Feeding. Either parent may feed one of both young together by opening its mouth and receiving the bill of the young in its bill. The parent usually lowers its head as it "pumps" food from its crop to the throat by violent "shivering" of the wings and crop. Nearly always the head is raised and the "pumping" process is repeated several times. Regurgitation feeding is sometime initiated by a parent, which may very gently peek or preen the newly hatched squab. During this process the head of the parent is often lowered and the bill partly opened. This peeking and preening usually stimulates the young squab to head waggle and bill search (A 2 and 5), although these may occur without detectable parental stimulation. See Lehrman (1955) for additional comments on this process.

### C. Sexual Behavior

1. Bow-coo. (The most frequent of coos.) The neck is inflated ventrally, the head and body held high; then the head is brought low suddenly with the bill pointed at or touching the ground. The pupil of the eye contracts. The first "note" of the call usually starts immediately as the head comes down. The first "note" is short; the middle notes form a rolling coo; and the last "note" is 2-3 times the duration of the first note, sometimes slightly descending the scale. If the observer is close, a strident, low, "appendix" note (one or two) is often heard at the end of the last note in the coo, as if the bird were regaining its breath or redistributing its air. The call may be indicated as huk' prrrroooo wah (wah). The bow-coo is always directed to or at a particular bird. It may be repeated as rapidly as 5 per ten seconds but usually longer interval occurs between calls. One bow-coo averages about 2 and 1/2 seconds per call. Between repeated bow-coos the male always "stamps" his feet lightly or steps toward the object-dove. However, sometimes one foot is only slightly raised and replaced. This call, occasionally given by unmated females, was never observed to be given by mated females.

2. Perch-coo. The notes are nearly the same as in a bow-coo (C 1), but they are given less hurriedly than the sometimes "frenzied" bow-coo. The perch-coo may be given with the eyes open, or nearly completely closed and is the only coo also given at night. It is never obviously directed at any particular bird in sight.

3. Nest-coo. The notes of this call are nearly the same as in a bow-coo (C 1), but the call is softer, less forceful, and more intermittent. It is always accompanied by wing "flipping" (C 4). The head may "nod" at the beginning of each nest-coo. In potential nest site males give this call more frequently than the female before a nest site is chosen, but afterwards the female may give it more frequently. (Apparently, doves sometimes consider a thin perch as a nest site and may even carry sticks to it, B 1).

4. Wing Flip. Either or both sexes in a nest site or more rarely on a perch may jerk their shoulders so that the wings, especially the tips, flip. Rarely only one wing is so flipped. Wing flipping may be constantly repeated and maintained intermittently for several

minutes with a frequency of approximately two flips per second. Nearly always the head is held low and the tail high when the wing flip is given.

5. Hetero-preening. The male and female of a pair may "preen" each other especially about the face and neck or head. Hetero preening may be somewhat ritualized since the preening movement is often more cursory than in homo preening. Parents may hetero-preen their young, apparently assisting the feathers to break out of the sheath.

6. Billing. Billing occurs in a situation similar to hetero preening (C 5). Billing is often initiated by the female, which preens the neck and face of the male. After variable amounts of this hetero preening the male may reciprocate and then take the bill of the female in his and apparently feed her as he would a squab. (It is not clear whether or not food is actually passed.) [A very small amount of food likely is taken or tasted by the female.]

7. Sex-crouch. The sex-crouch usually follows billing (C 6). The female squats, lowers her head, and raises her shoulders, which will support the feet of the male.

8. Sex-mount. (Treading). The male's posterior feathers fluff out and he repeatedly "cranes" his neck above the female. He may even "preen" or place his neck above the female. He may "preen" or place his bill between his wing tips and rump. Then he mounts the female (both facing in the same direction), which is in a sex-crouch and maintains his balance by fluttering his wings. The tail of the male bends antero-ventrally and swings from side to side until copulation. Normally, the sex-mount is always followed by the "laugh" or challenge note (D 3) by both sexes. The sex-mount takes about 5 to 10 seconds for completion, but the "preening" and "neck craning" by the male may be prolonged. Females very rarely try to mount mature males but may mount a partner frequently if paired with another female.

9. Driving. A few days prior to the female laying the first egg of a clutch, the male tends to follow her wherever she goes with occasional incomplete pecking movements (D 5a). Driving in ring neck doves is much less distinct than in *C. livia*. Goodwin (pers. comm., see 1956a) believes that driving normally occurs only if the potential sexual rivals are present.

10. Display Flight. (see F 16d)

#### D. Aggressive Behavior.

1. Attack Posture. The head is held low and horizontal and drawn close to the body. Sometimes the head is jerked up and down just before or after challenge notes (D 3) are given. The rump feathers are fluffed, and the pupil of the eye may contract and expand.

2. Rush. Maintaining and attack posture, the dove often runs or rushes at the opponent. At times the dove will fly toward the opponent but cage conditions tend to inhibit a rush by flying.

3. Challenge Note: Kah or "laugh". This note is nearly always given from an attack posture (D 1) and is often preceded or followed by a forward hop or jump. It consists of a series of similar high pitched, rapid, short notes (often five notes), hinh-hinh, hinh-hinh-hinh, frequently in one of the following ways.

OR

They may ascend and descend the scale slightly or alternate notes may go higher; other combinations are more rare. The high notes are accented. The challenge note given by a male often leads to bow-coos (C 1) if the "opponent" is a female and to a fight or flight

stance (D 4) if the opponent is a male. Females usually give it only to newcomers, mates or territorial transgressors.

4. Fight or Flight Stance: Fear-threat display. A position nearly broadside to the opponent may be assumed with the wing opposite the opponent half raised. Initially the fore body is often raised slightly. Either escape (E 2, 3, 4, 5) or fighting (D 5a, b) may ensue from the position. It is especially easy to observe contrasting "intention" movements of the aggressive escape "conflict" within a dove in this posture.

5. Fight. (Intermittently accompanied by challenge notes, D 3).

a. Pecking. The aggressor dove pecks intermittently at the head, neck and shoulders of the opponent who may return pecks and wing blows.

b. Wing boxing. From the fight or flight stance (D 4) the opponent may be hit with single or multiple wing blows more or less directed to the head, neck and shoulders. It is the wing nearest the opponent, which does the "boxing". Sometimes the wings of the aggressor in flight hit the opponent.

c. Standing on opponent. The aggressor often flies or hops to stand on the back of the opponent. Thereupon pecking or wing boxing may ensue; but strangely enough these are minimized and standing alone may satisfy the aggressor.

#### E. Escape Behavior

1. Alert Stance. The body is held erect by straightened legs with the tail low, neck stretched and held high. The plumage is tightened close to the body. It is usually accompanied by the alarm note (E 6). The alert stance and the alarm note may be stimulated by the appearance of hawks, unfamiliar moving objects, or by humans, cats, rats, and snakes.

2. Flight Stance. The bird crouches, stretches the head forward, and raises the tail somewhat. It may follow an alert stance (E 1).

3. Avoidance. The head is held low and away from the attacker with the body in a crouch and sometimes leaning to one side; or, less often, the head may be held high, as the bird attempts to climb out of reach. It may be an intermediate form of the flight stance (E 2).

4. Flight. (See F 16). Outright flight often occurs immediately after aggressor approaches, as when one dove is in another's territory. Flight usually terminates any persistent attack. When frightened from the ground by a hawk, the dove most commonly flies forward and upward with a noisy clatter or wings, according to Goodwin (1952).

5. Wings Vertical. Adults, juveniles or older squabs may spread the tail, fluff the feathers, and hold one or usually both wings vertically over the body, which is sometimes inclined away from the attacker. It may follow a fight or flight stance (D 4).

6. Alarm Note. A soft "hinnnh" may be given, often repeatedly. The character of this note may vary from time to time in the same individual, occasionally approaching a louder harsh quality. The latter may occur during feeding of the young. The duration of a single note is nearly one second, but a repeat note may be given every 5 to 10 seconds.

#### F. Other Behavior

1. Sunbathing. In direct sunshine, a dove may spread the tail, incline the body to one side and lift the wings, alternately holding one aloft during a few seconds or minutes.

2. Water Bathing. Doves may step into shallow water or sit on a perch near water level and fluff the feathers, crouch, and flutter the wings so that the water is "sprayed" throughout the plumage. The head is rapidly dipped or passed through the surface of the water a few times in a "sideswipe" motion. Often the wing is held vertical, but the tail is

seldom spread. This response may also occur at the beginning of a light rain or spray of water. The bird always preens and shakes afterwards, if undisturbed.

3. Relaxed Resting. Beyond the usual "perching" a dove may lean its body to one side so that one wing is partly laid upon. Sometimes both wings are at an unusual angle (shoulders out, wrists in near feet). It occurs frequently in immatures and more rarely in adults.

4. Stretch

a. Gape. The neck is stretched forward and the mouth opened widely and moved forward and up.

b. Back stretch. Both wings are held vertically over the body but not spread. The tail and head are depressed. It frequently precedes or follows a foot stretch.

c. Foot Stretch. (or foot and wing stretch). One foot and leg are stretched backwards; the tail and one wing are spread and extended toward the leg being stretched.

d. Upper Mandible Stretch. The terminal half (distal) of the upper mandible is sometimes lifted above the lower bill while the mouth is held closed.

5. Rapid Peering. The head is moved more or less up, forward, and back in what appears to be visual "searching" movements. The head also may be turned side to side allowing each eye in turn to see the object of attention.

6. Questioning Bill. When no escape behavior is exhibited and when the bird is watching action or objects seemingly peculiar or unfamiliar to the bird, a "silent" rapid opening and closing of the bill occurs singly or repeatedly.

7. Huddled. When cold, ill, or "frustrated" (?) the bird may fluff the feathers, draw its head in very close to the body and perhaps even close its eyes. It may remain thus for hours in extreme cases.

8. Shivering. When very cold, ill or "ill at ease" (?) a shivering of the body and especially of the wings may occur.

9. Sneeze. The bird may be stimulated by illness, [eating too much salt], or by unknown factors to "sneeze" in a sharp "pttk" accompanied by a sudden sideways jerk of the bill and head. If the bird does have a "cold," the sneeze may be followed by a wheezing sounds.

10. Preening (homo-preening). The dove may arrange its feathers and their parts with the bill, each feather being passed between the mandibles in turn. A dove cannot reach its own head and many of the neck feathers for preening. The uropygial gland is used relatively infrequently.

11. Ruffling and Shaking. Practically all the feathers of the body are raised or "fluffed" and the wings and body are shaken vigorously. The feathers smooth down quickly afterwards. It often occurs during or after preening (F 10).

12. Tail Wag. Often after preening or ruffling and shaking or if an object drops on the bird's tail, the dove may shake the tail sideways somewhat like a duck but with only one or two shakes.

13. Scratching. The dove scratches its head and neck with its toes. The leg is not held dorsal to the wing as occurs in some birds when they scratch.

14. Eye Wipe. When a feather or foreign object adheres to the eye or when illness affects it, the dove may wipe its eye on its shoulder.

15. Flight Exercise or Wing Fanning. Immatures and adults after a period of relative inactivity may beat their wings somewhat as in flight but remain grasping the perch or floor. (Click here to see wing fanning)

16. Flight

- a. Pen Flight or "hovering flight." The characteristic details of a dove flying in a pen or for short distances of a few feet have not been adequately distinguished. However, there seems to be a "hovering" quality distinct from distance flight.
- b. Distance Flight. Since this species is usually caged, such flight is only rarely observed, but it is swift and direct according to Goodwin (1952).
- c. Gliding Flight. The distance flight may be interrupted by gliding or sailing aspects with the wings held nearly motionless.
- d. Display Flight. The male flies upward wing-clapping, then with the wings and tail spread widely he glides down, often in a half-circle (Goodwin, 1952). In wing-clapping, common in the domestic pigeon but less marked in the ring neck dove, the wings meet above the body in flight, producing a clapping sound.

17. Defecation. In normal defecation the vent feathers are fluffed, a semi-solid mass is expelled and the vent muscles are rhythmically contracted a few times.

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### Development of Pecking in Ring Doves

The development of pecking in ring doves is described and analyzed as a model system for understanding the roles of learning in behavioral development. Ring dove squab go from complete dependence on their parents to independent feeding during the third and fourth week post-hatch. They learn to identify food and to consume it through their interaction with food and their parents. This chapter describes experiments that analyze the specific learning mechanisms involved in the development of pecking and what it is that squabs learn from their experience. More generally, the chapter illustrates the utility of applying learning principles to the analysis of behavioral development.

### Chapter Outline & Navigation

- I. Learning and Behavioral Development
- II. Pecking
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  - Thrusting and Gaping
  - Role of Feedback
  - Scaling of Gape to Seed Size
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## I. Learning and Behavioral Development

In this chapter we focus on how learning principles can be used to understand the development of pecking in the ring-necked dove (*Streptopelia risoria*). We study this system as a model for understanding how learning contributes to behavioral development (Balsam & Silver, 1994). First, we describe the character of adult pecking. Next, we describe how this response emerges during development followed by a summary of our research on how birds learn what to peck at and how they learn to make the skilled adult motor response. Lastly, we return to the general implications of this work for an analysis of behavioral development.

## II. Pecking

The beak is the primary means by which most birds influence the world. It is used for prehension in a similar way to how primates use fingers and hands to reach, grasp, and manipulate objects. The beak is used to pick up and ingest food, preen the feathers, and build the nest. In many altricial species the beak is used to feed the young, either by grasping the beaks of the young and delivering food regurgitatively or by using the beak to seize food and carry it back to the nest. Additionally, the beak is sometimes used to drink, inflict injury, and to produce song. All of these actions involve different topographies of movement that are tuned to the specific stimuli and functions. These behaviors are highly skilled in adults.

For example, picking up a piece of seed is a highly skilled action. An accurate response requires that information about the spatial location and properties of the target seed be rapidly acquired. This information is then used to precisely guide the motion of the head and the coordinated movement of the beak in grasping a seed. This is a remarkably flexible system in the fine adjustments that are made during each unique occurrence of the behavior. The trajectory of the head must change with each change in body position and the opening of the beak must be scaled to each change in seed size. In adults, the behavior is stereotyped and efficient, but it does not start out that way.

Prehension in avians, like that in primates requires the coordination of two response components the effector must be transported to the target object and then closed around it. In primates the transport component is typically called reaching or simply transport; for avians we prefer the term thrust. Closing around and securing of the target is called grasping. A successful peck requires that thrusting and grasping be well coordinated.

The duration of thrusting and the accompanying opening phase of grasping is so short (about 50-120 ms) in the Columbidae that either high speed motion picture photography or direct transduction by attached sensors is necessary to measure these movements precisely. A system for the direct measurement of the gape component was developed in

the pigeon. A small rare-earth magnet is glued to the bird's lower beak and a small magnetic sensor to the upper beak. The intensity of the magnetic field detected by the sensor decreases as the beak opens. The signal from the sensor is input into a computer and the changes in interbeak distance are recorded in real time.

We employed this system to record the gape of adult ring doves. The movement of the head is synchronized with that of the beak. The gape sensor record is also synchronized. The top panel of the gape sensor record shows displacement and the bottom panel velocity. Negative velocities indicate reclosure of the beak. As an ingestive sequence begins, the head is briefly fixated above the seed and then drives downward toward the seed. During this thrusting movement the beak opens. Gape reaches its maximum (1-2mm wider than the seed) while the head is being thrust downward. As the beak reaches the seed it is reclosed around it creating a plateau in the record. After reclosure with the seed secured at the beak tip, there is a set of higher velocity beak opening movements that typically have only a single velocity peak and result from moving the seed to the back of the beak for swallowing. The movement of the seed in the beak is called mandibulation, and is often assisted by the tongue which sticks to the seed and pulls it backwards. At the end of the ingestive sequence the beak opens one final time. This opening appears on the gape record as a peak with rounded shoulders. According to Van Gennip (1988), this epoch of the signal is caused by movement of the tongue to allow swallowing.

### III. Development of Pecking

The Columbidae family (pigeons and doves) provides good model of how adult feeding responses emerge during development. The general developmental pattern is similar in all members of this family and has been described in detail for the ring dove.

After a male and female ring dove have mated, the female typically lays a clutch of two eggs that are incubated by both parents for 14-15 days prior to hatching. Initially, the young are unable to feed themselves. The parents feed the squab "crop-milk", a cheese-like substance produced in the crop. Both parents participate in the regurgitative feeding of the young. These feedings are initiated by the parents after hatching, but by the time the young leave the nest on about post-natal day 10 (PD 10), the squab beg vigorously to obtain parental feeding. The begging consists of the squab thrusting its beak at the parent's beak while making very rapid fluttering motions with its wings. The begging is sometimes accompanied by a chirping-like call. During regurgitative feeding, the parent grasps the bill of the squab between its mandibles and makes vigorous pumping movements with its upper body, particularly with its neck and head. From around the third day post-hatching until the squab begin getting food on their own, the parents feed the squab crop-milk mixed with increasing amounts of seed. The amount of crop-milk fed to the squab increases through about PD 5 and declines thereafter. The amount of seed fed to the squab steadily increases until they are eating seed on their own during the fourth week after hatching.

The squab's and parents' behavior surrounding feeding interactions changes during the feeding transition from dependent to independent feeding. All of the young that we have observed will beg for food at least through the time of weaning (PD 21). The next figure shows that Parental feeding of young begins to decline near the end of the third week and usually ceases by the end of the fourth week post-hatch. Pecking begins around PD 14 and increases in frequency. Squab begin to successfully ingest seed by about PD 16 and continue to improve in efficiency. By PD 28 they are nearly as efficient as adults at ingesting seeds. We used the hall-effect system to follow the changes in gaping from the time squab start pecking until they independently feed. There were three types of gapes that were dominant during different steps in the development of feeding. Over 90% of all pecks could be sorted into the three types shown in the next figure. All of the squab moved through the same sequence of changes in topography as pecking became more efficient. Each transition in form was associated with improved efficiency of pecking. These were just the sort of changes that one might expect if the squab's experience with seed was contributing to the changes in response form.

#### Thrusting and gaping

In our first approach to the question of whether normal development of pecking depends on experience, we reared squab without any exposure to seed. We achieved this by grinding seed into a fine powder and gradually making this the only source of food available to parents prior to hatching. This powdered seed was also the only source of food available to the families after the squab hatched. We have found no differences between these powder-reared squabs and seed-reared squabs in growth and general behavior. Beginning on PD 14 and on all subsequent days, squabs were put into a chamber with seed on the floor for twenty minutes. We found that powder-reared squabs pecked very little during these test sessions as compared to seed-reared subjects indicating that direct experience with seed is important for development of the adult response.

We then began to analyze whether and what kind of experiences are necessary for normal development to occur. First, we have found that 2-3 week old squabs have an unconditioned tendency to thrust at seed. This response will habituate unless the sight of seed is followed by positive ingestional consequences. These Pavlovian pairings increase the rate of thrusting at seed and these pairings occur in natural parent-squab interactions.

The pairings of seed and food, while increasing head thrusts toward seed, do not result in the release of the skilled adult response. Initially, the opening and closing of the beak is only loosely coupled to head movement and seems to be elicited by the head movement. These gapes are not scaled to seed size and there is limited accuracy in the targeting of the peck. Suspecting that feedback from successful and unsuccessful pecks was necessary for sustaining pecking and for shaping the squab's behavior toward the adult form, we turned our attention to analyzing the roles of feedback in the development and maintenance of pecking.

#### Role of feedback

We guessed that feedback from the beak during the movement and feedback about the consequent success and failure of pecks was essential for the skill to develop. We thought that the feedback might be important for sustaining and strengthening the peck response. Additionally, unless the mapping from the visual cue to the size of the gape was "hard-wired", the afferent feedback from particular gapes must be associated with the success and failure of pecks at specific targets. In two different lines of experiments we have examined the role of feedback on the development of pecking.

To examine the role that feedback plays in sustaining the overall level of pecking, we exposed a group of powder-reared squab to seed for 20 minutes each day during the second week post hatch, but did not allow them to experience the seed in their beak. We did this by gluing the seed to the floor of the test chamber. These squab were immediately fed by the experimenter after the test session. The level of pecking observed in this group on day 22 when they were tested with loose seed on the floor was substantially less than the pecking observed in a second group who was given unglued seed throughout the prior training and testing days. Subjects exposed to the glued seed and deprived of feedback provided by successful pecks responded considerably less than the subjects that got to handle seed with the beak during testing. In fact, the glued-seed subjects pecked at exactly the same level as subjects that only received pairings of the sight of seed with food. Pavlovian pairings promote pecking but the opportunity to handle seed results in a higher peck rate. Thus one role of the feedback is to increase the overall rate of pecking. It is plausible that when parents regurgitatively feed offspring the sensation of seed in the beak becomes a conditioned reinforcer because of its association with positive nutritional consequences. Once the squab starts pecking successful responses provide this immediate reinforcement which would lead to a higher peck rate.

In sum, feedback about success and failure seems to contribute to every aspect of the skill. It contributes to the overall level of pecking and affects the targeting, grasping, and handling of the seed. When normal feedback is present during development the highly flexible adult response emerges. The bird pecks very precisely at a wide range of seeds from a range of positions. We wondered what learning underlies this flexibility. How does the bird build such a flexible repertoire?

#### Scaling of Gape to Seed Size

We already knew that maturation alone could not account for the development of the adult gaping response. Squabs reared on the powder diet do not show the adult gape form even when tested at an age when seed-reared squabs are quite proficient. The skilled adjustment to seeds of different size exhibited by adults depends on experience. Thus we turned our attention to identifying the specific experiences necessary for this aspect of the adult skill.

Our doves are usually raised on a standard dove mix. This mixture contains seeds of many sizes and shapes which range from about 1mm (millet) to about 12 mm (peas). It is possible that doves must separately learn to handle all of the different seeds before they

show the precise and flexible adult response. Alternatively, the doves may acquire a generalized motor program. One characteristic of a generalized motor program is that quantitative adjustments of behavior occur in novel situations. For example, once we are skilled walkers we adapt to new terrain with little loss of skill. Similarly, we adjust the opening phase of our grasp to the width of any new object we pick-up. Presumably, once the motor program is functioning we are able to extract the necessary information to use the program from visual cues provided by the novel object.

It was an open question as to whether experience is necessary for the development of motor programs. Though skill surely improves with experience, but it is not clear whether or not the initial induction of motor programs requires experience. Because we can limit the doves' experience with seed during development we can study this question with respect to pecking. We know from our powder-reared subjects that they are not able to pick up seed when they first encounter it – even at an age when normally reared subjects would be quite proficient (Deich & Balsam, 1994). Perhaps experience with a single seed would be sufficient for inducing the motor program. Alternatively, experience with two or more points along a dimension may be necessary for the development of a generalizable skill.

To test this hypothesis, we compared the pecking of normally reared doves to a group reared on a single size pellet. In the group reared on a single size pellet their diet consisted solely of pellets, 2 mm in diameter. This was the only food available to the parents and squab until the time of weaning and the only food available to the squab until they were 18-24 months old. A second group of subjects was reared on mixed grain until they were between 18 and 20 months old. This group was switched to a diet of only 2 mm pellets by gradually increasing the proportion of their food that consisted of pellets over the course of a week. These subjects were then maintained solely on these pellets for at least two months prior to testing.

On the first test day, subjects were given 1 mm, 2 mm, and 3.6 mm pellets to eat. On test trials ten seeds of each size were presented. All pecks were videotaped and scored for accuracy. The set-up was similar to the one illustrated in the video. The seeds and beak were visible from below and from the side of the test aquarium. We classified the types of errors made by the birds into the six categories described in the figure showing the data from this test. The result of this test showed that subjects reared on mixed seed (not shown in the figure) had little trouble [Click here to see results handling the 1 and 3.6 mm pellets even though they had only handled 2 mm seeds in the recent past.](#) The subjects who had only experienced a 2 mm diet (shown in the figure) exhibited a different pattern of results during the generalization test. These subjects had little trouble with the 1mm seed. They made a few errors in which they contacted the seed but failed to grasp it. This was about the same number and type of error that they made when handling the very familiar 2 mm pellet. In contrast, the subjects reared on the restricted diet did very poorly on the 3.6 mm seed. They often contacted the seed and failed to grasp it or got their beaks around it briefly until the pellet squirted out as the beak closed. They were not scaling the gape to the size of the seed or positioning the beak to securely grasp the seed. It seems likely that the gape they had learned for 2mm seeds was wide enough and targeted

well enough to handle the smaller, 1 mm, seed but not adequate for the larger seed. Over the next few days they readily learned to handle the larger seeds. In fact, they made very few errors after 50 or so experiences with the 3.6 mm seed. After a week of this testing, we introduced a 7.2 mm pellet during testing. None of the birds had any trouble with the new seed. Apparently, it takes experience with two or three points on a dimension to induce the generalizable skill.

#### Synopsis: Learning and the development of pecking

There is an unconditioned tendency for squabs to thrust at grain-like objects. However, this response habituates quickly unless the squab experiences Pavlovian pairings of the sight of grain with feeding. The Pavlovian induced thrusts do not have the coordinated gape found in the adult peck. There is only a loose coordination of gape and thrust, induced by the thrusting motion, itself. Squabs must have experience with handling and ingesting seed for the adult topography and coordination to emerge. Through differential feedback from successful and unsuccessful pecks, the gape component and its coordination with the thrust component are moved toward the more effective adult form by a process of response shaping. Operant conditioning is proposed as the underlying operative process because neither maturation nor extensive Pavlovian training is sufficient to produce the stereotyped adult response. Furthermore, reduction in the orosensory feedback as a result of beak deafferentation interferes with the development of the coordination.

All of these processes are important in the normal developmental context. From the time that parents start to feed squab seed the feel of seed in the mouth becomes associated with positive nutritional consequences. During the second week after hatching the parents stop consistently feeding the begging squab and, instead, go to peck at seed themselves (Wortis, 1969). The squabs follow the parents to the seed and make some unconditioned thrusts at food. Additionally, we have found that squabs tend to peck when their parents do (Iskrant & Balsam, 1994; see Zentall & Akins (2001) for more on social learning) and have documented that this social coordination is present in the undisturbed interactions of parents and squabs (Hirose & Balsam, 1995). The unconditioned tendency and the social enhancement guarantee the squabs visual exposure to seed. During this stage, parents generally feed squabs within a minute or two of this exposure (Hirose & Balsam, 1995). This allows for the sight of seed to be paired with food. The frequency of thrusting toward seed is increased by the Pavlovian pairings (Balsam et al., 1992). The squab's thrusting movement elicits loosely coordinated gapes (Wall et al., 1996). Some of these thrust-gape coordinations result in seed in the beak. Feedback from the seed in the beak reinforces the successful actions. The gape component and its coordination with the thrust component are moved toward the more effective adult form by a process of response shaping by reinforcement.

#### IV. Learning and Behavioral Development

The highly skilled and adaptable adult pecking response is produced by an intricate interplay between the squab's reflexes, the teaching of the parent, and the very precise

feedback that is provided by the environment for success and failure. In these regards the development of pecking shares many features of behavioral development that are common to altricial species.

Within the context of the parent-offspring interaction there is typically a great deal of flexibility in development as a result of experience. For example, in the case of feeding, local conditions of food availability can determine the rate at which weaning occurs, the specific foods that a juvenile learns to find and to consume, and the specific responses that are used for foraging and eating (Balsam et al., 1992). Thus experiences are a critical influence on development. An important question is how to understand the specific ways in which experience affects these behaviors.

A number of developmentalists have articulated the view that laboratory learning principles do not capture the ways that experience affects development. Gottlieb (1976, p. 232) wrote, "Traditional forms of learning (habituation, conditioning and the like) have not proven very useful in explaining the species-typical development of behavior..." In this context, we view the studies described in this paper as a true test of validity for laboratory learning principles and believe that they have done pretty well. At least in the case of pecking, laboratory-derived learning principles have served us well by providing an analytic tool for understanding how specific experiences contribute to the development of specific aspects of behavior.

The emergence of new behavior is also a significant aspect of development that is influenced by experience. New response forms can be induced by elicitation, Pavlovian conditioning, habituation, and shaping (Balsam & Silver, 1994). Again the learning principles seem useful for understanding the ways in which experience accomplishes these changes in development. Furthermore, one can conceive of the transitions in functionally equivalent behaviors as the product of changing relative reinforcement rates. For example, the transition from dependent to independent feeding is likely modulated by the pay-off that each affords. The selection of specific feeding topographies is likely determined by the successes and failures of those actions in the past. In sum, we believe that learning principles provide a very useful framework for understanding the roles of experience in the ontogeny of behavior.