Vol. 9, No. 2

WILDLIFE JOURNAL

Journal of the International Wildlife Rehabilitation Council



Waterproofing Birds . . . Page 7

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2. Full length articles run between 1500 and 2500 words.
3. Fillers and short articles run between 500 and 1500 words.
4. The writer's name and address and organization should be typed on the first page, and name and page number should appear on all consecutive pages.
5. It is the writer's obligation to obtain permission or reprint rights if submitted copy has been published elsewhere.
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8. We pay $25 for any feature article accepted; $5 for any fillers and "Handy Hints" under 500 words.

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Vol. 9, No. 2

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Typesetting By Chrysalis Productions
Burlingame, California

Cover photo by Jan Wild.

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EDITORIAL . . .

Managing Volunteers

With the onset of spring and the breeding season, wildlife care organizations everywhere brace themselves for the inevitable. Our work will double, triple, and quadruple over the spring and summer months. Are we ready for it? Is anybody ever, really?

Most of us start off by giving early spring training classes. We try, sometimes in vain, to recruit and train enough new volunteers to replace winter losses before the rush of spring. Finding stable, dependable, hard working people who will gain experience and then share it with new people is a job of no small magnitude. Only some of them will develop the dedication and stamina it takes to stay in this field. Those are the core people who make any wildlife rehabilitation organization go. How do we manage to get these folks and keep them? Well, in the last decade I have certainly learned how to lose them.

HOW TO LOSE YOUR VOLUNTEERS

1. Overwork them incessantly. Be ceaseless in your demands. If you need them, keep calling. They won't burn out. Demand absolute perfection in their work — that will gain their respect. Rather than look at all of the work you have done together, remind them constantly of how much remains to be done.
2. Since it is well understood how busy we are in wildlife rehabilitation, your volunteers and staff will understand why you do not put together continuing education programs or have staff meetings. Everyone knows that cage cleaning and feeding are the mainstay of our work . After all, the animals come first.
3. Remember that a leader must always be right; volunteers lose faith if the leader is shown to be wrong. If they ask you something you don't know or remember, ad lib. They don't have the resources to check.
4. The way to keep volunteers and staff from challenging your methodology is to keep them from resources that you don't agree with or don't think you can afford to implement. Discussion of new methods will only result in dissent and dead animals.
5. When you have had it up to your eyeballs and can't take it anymore, unload your frustrations on your best volunteers. They of all people will understand.

Do these five things for any length of time at all and your organization will have to rewrite its bylaws to include chaos and riot control. Believe me, some organizations have had to deal with some or all of these problems. The groups that don't deal effectively with these problems are frought with internal dissension and discord.

SO HOW DO WE KEEP OUR VOLUNTEERS

The Workload

When the animals pour in and there are enough staff and facilities the ship sails smoothly enough. However, when staffing becomes irregular or the load too heavy, manager(s) must be prepared to alleviate the situation. Wildlife care groups handle the increased springtime workload in various ways. Some call in all available volunteers to help distribute the overload. Others take on more paid staff, but this solution presents the organization with added expenses, in addition to the increased cost of animal care. Calling in more volunteers works for a while as long as there are enough people to draw on. This is where those springtime classes can make or break a rehabilitation program. If the load falls on the shoulders of too few workers, even the best of them will very likely suffer "burn out" and then the group will again be in dire need of both new and

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Hand-rearing Chimney Swifts

Paul and Georgean Kyle

Wildlife Rescue, Inc., Austin, Texas

The Chimney Swift (*Chaetura pelagica)* is one of four regularly occuring species of swifts found in North America, and the most common one found east of the Rocky Mountains. As their name implies, they are accustomed to building their nests in chimneys as well as old buildings and occasionally stone wells. Because of their close association with man, the adults and their young are frequent candidates for rehabilitation.

Adult Chimney Swifts are most commonly seen in flight. When soaring, their long scythe-shaped wings span about 31.75 cm (12.5") to support a proportionally short body with a squared-off tail. The flickering, bat-like flight when flapping is due to short, massive wing bones. Usually seen in groups, Chimney Swifts' flight is accompanied by a sharp "chippering" or "ticking" call.

At rest, an average 122 cm (5"), 22.8 g (0.8 oz) adult is sooty-grey to black with the throat slightly lighter or even silvery-grey in color. Both sexes are identical in appearance. The long wings cross by an inch or more over the tail feathers, which are tipped by pointed bristles. Both the claws and tail bristles are useful in clinging to rough vertical surfaces. Swifts are unable to perch.



21 day old Chimney Swift.

Chimney Swifts winter in the Amazon Basin of Peru. They appear in Texas in March and are gone by early November. Nesting begins in May, and has been known to continue into August. The female normally lays four to five (rarely two to seven) white eggs in a nest of twigs glued together with saliva and attached to a vertical surface. Because the nest is unlined, the eggs must be constantly incubated by alternating adults. After 18-19 days, the eggs begin to hatch.

DESCRIPTION OF HATCHLINGS

Hatchlings are pink and naked at birth. They have sharp claws which enable them to cling to textured surfaces, and they chatter loudly when stimulated.

DEVELOPMENT

The average growth rate for hand-raised Chimney Swifts should be one to two grams of body weight per day for the first three weeks. A weight gain of less than 0.5 g may indicate a metobolic problem often related to a systematic infection. However, a fluctuation in weight after a bird reaches 20 g is normal. Within a few days of hatching, black pinfeathers begin to appear. They are able to climb, and they exhibit preening behavior, even with no feathers.

STAGES OF DEVELOPMENT

8 to 10 days	—Feathers begin to unfurl.
15 to 17 days	—Eyes open. They are subtle blue in color at first, but turn brown by 21 days.(Birds which are stressed by excessive heat or emaciation may have their eyes open at a much earlier age.)
21 days	—Fully feathered, "practice flapping."
30 days	—Flying

NESTLING HOUSING

Line the sides of a tall box or basket with a snag-free cloth such as muslin and place unscented facial tissue in the bottom to facilitate cleaning. Until feathered, the birds will need external heat (85°F) and high humidity (60-70%). During this stage of growth it is preferable to use a "hospital box" or incubator/brooder with automatic thermostat and indirect or filtered sunlight.

NATURAL DIET AND FEEDING HABITS

Chimney Swifts catch flying insects on the wing and will dive at trees and shrubs to pick insects, bugs, spiders, etc. from the tips of leaves and branches in passing. During the first week of life, baby Chimney Swifts are fed by regurgitation from the gullet of the adult. After six or seven days, the parents no longer regurgitate, but will form a ball of insects or "pellet" which is stored in a throat pouch until it is fed to the young.

CAPTIVE CARE

REHYDRATION

Because Chimney Swifts nest during the hottest time of the year, the vast majority of babies presented for rehabilitation will be dehydrated — at least to some degree. Birds fed under these conditions will not be able to digest food properly, and may die if not rehydrated first. As soon as a swift is acquired for rehabilitation, it should be given three to four drops of 10:1 Gatrorade: Nutri-cal mix. This should be repeated every 30 minutes, regardless of the bird's age, until a moist stool is observed. When normal stool is observed, small amounts of the "Substitute Diet" should be introduced. Fluid therapy may take as long as 12 hours.

SUBSTITUTE DIET

Small mealworms (not the jumbo kind from bait stores which contain steroids) are soaked in a small amount of: 1 tbsp. of Avimin liquid mineral supplement, ¼ tsp. of Plex-sol C or ½ tsp.Avi-con powdered vitamin supplement (high in folic acid) and eight ounces of distilled water. The mealworms must then be sprinkled with Plus Yeast protein powder (for essential amino-acids) and dipped in a 50/50 mixture of full-strength Nutri-cal and plain, active-culture yogurt. Once feathers begin to unfurl, part of a small piece of soaked-until-soft Purina High-Protein Dog Meal should be added to each feeding. Both the yogurt/Nutri-cal mix and the soaked dog food must be prepared fresh every two hours to prevent spoilage. When feeding unfeathered birds, the dead mealworms should first be "tenderized" by pinching the head and all along the body with tweezers. If this is not done, the birds may have difficulty swallowing or digesting the food and will pass a mealworm whole.

FEEDING

Chimney Swifts' feeding responses can be triggered by tapping the basket, tapping their beaks, gently brushing their faces with a facial tissue or gently blowing on the birds (parent's wings). They respond by bobbing their heads down, chattering loudly and gulping at anything close by. With a little practice, they can be taught to feed from above with a pair of tweezers. Each bird should be given as many mealworms (prepared as described previously) every 30 minutes, 12-13 hours per day until its eyes are open, then every hour until fully feathered and then every two hours until released. Older fledglings may have to be force-fed four to six mealworms every hour until they learn to accept food from tweezers. Juveniles and adults may never learn to take food and may have to be force fed up until the time of release. Remember: *Never feed solid food* until the bird has been properly rehydrated. Because swifts feed on the wing and are unable to perch, they will never learn to self-feed in captivity.

One or two drops of distilled water from a curved-tip irrigating syringe should follow each feeding. Place the drops on the bird's beak — *not in the throat.* Chimney Swifts become fond of these droplets and may begin biting them from the tip of the syringe.

Caution: Because of the frantic nature of their feeding response, special care must be taken to keep the birds' faces clean. The nostrils on swifts are very far forward. Be careful not to get food in them as it will harden and be difficult to remove. Always clean the bird's face with a damp tissue after each feeding.

FLEDGLING HOUSING

Fledgling swifts require a large area for practice flying — at least 15'L x 10'W x 8'H . . . the larger, the better. Any windows should be covered to prevent the birds from flying into them and becoming injured. Some textured surface (such as burlap) should be provided on at least two opposite walls for the swifts to cling to. Once swifts begin to fly, they must have access to this area during all daylight hours until release. Any less than complete access will lead to improper development and may render a swift unreleasable.

RELEASE

After a week of practice flying, and when the birds' wings cross by an inch or more while at rest, release should be considered. In order to survive in the wild, Chimney Swifts must be perfect flyers. They should be able to maneuver and turn sharply, hover and act "reststless" prior to release. A swift which is reluctant to fly probably has some physical problem or is too young to release. Release weight for hand-raised Chimney Swifts should be approximately 20 g, and the wing cord (measured from the epaulet to the tip of the longest primary) should be approximately 127 mm.

Chimney Swifts are migratory and very communal. Always release them into a known population at least two weeks prior to normal migration time. Early on a calm morning, locate a group of Chimney Swifts and toss the bird skyward as they fly overhead. Usually, if the new bird strays, some of the others will swoop down to show it the way. Another method for release is to place the bird above the damper inside a chimney where other swifts are living. If all goes well, the bird will climb up to the others and join their colony. Check the chimney periodically to make certain the bird has not fallen back down or gotten into a bind. Back-up feeding is usually not possible. However, if released where they are raised, some swifts will return for a few days after release.

SPECIAL CONSIDERATIONS

If aspiration does occur when giving a bird water from a syringe, using distilled water will minimize the chances of causing pneumonia. Distilled water has no suspended particles to irritate the lungs.

Unlined berry baskets have cause problems of injured feet and broken primary feathers. These accidents can be avoided by lining the basket with a snag-free material such as muslin. An empty mealworm bag works well.

Young swifts which are not given yogurt do not seem to properly digest their food and may develop visible problems such as excess mucus in the mouth, off-color droppings, poor feathering and may actually die. Similarly, swifts raised on a diet lacking the protein powder have suffered from poor feather development. Yogurt and protein powder are essential — not extras.

Baby swifts are subject to several injuries simply because of the location of their nests. The sounds they make when begging for food are often mistaken for those of bats or even snakes. Fires intended to drive them off cause poisoning from toxic fumes and burns. Inhalation problems should be treated with oxygen therapy immediately by a veterinarian. Burns should be flooded with sterile water or isotonic saline once or twice daily until new tissue begins to grow. Eyes should be checked for corneal damage and kept moist with an "artificial tears" solution. Because they cling so well, claws are sometimes damaged or ripped out when the youngsters are pulled from their chimney or handled too roughly. An ointment such as Panalog will reduce swelling and the chance of infection. Be sure to consult a veterinarian before using medications.

INJURED ADULTS

Injured adults must be force-fed about six to ten soaked mealworms (prepared as described in "Substitute Diet" section) and a part of a piece of Purina High-Protein Dog Meal every two hours during daylight. They also need the water supplement. Until able to fly, the bird should be confined in a small cage with a rough log or brick for it to cling to as well as muslin lining on at least one side. Because injured swifts will often lie flat on the bottom of their cage, care must be taken to keep the vent clean and open. Several days of practice flying in a large room is necessary prior to release.



Birds resting on the side of a structure.

REASON FOR ACQUISITION OF IMMATURE CHIMNEY SWIFTS: 1985

(n = 141)

FELL FROM NEST	41
ENTIRE NEST FELL	46
FORCIBLY REMOVED*	33
OTHER	21

*By homeowner or professional chimney sweep at homeowner's request.

ONGOING RESEARCH

Prior to July of 1985, all Chimney Swifts which were acquired under six days of age died following three to four days of apparently normal development. Because necropsies revealed a bacterial infection by a different gram negative organism as the cause of death in each case, immune incompetence was suspected rather than equipment contamination. Whether this condition was due to the young age of the birds, stress, or the absence of some substance provided by the parents during the feeding process was unknown, but the latter was assumed.

After this time, all swifts under seven days of age (feathers sheathed) were fed a mealworm coated with the saliva from the throat of an injured but otherwise healthy adult three or four times each day in addition to the standard "Substitute Diet" until they were approximately 16 days of age (eyes open). Once this procedure was initiated, 94% of all uninjured birds acquired at three days of age or older (and one individual no more than 48 hours old) survived, developed normally and were subsequently released.

Because the constituents of the saliva and the mechanism involved are unknown at this time, and because concurrent controls were not used, the results are not conclusive. However, the improved success rate presents a strong case in favor of recommending saliva transfer or "inoculation" as a standard practice in hand-rearing very young chimney swifts.

EVALUATION OF THE SUBSTITUTE DIET

Prior to July 1983 and the introduction of the diet in this paper, the known percent of releases for hand-raised Chimney Swifts in Texas was no more than 29%. Since that time, the overall success rate for young, uninjured birds raised on the diet has been approximately 78%.

Additional evidence in favor of the diet includes two individuals which were kept for extended periods of time. A White-throated Swift recovering from a slow-healing head injury was released after eighteen months of care, and a Chimney Swift which was acquired as a nestling in July of 1984 was still in captivity as of September of 1985 due to a shoulder injury. Both birds maintained a normal body weight and went through a complete moult with perfect feather replacement.

The average daily consumption of the "Substitute Diet" by a hand-raised Chimney Swift weighing 18-24g (13 days to adult) is listed in Table 2.

SOURCES FOR PRODUCTS AND SUPPLIES MENTIONED

Avi-Con: Vet-A-Mix, Inc., Shenandoah, Iowa 51601 and available from veterinarians.
Avimin: Lambert-Kay, Cranbury, New Jersey 08512 and pet stores.
Berry baskets: grocery stores (used to package strawberries, cherries, mushrooms, etc.).
Brooders: Sears, Roebuck and Company and local feed stores.
Gatorade: Stokely-Van Camp, Inc., Chicago, Illinois 60654 and grocery stores.
Hospital box: A "hospital box" is a ventilated enclosure which provides an environment with a constant air temperature and relative humidity. A satisfactory set-up can be made by laying an aquarium on its side on a heating pad and taping a flap of clear plastic to the open side to act as a door. A damp sponge placed in the corner will act as a good humidity source. The temperature in an improvised system must be constantly monitored with a thermometer placed on the same level as the nest of baby birds. With the door on the side rather than on top, less heat escapes during the frequent feedings, and the environment remains more stable. If condensation begins to appear, the humidity is too high and must be adjusted. The ideal hospital box will have an automatic thermostat which can be set for the desired temperature. The heating element and thermostat for such a system may be available at feed stores specializing in poultry equipment.
Hygrometers: Sears, Roebuck and Company and local feed stores.
Incubators: Sears, Roebuck and Company and local feed stores.
Mealworms: Rainbow Mealworms, 126 E. Spruce Street, Compton, California 90224, 213/635-1494. Do not use jumbo or mealworms from bait shops because they contain steroids.
Nutri-cal: Evesco Pharmaceuticals, Buena, New Jersey 08310 or your veterinarian.
Plex-Sol C: Vet-A-Mix, Inc. Shenandoah, Iowa 51601 and available from veterinarians.
Plus Yeast Protein Powder: Plus Products, Irvine, California 92714 and health food stores.
Purina High-Protein Dog Meal: grocery or feed stores.
Syringes (curved irrigating), Monoject #12: available at pharmacies.
Thermometers: Sears, Roebuck and Company and local feed stores.

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Additional charts and photos continued on page 11. All charts and photographs courtesy of Paul and Georgean Kyle.

TABLE 1

DISPOSITION OF CHIMNEY SWIFTS HAND-RAISED WITH AND WITHOUT SALIVA "INOCULATION"

AGE IN DAYS	1	2	3	4	5	6	7	8	TOTALS
WITHOUT SALIVA (N=8)									
EXPIRED	-	2	2	2	1	-	-	1	8
RELEASED	-	0	0	0	0	-	-	0	0
WITH SALIVA (N=40)									
EXPIRED	2	2	0	1	0	0	0	1	6
RELEASED	0	1	3	6	4	16	3	1	34

continued on page 11

For the New Rehabber:

Is Your Bird Waterproof?

Kirstine M. Thorne, Wildlife Biologist
International Wildlife Rehabilitation Council
Walnut Creek, California

Waterproof-adj. Being impenetrable to or unaffected by water

Feather Structure

Having feathers that are waterproof is critical to all birds. Birds such as Gaviiformes (loons), Podicipediformes (grebes), Sphenischiformes (penguins), Procellariiformes (petrels, albatross, fulmars, shearwaters), Pelecaniformes (pelicans, tropicbirds, cormorants, boobies, anhingas, frigatebirds), Anseriformes (swans, geese, ducks, mergansers), Gruiformes (rails, coots, cranes, limpkins), Ciconiiformes (herons, bitterns, spoonbills, storks), Phenicopteriformes (flamingos), Coraciiformes (kingfishers), Cinclidae (dippers), and Charadriiformes (shorebirds, gulls, auks, terns, murres, puffins) must have completely waterproof feathers in order to survive in the wild. All of these birds spend the majority of their lives in or near water. Of course, all birds, no matter what species, must have waterproof feathers before being released.

Having waterproof feathers (also referred to as "being waterproof") is a function of feather structure. Once formed, a feather is just a dead keratinous (protein) structure without living cells, receiving only physical support from the body. There are five commonly recognized types of feathers (vaned, down, semiplume, filoplume, and bristle). Vaned and down feathers will be described here because of their importance in keeping a bird waterproof.

Vaned feathers cover a bird's body and give it a streamlined form. The typical vaned feather has a central shaft (or rachis) and a vane. The proximal (toward the body) end of the shaft is the quill (or calamus). See Figure 1. The vane is composed of barbs which branch from the opposite sides of the shaft. Smaller barbules branch from the barbs. The barbules on the distal (away from the body) side of each barb have on their edges hooklets that engage the proximal barbules on the adjacent barb. See Figure 2. It is this tightly knit web of an intact feather that forms the barrier to water.

FEATHER DYSFUNCTION

Changes in the normal structure of a feather (such as by becoming broken, soiled, or otherwise damaged) will reduce the water-resisting properties of the feather and will allow water to penetrate the barrier. If the elements of a vane simply become misaligned, the integrity of the feather can be restored by preening, which re-engages the hooklets.

Down feathers are under vaned feathers next to the skin. (Vaned feathers may also be called contour feathers.) Their function is insulation. Down feathers are fluffy with little or no shaft. Long barbs branch from the quill and do not have hooklets. See Figure 3.

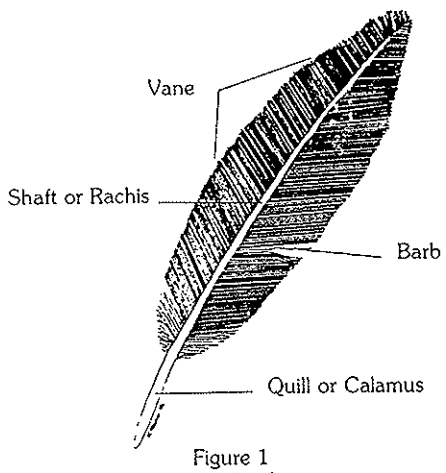


Figure 1
Vaned Feather

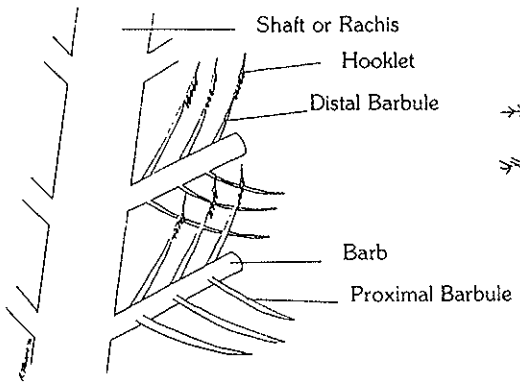


Figure 2
Barb Structure

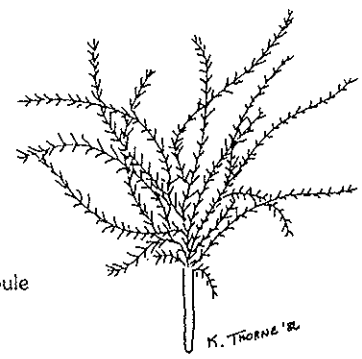


Figure 3
Down Feather

Grooming feathers can require as much as 25% of the waking hours of a bird. Oil, fecal matter, and anything else that can modify feather structure must be preened away. When the bird cannot preen the offending substance away, rehabilitators must assist.

Feather function is primarily related to flight and maintenance of a constant body temperature. In 1960, a researcher discovered that the tips of the contour feathers of winter residents of artic Alaska are fluffier than those of summer residents. In cold weather when a bird erects its feathers, the soft feather tips interlock to trap a layer of air. (Stiff tipped feathers readily separate and lose the insulating air.) Air is a poor conductor of heat. Static air trapped by feathers is warmed by blood vessels near the skin and acts to protect the body from heat loss in cold weather. Therefore, if down becomes wet, it loses its ability to trap air and insulate the bird.

TESTING WATERPROOFING

During confinement feathers can lose their waterproofing ability in one to two days. Always test whether a bird has waterproof feathers. Birds such as the Columbiformes (doves, pigeons), Cuculiformes (cuckoos, roadrunners), Falconiformes (vultures, diurnal birds of prey), Strigiformes (owls), Psittaciformes (parrots), Caprimulgiformes (nighthawks), Apodiformes (swifts, hummingbirds), Piciformes (woodpeckers), Coraciiformes (kingfishers), and Passerines (perching birds) may be tested in either of two ways.

Place a flat-bottomed pan in the bird's cage so that the bird can bathe and then retreat to a dry area for preening. Use caution with juvenile birds. They can become waterlogged and cold. For a small bird like a swallow a pan about 5" in diameter and 1" deep can be used. For a larger bird like a Turkey Vulture use a pan that is 3' long by 3' wide and 8" deep.

The other method is to gently, but thoroughly, mist the bird with tepid water from a spray bottle. Be sure to spray the entire bird. Observe the water to see if it beads up on the feathers and rolls off or if it sinks into the feather making the bird wet. The procedure is repeated frequently (at least two to three times daily) until the bird is not soaking up the mist. Outside housing can be designed so that a sprinkler "mists" the birds twice daily. This is best done in the morning and mid-afternoon. Birds should be dry before the close of the day.

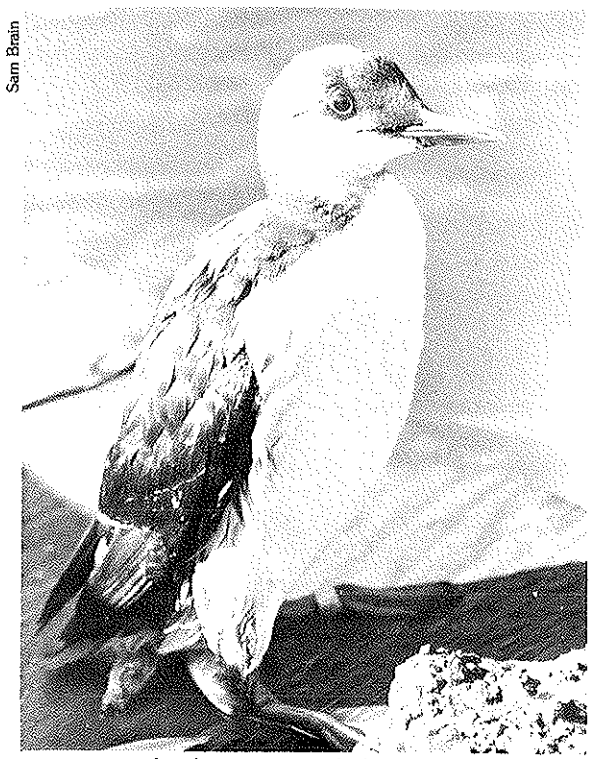
To test whether a bird that spends the majority of its life near water (such as those listed in the first paragraph) is waterproof, let it swim. Pools must be of adequate depth and width in order to stimulate swimming and yet small enough so that the birds can be re-captured by handlers. Large birds (loons, grebes, cormorants, albatross, swans, and large geese) as well as diving birds require a pool that is 15-18' in diameter with 4' sides filled to a depth of 2½-3'. Smaller birds such as some of the tubenose swimmers (petrels, fulmars, shearwaters) and surface feeding waterfowl or small geese can be waterproofed in pools that are 6-12" in diameter and 2' deep. A child's wading pool (14-16" deep) can be used for wading type birds (herons, bitterns, geese, dippers, gulls, terns, and some dabbling ducks). Even small water pans can be used for small birds such as killdeer, kingfishers, and dippers. Many birds, especially gulls and coots will tend to fly out of the pools. To prevent this, cover the pool with ½ to 1" netting. All pools should contain ramps (to facilitate entry and exit) when the pool is inside an enclosure or cage. In the standing pools a platform must be provided that floats on the surface allowing the birds to haul out and dry off.

The water in the pools must be very clean, especially the surface water that the birds swim through. Contaminants such as feces, feathers, and food will often be oily and lower the surface tension of the water. Excessive algae will do likewise. Water with a low surface tension will penetrate even the most waterproof bird!

To keep the surface layer clean it is advisable to keep this layer continually draining off. This requires a good filter system. Backyard pools can have slits cut in their liners at the upper level of the water and in this way accomplish the goal as long as fresh water is drained in at the same rate. Algal growth can be controlled by adding chlorine at ½ ppm without harming the birds. Pools must be vacuumed when they need it. Smaller pools must be emptied and scrubbed out.

Allow the bird to swim under supervision for short periods of time (3-15 minutes) and remove when the bird becomes wet and chilled. Chilled birds will shiver which may ripple the water around them. Once the bird has preened the wet feathers back into place and has dried, repeat the swim. As the alignment of the feathers improves, the bird will be able to stay in water for longer amounts of time without ill effects.

Birds who are in trouble will be less bouyant and sink down in the water lower than others who are not taking on water. A tail that hangs down in, or under, the water is usually a sign of a wet bird. These birds will try hard to leave the pool as they become more waterlogged. It is of course, imperative that they be able to do this without human assistance in the event that the person supervising the swim has been temporarily distracted.



Murre not completely waterproofed. Note the wet feathers around the leg and wings.

WATERPROOFING BIRDS

Repeated swimming in clean water is the key to improving waterproofing provided the bird also stays in a clean condition. Give birds as much swimming time as possible. Dirty birds especially those with newsprint on their feathers will not show improvement. Newsprint contains substances which can soil birds' feathers and should not be used as bedding material if it will come into direct contact with the bird. Birds that are missing feathers in certain key areas will also be unable to become waterproof. Areas to be checked closely are the cloacal region, under the wings, and the leg feathers. Remember, when birds get wet, they will be unable to maintain their body temperature in the water and rapidly become hypothermic which could lead to death.

Keeping stress to a minimum is important for the general health of the bird. Use fishing nets with long handles to catch the birds. Capture and transport to other housing should be accomplished as quietly and gently as possible. Overcrowding should be avoided to prevent fighting.

Common patients presented to rehabilitation centers with soiled feathers are pigeons and sparrows that have fallen into cooking fat leftovers, birds covered in motor oils, birds caught in oil sumps, or birds covered in crude oils as a result of spills in oceans, rivers, bays, etc. Soiled feathers must be cleaned by washing and then the birds allowed to preen to restore feather structure. The bird must be otherwise healthy and stable as washing is a stressful experience. Usual procedure dictates that birds needing washing are first examined to check stability and body temperature (102°-106°F). Birds that cannot be washed immediately are wrapped in clean towels or ponchos to prevent them from preening oil or any other contaminant on their feathers. It also prevents the birds from ingesting any contaminant.

There are various methodologies described in the literature in regard to the actual cleaning process. There is not a complete consensus yet. The following steps listed should help ensure a clean, waterproof bird. This procedure works best using a two-person team.

1. Prepare a basin with warm (103° - 106°F) water. Add enough Dawn liquid detergent to make a one percent solution. (Use 1 part Dawn to 99 parts water or 2.6 oz. Dawn to 2 gallons of water.) Add the detergent after the basin is filled so as not to have bubbles form. Measure water temperature to make sure it is still between 103° and 106°F. If the water has cooled, add enough hot water to increase the temperature to the proper range.

2. Put the bird in the basin of soapy water. Submerge the bird's body (not the head) by exerting pressure on the back of the bird.

3. Thoroughly "ruffle" the feathers under the water. Be careful not to go against the natural lay of the feathers. Special attention should be given to the area around the cloaca, the legs, and under the wings. Agitate the feathers and the water next to the feathers for at least five minutes; or until the water becomes dark and cloudy, indicating that the water has absorbed all of the oil and dirt it can. When this occurs, place the bird in another detergent prepared basin. Repeat this step until the water no longer becomes fouled. Watch the bird for signs of stress (gasping, eye closing, temperature change, limp neck or inability to hold head up in normal position etc.). If the bird shows signs of stress, stop washing and quickly rinse the bird with warm water. It can be washed again later.


Sam Brain

Thoroughly rinse the bird.

4. The head is pointed downward and washed taking care to keep detergent out of the eyes. The soapy solution can be applied with a WaterPik and the selective spray of this appliance is helpful for areas close to the eyes. The spray should not be directed into either ears or eyes. The reservoir is filled with detergent solution as previously described. The dial is set on low. Aim the nozzle up under the feathers, moving it back and forth in a tight "Z" pattern. Work from the top of the head down to the neck. Be very careful around the mouth and eyes. Another method of cleaning tenacious oil from the head is by the gentle use of a soft toothbrush. The short feathers on the head are delicate and susceptible to breakage. Sensitive areas around the beak, eyes or ears can also be cleaned using cotton balls, or Q-tips. Dip the cotton balls or Q-tips in the detergent solution and gently swab the feathers, always wiping from the proximal to distal end of the feathers.

5. Rinse the bird thoroughly with a stream of moderately forceful warm water from a spray nozzle. Use the tight "Z" pattern that is used with the WaterPik. Small birds (finches, sparrows) may in fact be rinsed with the WaterPik. Larger birds can be supported by an upturned plastic milk crate which allows the dirty water to flow away from the bird easily. Rinse the head using the method previously described for washing this area. Rinsing a medium-sized bird (murre, duck) properly will take 10-15 minutes of continuous spray. When clean, the water will bead up on the feathers and roll off leaving the feathers with a dry appearance. At this time, one should check again around the cloaca, upper leg feathers, and under the wing areas. It is very important to finish the rinse before allowing the bird to go into a drying pen (i.e., be dried with forced heat). The heat will literally bake the soap in and it will become very difficult to remove.

6. Pat the rinsed bird gently with a clean, dry towel to remove excess moisture. Do not rub against the lay of the feathers.

7. Place the bird in a clean cage. (Birds with webbed feet need protection and their feet should be coated with water soluble K-Y Jelly at this time.) Cover cage openings with a heavy towel. Position a blower-dryer set on low heat to blow into the cage. Ambient temperature in the cage should be between 90°-100°F. Check the bird every ten minutes. If the bird starts to pant, turn off the dryer. Check the bird for dryness by carefully separating feathers on the breast and looking at the down. If it is fluffy, it is dry. Also check the inner thighs, the back, and under the wings. In duck-sized birds, complete drying will take one to two hours.

8. The clean, dry bird can now have its waterproofing capabilities tested under supervised conditions. Using one of the two previously described methods, the bird can be placed into water or receive misting. Misting is mainly used as a test on birds who do not normally swim (owls, buteos, certain passerines, etc.) If the bird is in a pool, check the plumage for wetness after it has been in the water for 5-10 minutes. If the bird is not showing any signs of wetness, it can stay in the water and be further checked every 30 minutes. A fully waterproof bird will not have any wet spots after being in the water for 24 hours.

If after all of this the bird is still not waterproof, there are two options. Note if feathers in just a few areas are taking on water or if the problem is general.

1. If the problem is localized to areas under the wings, around the cloaca, where the legs meet the body, or around the crop/chest area (feeding contamination) a re-rinse can help remove soap or slight food debris. This option works best when the bird has only two to three wet spots.

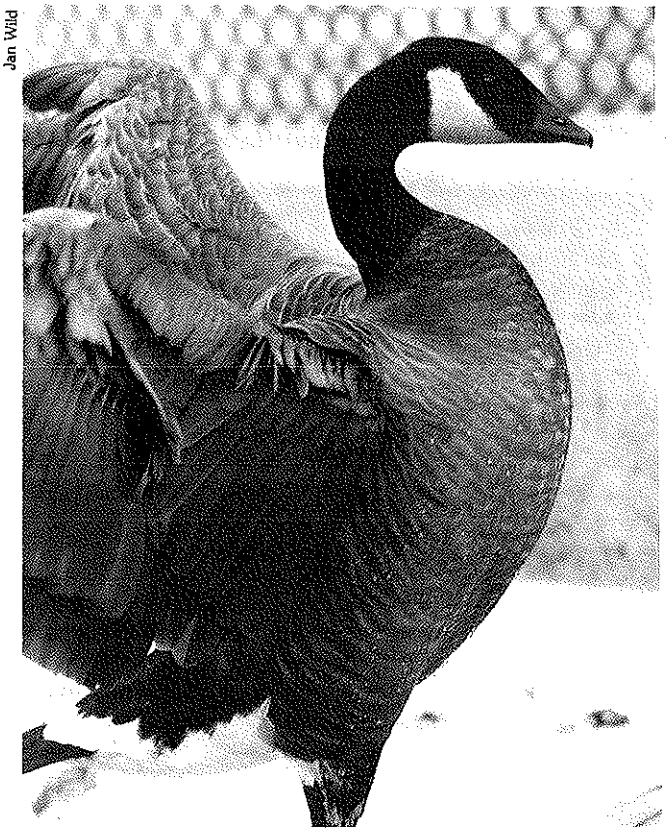
2. Complete re-washing (Steps one through eight) is called for when a bird has more than three wet spots or does not show any signs of being waterproof.

Birds that become wet or chilled during washing, bathing, swimming, or misting should be gently dried with a clean dry towel. Repeat step seven bearing in mind that birds dried with soap still on their feathers can present further challenges to clean. Remember that a cold bird usually has depressed bodily functions and should not be fed until its body temperature stabilizes. Additionally, after the wash is completed, birds can be tubed liquids prior to entering the drying pen. It is best not to present fish eating birds with oily fish at that time. Rather, dry them, swim them and then feed. In this way, a truer assessment can be made of the efficacy of the wash.

When all of these steps are followed, the bird, and its feathers, should be waterproof *(adj.) - impenetrable or unaffected by water.*

Glossary

surface tension: an open surface of a liquid is under a state of tension, causing a tendency for the portions of the surface to separate from each other; the surface thus shows properties similar to those of a stretched elastic film over the liquid. Therefore the weight of a needle floated on water makes a depression in the surface. Surface tension governs the wetting properties of liquids.



Jan Wild

A completely cleaned and waterproofed Canada Goose. Note the water beading on the chest.

Editor's Note: Pelagic birds need to have their salt tolerance reestablished if held in fresh water for more than 6-7 days. This process will be detailed in an upcoming ***Wildlife Journal*** *article by Jay Holcomb.*

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TABLE 2

CHIMNEY SWIFT DIET: PROPORTIONS OF CONSTITUENTS

INGREDIENT	WEIGHT IN GRAMS
Mealworms (50)	5.00
Hi-Pro (dry weight — three small pieces)	0.60
Yogurt	0.45
Nutri-cal	0.40
Plus Yeast	0.10
Plex-Sol C/Avimin drowning mix (1.1 cc)	1.30
Distilled water (for soaking Hi-Pro)	1.80
Total average daily consumption	9.65

TABLE 3

CHIMNEY SWIFT DISPOSITION IN TEXAS

	RELEASED	EXPIRED	TOTALS
1980-1984[1] Miscellaneous Diets			
Adults	19	15	34
Immature	76	223	299
Totals	95	238	333
Percent	29%	71%	
1983-1984[2] Substitute Diet[3]			
Adults	7	10	17 (15)[4]
Immature	71	31	102 (21)[4]
Totals	78	41	119 (36)[4]
Percent	66%	34%	
1985[2] Substitute Diet[3]			
Adults	2	2	4 (4)[4]
Immature	116	31	147 (24)[4]
Totals	118	33	151 (28)[4]
Percent	78%	22%	

[1] Statistics taken from the active Scientific Permits file, Texas Parks and Wildlife Department, September, 1985.

[2] Statistics taken from Animal Care and Research Committee Archives, Wildlife Rescue, Inc. of Austin, Texas.

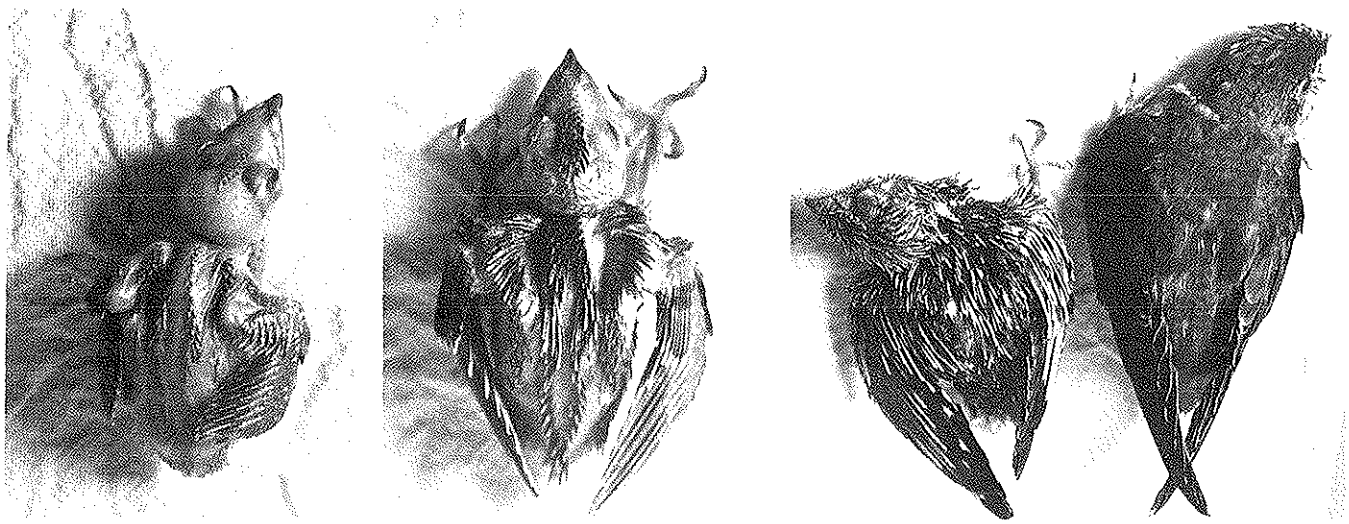
[3] Mealworms, Purina High-Protein Dog Meal, yogurt, Nutri-cal, Plus Yeast Protein Powder, Avimin, Plex-Sol C (or Avi-Con), prepared as described.

[4] Number of birds which were ill or injured when acquired.

TABLE 4

GROWTH RATE OF HAND-RAISED CHIMNEY SWIFTS
(Average of twelve individuals/five broods)

DAYS OF AGE	AVERAGE WEIGHT IN GRAMS			DEVELOPMENT
	High	Low	Average	
1	1.9	1.7	1.8	Pink, blind and naked.
2	3.0	3.0	3.0	Pin feathers begin to appear.
3	3.6	3.6	3.6	Exhibiting preening behavior.
4	4.5	4.5	4.5	
5	6.0	5.3	5.5	
6	7.2	5.9	6.7	
7	8.4	7.5	8.1	
8	10.3	9.3	9.5	Feathers begin to unfurl.
9	12.2	8.3	10.9	Feathers begin to unfurl.
10	14.7	11.4	12.7	Feathers begin to unfurl.
11	15.5	13.1	14.5	
12	18.7	13.2	16.3	
13	20.4	16.0	17.7	
14	21.0	16.6	19.5	
15	22.1	17.5	20.5	Eyes begin to open (15 to 17 days) —
16	22.9	19.0	21.0	pale, milky blue at first.
17	23.5	19.9	21.5	
18	23.8	20.0	22.0	
19	23.6	19.0	22.1	
20	24.4	19.1	22.3	Eyes have turned brown.
21	24.3	21.0	22.3	Fully feathered.
22	24.7	20.8	22.2	"Practice flapping."
23	25.1	20.3	22.3	
24	24.0	21.8	22.9	
After 24 days, the weight of each bird fluctuated greatly, and no clear pattern of growth was evident.				



Chimney Swifts from left to right, 5 - 7 days old, 10 days old, 14 days old and 21 days old.

TABLE 5

WEIGHT AND WING CORD OF HAND-RAISED CHIMNEY SWIFTS[1]

(n = 116)

WING CORD		WEIGHT	
MILLIMETERS	NUMBER	GRAMS	NUMBER
115[2]	1	16.5	3
116[2]	1	17.0	1
120	1	17.5	7
123	1	18.0	14
124	5	18.5	18
125	7	19.0	23
126	1	20.0	10
127	9	20.5	9
128	9	21.0	2
129	10	21.5	3
130	14	22.0	2
131	8		
132	11		
133	8		
134	4		
135	12		
136	4		
137	5		
138	1		
139	2		
140	1		
141	1		

[1] At the time of release, 1985.
[2] Tips of the primaries were broken off, but flight ability was adequate for release.

TABLE 6

WEEKLY ACQUISITION OF IMMATURE CHIMNEY SWIFTS: 1985

(n = 141)

	June				July				August		
WEEK ENDING:	8	15	22	29	6	13	20	27	3	10	17
NUMBER	13	6	26	24	15	2	19	22	6	7	1

Financial and technical assistance with Chimney Swift care and research were provided in part by Wildlife Rescue, Inc., Austin, Texas, and its members, Katherine A. Van Winkle, DVM, of Barton Creek Animal Clinic, Austin, Texas, and the Avian Diagnostic Lab, Texas A & M University, College Station, Texas.

Some chimney cleaning companies openly advertise bird removal, and will illegally remove nests and baby swifts from chimneys for a fee. This activity should be reported to state and federal game wardens.

This paper is a revised edition of *Care of Chimney Swifts,* copyright by Paul Kyle (1984).

experienced help.

Some groups reduce the workload by streamlining procedures and records to increase efficiency. Others may stop accepting certain non-native species (e.g., starlings, pigeons) and instead give the public generalized care instructions, or they may accept these animals and put them down. Some, in peak times, euthanize the hard medical cases opting to put their time into "orphans". In some cases, transfers can be made between organizations. Each organization finds a way that it feels most comfortable with. None, we hope, refuses animals that cannot legally be cared for by the public, i.e., species requiring a permit.

In any case, those organizations that do not respond to hard times by reducing the work load or increasing the staff, often have real stability problems, fail to grow, or even close after a period of time. Probably the hardest part of being a wildlife center director is coming to grips with the reality that individual animals who under different circumstances might be given the opportunity to attempt recovery, have to be put down in order to maintain a minimum level of care for those remaining.

Maintaining Your Staff

Maintenance of existing personnel is not a luxury. It is vital to keep experienced volunteers active, as they are the backbone of the work force and provide continuity by helping to train new people. Yet, we often forget they are here to learn as well as to work. Once they have mastered basic skills, other continuing educational opportunities need to be afforded them. These may include one-to-one demonstration of skills (many like to follow the director about, learning how decisions are made on various cases), informal rounds and general case discussion, short 15-30 minute sessions for all volunteers on various skills (e.g., immobilization techniques, bandaging, hummingbird care), and attendance at the various regional, statewide, or national conferences. Organizations can help by sponsoring a volunteer or two to these meetings. A fair and clearly understood selection process should be utilized if this is done.

Although cleaning, feeding and medicating the animals are indeed the mainstay of our work, a solid workload of nothing else will increase the turnover of experienced personnel. Since it takes at least one year to get a person trained and exposed to the seasonal caseload, it behooves us to take some time to offer learning opportunities to them.

Keeping lines of communication open, especially to *receive* feedback, is another maintenance technique common to well-run organizations. Periodic staff-volunteer meetings increase cooperation and teamwork. Take time for them and reap the dividends. Some groups offer informal social gatherings (i.e., potlucks, pool parties, picnics) to increase cooperation and teamwork. These events offer a relaxed atmosphere in which staff and volunteers can open up and communicate. Whether at a conference, pool party, or regional meeting, much wildlife rehabilitation is learned through human interaction — in addition to any lectures, papers, or demonstrations.

Effective volunteer management can enable a growing organization to keep up with both the seasonal and annual increase in workload. The key to keeping volunteers, in my experience, has been good communication (listening as well as speaking), reasonable workloads, mutual consideration for the non-rehabilitation related aspects of life, and continued opportunities to learn and grow within the field. While volunteers do not replace paid staff, in wildlife rehabilitation we find them ar invaluable asset.

Jan White

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Clinician's Corner

Measuring Blood Glucose in Avian Shock Patients

Joanne Paul-Murphy, D.V.M.
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Many avian patients presented to wildlife rehabilitation care centers are in a state of shock or have been without food for some time. Birds in the initial stages of shock will often be hyperglycemic. Their blood sugar levels then drop steadily in the middle and later stages of shock. It is important to know the blood glucose level when deciding what type of fluids these birds should be given and by what route.

To determine a bird's need for glucose a simple test using a reagent strip may be used. Several brands can measure blood glucose levels high enough to record avian values. Chemstrip:bG (Bio-Dynamics Boehringer Mannheim Co.) or Visidex II (Ames Division, Miles Laboratories) are two such products.

Normal blood values for the avian patient are approximately 240 mg/dl. If the blood glucose level is between 150-240 mg/dl, then oral glucose solutions can be relied on to supply energy. If below 150 mg/dl, the glucose solution should be given subcutaneously (SQ) or intravenously (IV). If given subcutaneously or orally, they should be of a strength no greater than 2½%. Values that are between 400 and 800 mg/dl are considered too high.

Hypertonic glucose solution (i.e., greater than 2½%) given orally can promote further dehydration due to an osmotic effect drawing fluid into the gastrointestinal tract. Therefore, fluid therapy is essential if this route is chosen. The oral uptake of solid food is inhibited by hypothermia so it is best to wait 12-24 hours after supportive care (including fluid therapy) before giving calories in this way. Oral feeding of liquid diets (i.e., tube mixes) should be done only after the bird has received fluids and warmth and is in a stable condition.

Table 1

BLOOD GLUCOSE LEVEL	FLUIDS/ROUTE OF ADMINISTRATION
< 150 mg/dl	5% Dextrose IV or 2½% SQ
150-240 mg/dl	2½% Dextrose oral
400-800 mg/dl	no Dextrose in fluids



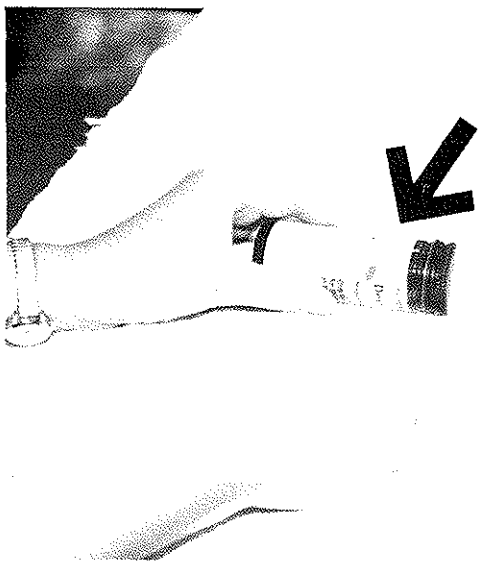
1. Blood (0.05-0.10cc) can be obtained from a metatarsal vein.



2. Small birds can be sampled by clipping a toenail.



3. One drop of blood is placed on the reagent strip and rinsed after the appropriate time interval.



4. Read the strip by comparing it to the chart on the reagent bottle.

Book Review

The American Hunting Myth

Ron Baker

Vantage Press, New York, NY

287 pp., 1985, $10.95

In the late 1960's Ron Baker began to crusade for animals and the environment. Now he is vice-president of the New York-based Committee to Abolish Sport Hunting. This hard-bound book is his step-by-step condemnation of both recreational hunting and current wildlife management practices.

The American Hunting Myth is composed of three sections. Part One discusses the "political basis" of wildlife management and its evolution into "wildlife exploitation". Many examples are given to support the author's contention that wildlife management, as currently practiced in the United States, is an illogical system maintained only to benefit state or federal departments or commissions by the sale of fishing and hunting licenses and sporting goods.

In Part Two, the author inventories arguments commonly used to justify or defend sport hunting and wildlife management. After each "Hunter's Argument" Mr. Baker writes his analysis. There are quotes from unnamed sources, excerpts from published and unpublished reports, and partial quotes from newspaper and magazine editorials and articles. Each quote supports Mr. Baker's antihunting point of view.

Part Three is concerned with the effect hunting has on society and why hunting continues to be a sport in the United States. Mr. Baker offers his opinions on these topics and suggests ways in which hunting can be overcome and wildlife management changed. The Appendix is a continuation of Part Three and discusses how an individual can become a "wildlife protectionist".

The index provides a welcome reference. Not many books of this nature are indexed so thoroughly. Included besides the standard names and places are theories, publications, and a few rather unusual listings such as "Student opposition to wildlife management indoctrination at colleges and universities." Another unusual feature is the listing of the titles of an author's books under the author's name. It should also be noted that the author does recommend that people who find injured or orphaned wildlife seek the services of a wildlife rehabilitator.

A conscientious reader might also wonder about Mr. Baker's response to the question, "If we are to behave ethically toward animals. . . how far down the evolutionary scale do we go?" Mr. Baker replied, "Certainly we should include mammals. They are very intelligent and belong to the zoological group that includes our species. . .many species of birds also display signs of great intelligence. . .So, at least warm-blooded creatures, birds and mammals, would receive ethical consideration. The ethical treatment of reptiles, amphibians, and fish would be more difficult to justify." Mr. Baker claims to be an animal activist, but apparently only for animals that are intelligent and warm-blooded.

Kirstine M. Thorne
Wildlife Biologist